Office of Enterprise Assessments
Assessment of the West Valley Demonstration Project Work Planning and Control Program

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Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
ACM	Asbestos-Containing Material
AHA	Activity Hazards Analysis
AIHA	American Industrial Hygiene Association
ALARA	As Low As Reasonably Achievable
BTZ	Beyond Target Zero
BZA	Breathing Zone Air
CAM	Continuous Air Monitor
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CHBWV	CH2M HILL BWXT West Valley, LLC
CRAD	Criteria and Review Approach Document
D&D	Decontamination and Decommissioning
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DOE-WVDP	DOE West Valley Demonstration Project
EA	Office of Enterprise Assessments
ECP	Employee Concerns Program
EDR	Equipment Decontamination Room
EM	Office of Environmental Management
FR	Facility Representative
FY	Fiscal Year
IAS	Integrated Assessment Schedule
IH	Industrial Hygiene
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
IWP	Industrial Work Permit
JSA	Job Safety Analysis
LOI	Line of Inquiry
LOTO	Lockout/Tagout
MWV	Management Workplace Visit
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
OITS	Open Items Tracking System
PFP	Plutonium Finishing Plant
PM	Preventive Maintenance
POD	Plan of the Day
PPE	Personal Protective Equipment
RCT	Radiological Control Technician
RHWF	Remote Handled Waste Facility
RWP	Radiological Work Permit
SAC	Safety Assessment Center
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SOTW	Skill of the Worker
STSM	Senior Technical Safety Manager
TRU	Transuranic
TWD	Technical Work Document
WCD	Work Control Document

WIP	Work Instruction Package
WP&C	Work Planning and Control
WPA	Waste Processing Area
WVDP	West Valley Demonstration Project

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C), and selected elements of the contractor assurance system (CAS) and feedback and improvement at the West Valley Demonstration Project (WVDP) operated by CH2M HILL BWXT West Valley, LLC (CHBWV). Work activities were observed within the Waste and Site Operations Division, the Strategic Operations and Facility Disposition Division, and the maintenance organization which resides within Balance of Site Facilities decontamination and decommissioning (D&D) division. EA also evaluated DOE West Valley Demonstration Project (DOE-WVDP) oversight. This assessment was conducted within the broader context of a series of targeted assessments of WP&C at sites across the DOE complex. EA conducted the onsite portions of this assessment June 18-21 and July 9-12, 2018.

CHBWV has appropriate requirements documents to govern implementation of WP&C processes. Work evolutions observed by EA were generally performed within established controls, and followed the appropriate hierarchy of controls. Plan of the Day meetings and the use of mock-ups as part of WP&C were particularly effective. Workers and supervisors that EA observed and/or interviewed were not hesitant to stop/pause work as appropriate, and exhibited a questioning attitude at several pre-job briefings and work evolutions. Radiological air sampling was robust, including continuous air monitors, representative job specific air sampling, and personal breathing zone air sampling.

However, the WP&C process does not integrate industrial hygiene (IH) subject matter experts in the development of work control documents. CHBWV has not implemented an adequate IH exposure assessment process. Most work tasks observed by EA had limited or no IH sampling or monitoring data to assess worker exposures. In addition, EA identified weaknesses related to the lack of an effective WP&C mechanism for the identification and documentation of all task-specific hazards, and an inadequate WP&C process that does not ensure discrepancies between radiological and industrial work permit hazards and controls are resolved. Also, in some cases controls were not identified, properly implemented, or were conflicting. EA observed one example of a maintenance activity where work was not planned and performed in accordance with established WP&C processes.

The CAS related to WP&C has adequate procedures for assessment of planning and performance, and operational awareness activities. Lessons-learned information is provided to all levels of the organization through multiple mechanisms, and is generally incorporated into the work planning process. CHBWV conducted multiple audits and internal and external reviews of WP&C within the last two years. However, these assessments were not sufficiently rigorous to be able to identify and address the types of WP&C issues identified during this assessment. Additionally, work control feedback mechanisms are not always used, and feedback information that is supplied is not consistently provided to the Work Authorization Manager in a timely manner.

Overall, DOE-WVDP has developed and implemented appropriate processes for oversight of WP&C through assessment planning and performance, issues management, and performance assurance analysis. Enhanced operational awareness mechanisms implemented since February 2018 represent an improvement in real-time understanding of WP&C during high-risk D&D activities and emerging safety issues. However, DOE-WVDP oversight did not identify the weaknesses in the IH program and its integration into all aspects of WP&C activities, and the technical qualification and employee concerns programs have not been adequately implemented.

Office of Enterprise Assessments
Assessment of the West Valley Demonstration Project
Work Planning and Control Program

1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the work planning and control (WP&C) program at the West Valley Demonstration Project (WVDP). EA performed this independent assessment in consideration of the former Deputy Secretary's response to the Defense Nuclear Facilities Safety Board (DNFSB) letter and technical report DNFSB/Tech-37, which included a commitment to enhance Federal oversight of activity-level WP&C. Additionally, the WP&C program assessment is within the broader context of EA's targeted assessments of programs at DOE sites that have high-consequence activities or whose performance may present significant risks, in accordance with DOE Order 227.1A, *Independent Oversight Program*. EA conducted the onsite portions of this assessment June 18-21 and July 9-12, 2018.

2.0 SCOPE

EA conducted this assessment in accordance with the *Plan for the Office of Enterprise Assessments Assessment of the Work Planning and Control Program at the West Valley Demonstration Project Site, June – July 2018*. This assessment evaluated the effectiveness of CH2M HILL BWXT West Valley, LLC (CHBWV) implementation of the integrated safety management (ISM) core functions (define scope of work, identify and analyze hazards, identify and implement controls, perform work safely within controls, and feedback and improvement) with respect to WP&C implementation in operations that contain physical, chemical, and radiological hazards at the WVDP site. This assessment also included an evaluation of elements of the CHBWV contractor assurance system (CAS) and feedback and improvement program, as well as the DOE-WVDP processes for oversight pertaining to WP&C activities.

3.0 BACKGROUND

WVDP is an environmental remediation project at the site of a former commercial nuclear fuel reprocessing center. The site reprocessed approximately 640 metric tons of fuel, generating a significant quantity of usable uranium and plutonium, and approximately 660,000 gallons of liquid high-level waste. Operations were shut down in 1972 for facility modifications and have never resumed. Since the passage of the West Valley Demonstration Project Act in 1980, the site has been a cleanup project managed by the DOE Office of Environmental Management (EM) through its field element, DOE-WVDP. In 1983, vitrification was selected as the method for solidifying the high-level waste. The vitrification process was completed in 2002, resulting in 278 stainless steel canisters of solidified high-level waste, which are now in storage at the site for future transport to a disposal facility.

The current mission includes deactivation and demolition of the facilities and equipment used in the original reprocessing and subsequent vitrification operations. The mission also includes processing, packaging, and shipping off site for disposal legacy waste (previously generated waste in storage) and newly generated waste from current activities. The waste includes low-level waste, mixed low-level waste, and industrial waste generated at WVDP. The site covers approximately 200 acres, about 150 of which is contained within a fenced security perimeter, and the current CHBWV workforce is approximately 300 employees.

Since August 2011, CHBWV has been the contractor performing the decommissioning work on the site. The contract scope of work includes relocation of 56 high-level waste canisters from the plant into shielded casks for outdoor storage (completed), demolition and disposition of the main plant equipment and facilities, ongoing site operations and maintenance, and waste management. This work involves operations in areas with significant radiological hazards, such as high levels of removable radioactive contamination and elevated dose rates, as well as occupational safety and industrial hygiene (IH) hazards.

4.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A. EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms "deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for the deficiencies identified as findings. Other important deficiencies not meeting the criteria for a finding are also highlighted in the report and summarized in Appendix C. These deficiencies should be addressed consistent with site-specific issues management procedures.

As identified in the EA assessment plan, this assessment considered requirements based on selected objectives and criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, Appendix D, *Activity-Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*. EA also selected objectives and criteria from sections of EA Criteria and Review Approach Document (CRAD) EA-32-03, *Industrial Hygiene Program Criteria and Review Approach Document*; CRAD EA-45-35, *Occupational Radiation Protection Criteria Review and Approach Document*; and CRAD EA-30-01, *Contractor Assurance System*, as well as selected feedback and improvement criteria from DOE Guide 226.1-2A. EA used elements of CRAD 45-21, *Feedback and Continuous Improvement Assessment Criteria and Approach – DOE Field Element*, to collect and analyze data on DOE-WVDP oversight activities related to WP&C.

EA examined key documents, such as work packages, procedures, analyses, policies, training and qualification records, and numerous other documents. EA also conducted interviews of key personnel responsible for developing and executing the associated programs; observed maintenance, waste operations, construction, and decommissioning activities; and walked down significant portions of the WVDP facilities. The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed, personnel interviewed, and observations made during this assessment, relevant to the findings and conclusions of this report, is provided in Appendix B.

EA has not conducted a recent assessment of WP&C at WVDP. Therefore, there were no items for follow-up during this assessment.

5.0 RESULTS

5.1 Work Planning and Control Program

Objective:

The Organization has developed and approved WP&C processes to enable safe performance of work. (DOE Guide 226.1-2A, Appendix D, Objective WP&C1-1, Criteria #3 and 6)

The Organization has established a management and organizational framework for (1) initiating, analyzing, planning, and approving activity-level work and (2) authorizing, releasing, and safely performing activity-level work. (DOE Guide 226.1-2A, Appendix D, Objective WP&C1-4, Criterion #5)

Two overarching WP&C documents govern work control and hazard analysis at WVDP: WVDP-485, *Work Control*, and WV-921, *Hazard Identification and Analysis*. In general, these documents provide an adequate framework for proper implementation of the five core functions of ISM.

An effective element of the WP&C process was the number and frequency of work planning meetings during the design and preparation for complex and high-hazard work activities. Typically, the depth, breadth, and number of such work planning meetings, including pre-job briefings, tabletop work activity reviews, and project design reviews, were commensurate with the work scope complexity and hazards of the work activity. For example, in preparation for removal and size-reduction of the Vitrification Building shield door, a series of work planning meetings was held by hoisting and rigging specialists to configure the mechanisms for removing and staging the 200,000 pound shield door, followed by a meeting of radiological, IH, and safety SMEs to identify hazards and hazard controls for each stage of the work activity.

Another positive attribute of the WP&C process is the incorporation of mock-ups in the work planning process for complex and hazardous work evolutions. On several occasions, EA observed that mock-ups were staged as an element of work planning to reduce the likelihood of errors, and improve efficiency and worker safety. For example, a dry run of the exothermic cutting (Oxylance^{TM}) and size reduction of the Vitrification Facility shield door, using a carbon steel replica, improved the planning and execution of the work. Mock-ups were also used to validate hazard controls for the movement of the dissolver into the Remote Handled Waste Facility (RHWF) and the ventilation exhaust cell dismantlement.

EA identified programmatic weaknesses with respect to activity-level hazard analyses, inconsistencies between radiological work permits (RWPs) and industrial work permits (IWPs), and integration of elements of the IH program into WP&C. Each of these aspects is described in the following paragraphs.

The WP&C hazard analysis process consists of three primary mechanisms for defining job-specific hazards: (1) the *Activity Hazards Analysis (AHA) Form* WV-3909, which is implemented through WV-921; (2) various safety permits, especially the IWP, as described in SHIP-201, *Industrial Work Permits*, and the RWP described in WVDP-010, *WVDP Radiological Controls Manual*; and (3) the job safety analysis (JSA) process described in the Safety and Health Implementing Procedure (SHIP-108, *Job Safety Analysis*). The AHA process is primarily a screening tool, the implementation of which does not result in the task-specific breakdown of work steps and identification of all task-specific hazards and controls, as called for in WV-921. These issues are particularly relevant to complex and higher risk work activities, such as in the demolition of the Vitrification Facility. (See Section 5.2 for examples.) The IWPs, which were developed for most of the work activities observed by EA, provide a greater level of specificity of hazard controls for a given work activity, but they do not provide a mechanism for identifying all task-specific hazards, particularly for complex, higher risk and longer duration work activities in which the

hazards and controls may change as the work activity progresses. Furthermore, an IWP is not required when the work activity is performed using standard operating procedures (SOPs). While the JSA process provides an adequate mechanism for identifying activity-level hazards and controls, it is not used for complex, hazardous activities and, during this assessment, was only used for a few maintenance activities. CHBWV indicated that the use of JSAs was largely discontinued, in lieu of the other mechanisms described above, and not being maintained. Additional examples of unclear task-specific hazards or task-specific hazards not being identified are provided in Sections 5.2.1 and 5.2.2. (**Deficiency**)

CHBWV also lacks a systematic WP&C process that ensures that any discrepancies between RWP and IWP hazards and controls are reviewed and resolved, as required by WV-921. The IWP is intended to identify non-radiological (e.g., safety and IH) hazards and controls, whereas the RWP is intended to address radiological hazards and controls. However, most work activities observed by EA involved both non-radiological and radiological hazards, so both IWPs and RWPs were included in the WCDs. In several observed work evolutions, hazard controls within the IWP were unclear, conflicting, or unnecessary based on controls in the RWP. (See Section 5.2 for examples.) (**Deficiency**)

The WP&C process is not effective in ensuring all IH hazards are identified, analyzed, controlled, and effectively communicated to workers, as required by 10 CFR 851 and CHBWV procedures. Specific elements of the WP&C process that are deficient with respect to integration and performance of IH in the work control process are discussed below. (See **F-CHBWV-WPC-1**.)

- The WP&C process does not include effective mechanisms for involving IH professionals (SMEs) in the WP&C planning process, contrary to the requirements of WVDP-485. IH SMEs are not required to review or approve WCDs involving IH hazards. For example, of the IH discipline areas listed in AHA Form WV-3909, such as heat stress, noise, chemical hazards, ergonomics, and airborne hazards from welding fumes, none of these hazards (when checked as applicable to the work activity) require a review by an IH SME and IH is not required to approve WCDs (WIPs or SOPs) involving such hazards and controls. An IH SME may be involved in reviewing WCDs, at the discretion of the safety technicians; however, there is no documented process for involving IH SMEs in the hazards identification, analysis, and control selection process. At the time of this EA assessment, CHBWV was supported by five safety technicians, a safety technician supervisor, and a safety engineer, but only one part-time certified industrial hygienist. The lack of sufficient IH SME resources and the absence of an effective mechanism for involving IH SMEs in the WP&C process has resulted in IH SME involvement often being more reactive than proactive. For example, the WIP for grouting boxes for the 3C-1 dissolver in the RHWF identified dermal hazards associated with a grout spill and recommended vinegar as an antidote. The initial involvement of the IH SME in this activity was late in the work planning process, (i.e., at the commencement of the field work activity and after the pre-job briefing). The subsequent IH review indicated that the use of vinegar was not the most appropriate control, resulting in a revision to the WIP and potential work delays.

- CHBWV has not implemented an IH exposure assessment process using recognized exposure assessment methodologies. Title 10 CFR 851 Appendix A.6(a) requires the performance of "initial or baseline surveys and periodic resurveys and/or exposure monitoring as appropriate of all work areas or operations to identify and evaluate potential worker health risks." In 1995 an initial baseline survey was performed of WVDP, but that survey has not been updated to reflect the current hazards associated with demolition activities. Title 10 CFR 851.21(a)(2) requires "documented assessments for chemical, physical, biological, and safety workplace hazards using recognized exposure assessment and testing methodologies." In addition, the lack of an exposure assessment and sampling/monitoring (when necessitated by the exposure assessment) limits the Occupational Medical Provider's ability to evaluate any occupational illnesses that arise. Although WVDP-585 and SHIP-105, *Industrial Hygiene and Safety Hazard Control Program*, identify the intent to meet

these requirements, CHBWV has not developed or implemented a process for conducting IH exposure assessments using recognized exposure assessment methodologies, such as those established by the American Industrial Hygiene Association (AIHA) and described in the AIHA publication *A Strategy for Assessing and Managing Occupational Exposures*. (See **OFI-CHBWV-1**.)

- Most of the work tasks EA observed have limited or no IH sampling or monitoring data to assess worker exposures, and lack a documented IH exposure assessment that explains the basis for not sampling or monitoring workers' exposures, as required by 10 CFR 851.21(a)(1); 10 CFR 851, Appendix A.6 (a); Section 5.0 of the CHBWV procedure on *Industrial Safety Standard Sampling Methods* (SHIP-207); and Section 3.0 of the *Industrial Hygiene Safety and Hazard Control Program* (SHIP-105). For example, laborers and heavy equipment operators involved with the demolition of the concrete Vitrification Facility are potentially exposed to airborne silica. However, there has been no airborne sampling of respirable silica for these workers, nor is there a documented exposure assessment indicating the basis for not sampling. Similarly, there is no documented exposure assessment or IH sampling data of airborne chemicals for workers involved with grouting and painting work for the dissolver in the RHWF. Based on interviews with CHBWV management, safety staff, and workers, as well as review of a number of work documents, the general consensus is that since personal protective equipment (PPE) is assigned to control the radiological hazard, which is often present with the IH hazard, the equipment would be sufficient to address the IH hazards and, therefore, an IH exposure assessment and/or sampling and monitoring is unnecessary. While EA concurs that the radiological PPE may be sufficient in certain work activities to control the IH hazards, the presence of the radiological controls does not preclude the necessity of identifying and analyzing the IH hazards, assessing the potential IH exposures and health risks, and ensuring that the appropriate hazard controls are identified and implemented for the IH hazards, as required by 10 CFR 851 and the WVDP Integrated Safety Management System (ISMS) Description.

- There are no effective work control mechanisms to ensure that hazard control recommendations provided by the IH SME are incorporated into WCDs as required by Section 4.9 and 5.4 of WVDP-485. For example, SOP 313-14, *RHWF Waste Sorting*, occasionally involves the use of a plasma arc cutter in the RHWF work cell, which results in a potential eye hazard to workers outside the work cell from the cutting arc. On March 16, 2017, the IH SME prepared a "white paper" addressing this hazard and identified seven hazard control recommendations, such as the use of welding curtains, maximizing the distance of viewing, providing warning signs, advising safety if using higher amperages, and wearing safety glasses with a tint of at least 3. The work planner was not aware of the white paper, since such documents are not incorporated into the WP&C process, and only the recommendation of safety glasses (minus the tint requirements) was included in the SOP and implemented.

- The WP&C process assigns planning of work involving IH hazards to individuals who may not have sufficient IH training and expertise in industrial hygiene (e.g., safety technicians), resulting in occasional missed or inappropriate IH controls. Title 10 CFR 851 Appendix A.6(e) requires "professionally and technically qualified industrial hygienists to manage and implement the industrial hygiene program." Section 3.2.3 of the WVDP Industrial Hygiene and Safety Manual states "ensure workers are properly trained and qualified for work assigned to them." As indicated previously, safety technicians routinely evaluate IH hazards and establish IH hazard controls in WCDs without a WP&C requirement for involvement of an IH SME. CHBWV employs safety technicians with considerable radiological and safety experience, and provides focused, but limited, training and on-the-job training on a variety of IH instruments. However, with respect to the wide diversity of IH tasks at WVDP, CHBWV has not clearly defined the roles and responsibilities of the safety technicians, safety engineer, and IH SME. Furthermore, EA observed that the assignment of safety technicians/engineers without involvement of an IH SME, in a few cases, has resulted in work

performance concerns. For example, during a recent IH sampling event associated with the exothermic cutting (Oxylance™) of the Vitrification Building steel door, an error was made by a safety technician on the sample chain-of-custody form, where the sample flow rate was entered on the form in lieu of the sample volume. As a result, the laboratory calculated and reported the incorrect worker exposures for the event.

- EA identified that the noise exposure data communicated to workers on the "Employee Physical Exposure Report" did not include noise exposures based on American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs), only Occupational Safety and Health Administration permissible exposure limits, and some data was not corrected for employees who worked extended shifts (i.e., more than eight hours). The hazard controls in the CHBWV procedure on the *Hearing Conservation Program* (SHIP-210) are based primarily on noise exposures assessed only with respect to the ACGIH TLVs on noise; however, such exposures are not reported to workers, contrary to the requirements of Section 5.1.7 of this procedure.

Work Planning and Control Program Conclusions

Overall, the WP&C procedures provide an adequate framework for implementing the five core functions of ISMS, particularly for complex and/or high-hazard work activities. An element of the WP&C process that is significant to the successful completion of work in a safe and timely manner is the number, frequency, and types of work planning meetings that are effective in identifying work scope and hazard controls, and in resolving issues with respect to high-hazard and complex work activities. In addition, the integration of mock-ups and dry-runs into the work control process is particularly effective. Of most significance, however, is the lack of adequate mechanisms for identification, analysis, and integration of IH hazards and controls into the WP&C process. EA also identified WP&C programmatic issues with respect to identification and documentation of task-specific, activity-level hazards and some conflicting information between RWPs and IWPs.

5.2 Work Planning and Control Implementation

5.2.1 Waste and Site Operations and Strategic Operations and Facility Disposition Divisions

EA observed ongoing work activities within two CHBWV divisions; Waste and Site Operations, and Strategic Operations and Facility Disposition. Waste and Site Operations manages low-level radioactive waste and transuranic (TRU) waste packaging, storage, transportation, and disposal, while the Strategic Operations and Facility Disposition Division manages and implements all site decontamination and decommissioning (D&D) activities including facility deactivation and demolition. All observed work evolutions also included support from SMEs and technicians from the Environmental, Safety, Health and Quality Division.

Objective:

The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-1, Criteria #2 and 3)

The Waste and Site Operations and Facility Disposition work evolutions that EA observed during this assessment were governed by WIPs and/or SOPs. The scope of work defined in the WIPs and SOPs was generally sufficient to permit identification of most hazards and mitigating controls. (An exception is discussed in the programmatic section 5.1 above.) The project with the largest work scope that EA reviewed was the Vitrification Facility demolition, which is governed by WIP W1601472, *Vitrification*

Plant Demolition. The actual building demolition is governed by a Building Demolition Plan containing sequencing specifications for various sections of the building to be demolished, and was sufficiently detailed to permit identification of hazards associated with the work.

Some observed work was considered routine and governed by an SOP. For example, a TRU waste processing evolution in the Waste Processing Area (WPA), involving neutralization of acidic liquid TRU waste, was governed by SOP-09-38, *TRU Waste Processing*. Another TRU waste processing campaign to inspect and sort TRU waste in the WPA required the use of a WIP (WIP W1802702, *Process TRU Waste in WPA*) due to high radioactivity content. It should be noted that the use of SOP 09-38 for some wastes versus a specific WIP for other wastes contributed to the lack of required As Low As Reasonably Achievable (ALARA) reviews for this work, which is further discussed later in this section.

Objective:

All hazards that could adversely impact workers, the public, the environment, and the facility and its equipment are documented and analyzed for severity/significance. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-2, Criteria #2, 4, 5, 7, and 8)

Most Waste and Site Operations and Facility Disposition work observed was performed using WIPs, in which the AHAs were appropriately accompanied by IWPs, RWPs, and other permits and supporting hazard identification and analysis documents. For example, hazards associated with the equalization basin and associated equipment demolition work (WIP W1703806, *Equalization Basin and Associated Equipment Demolition*) were generally well documented within the WCDs associated with this work activity. Radiological and industrial/health hazards were sufficiently documented on RWPs and IWPs. In the preparation of the IWP, the safety technician supplemented the hazards and controls checked on the IWP form with a number of special instructions that further explained the hazard and/or control. The IH SME had prepared a negative exposure assessment that sufficiently documented and analyzed the potential silica hazard for this work activity. In addition, general hazards were identified on the pre-job briefing checklist.

The AHA process was applied to all Waste and Site Operations and Facility Disposition work activities observed by EA, and WV-3909 AHA forms were included in the WCDs. However, as discussed in Section 5.1, the AHA did not result in the identification of task-specific work hazards. Most Waste and Site Operations and Facility Disposition work activities were accompanied by an IWP, RWP, and one or more specific safety work permits (e.g., hot work permit), which provided a useful, but not always complete, level of activity-level hazard analysis, particularly for complex, higher hazard, and longer duration work activities. The hazard analysis process, as implemented, does not link hazards and controls to specific work evolutions within a complex, longer duration work activity. As a result, for a specific work evolution, it is not always clear which specific hazards and controls listed within the WCDs (e.g., IWP) apply to that work evolution, if any. For example, noise producing equipment such as power tools and fall hazards such as ladder use are not required in all tasks or work steps that comprise the overall scope of work, and the WCDs address the controls as if they do.

Work performed using SOPs had the least documented activity-level hazard analysis, particularly for non-radiological hazards, since IWPs were not prepared for SOPs. Section 5.2.3 of WVDP-485, *Work Control*, describes the use of SOPs as a WP&C process for repetitive operations, and/or where the complexity of the task requires detailed instructions. The procedure states that for SOPs, the hazard analysis is performed in accordance with WV-921 and hazard mitigations are included directly in the SOP or in permits required by the SOP. EA observed that for work performed by SOPs, a number of hazard mitigations or hazard controls were incorporated into SOPs, but the hazards for which the controls were

intended were not documented in an IWP and were not always clear (e.g., *RHWF Waste Sorting Procedure* (SOP 313-14)). Also see the first WP&C programmatic deficiency in Section 5.1.

EA also observed a few activities that used WIPs in which some of the activity-level hazards were not sufficiently identified, analyzed, and/or documented. **(Deficiency**) For example:

- Potential worker (laborer and heavy equipment operators) exposures to respirable silica from the demolition of the concrete structure of the Vitrification Facility have not been sampled or analyzed, nor has an IH exposure assessment been performed (see Section 5.1).

- Potential inhalation and dermal hazards to workers from exposures to grout and paint while grouting boxes in the RHWF buffer cell and receiving cell (WIP #W1802234) have not been analyzed.

- Potential worker exposures to noise and dermal (wet fixative) hazards while emptying the waste box 3C-1 in the RHWF buffer cell (WIP # W18017777) have not been documented.

Objective:

Controls are identified and implemented that effectively protect against identified hazards and approved activity-level work control documents can be performed as written. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-3, Criteria #2, 3, 4, 5, 6, 7, and 8)

Engineered controls, such as remote handling, containments, and local ventilation, were extensively and appropriately used to mitigate many hazards associated with D&D work. During all observed Waste and Site Operations and Facility Disposition work evolutions, EA noted the appropriate hierarchy of controls with principal emphasis on engineered controls, followed by administrative controls, and lastly PPE when needed. For example, the WPA is an engineered enclosure designed for safely opening and processing/repackaging waste materials. Safety features include negative ventilation, such as elephant trunk suction that can be positioned close to open container tops, and continuous air monitoring inside the enclosure and entry and egress airlocks. A count room is also located close by with handheld and automated proportional counting equipment for analysis of smears collected during work evolutions. Similarly, the shielded work cell at the RHWF provides a means for remotely handling and reducing the size of components that are highly radioactive, and provides a means for reducing worker exposures to airborne welding and cutting gases.

The potential for airborne radioactivity hazards is prevalent during much of the work at WVDP. Air sampling was appropriately implemented using various techniques including fixed air samplers, continuous air monitors (CAMs), job-specific low and high volume air samplers, and personal breathing zone air samplers (BZAs). In addition, the Vitrification Facility demolition work has continuous supplemental air sampling that is designed to detect any elevated airborne activity through a network of boundary air samplers, including 4 CAMs with real-time readouts, and 13 perimeter air samplers that are checked periodically during demolition work.

Despite these positive observations, EA identified several examples where controls were not identified and/or implemented, or consistent in IWPs and RWPs for the same work. (**Deficiency**) These examples included:

- During Equipment Decontamination Room (EDR) waste packaging work under WIP W1801762, *CPC/CCR Waste Cleanup and Removal* a pre-use crane inspection required by SOP 15-56 and/or SOP 03-13 was not performed. There were indications based on discussions and crane inspection

logbook entries that this was not an isolated example. The most recent entry in the EDR pre-use crane inspection logbook was from 2017. Also, while the IWP identified a hoisting and rigging hazard, it required Checklist WV-2180, *Pre-Lift Checklist*, which is for planned lifts and was not applicable to the observed EDR crane use.

- In the Vitrification Facility demolition WIP (WIP 1601472), the respiratory protection requirements are identified in both the IWP and RWP documents (IWP # 108132 and RWP # 2018-5001.2). The respiratory hazards for the radiological work were well documented. However, the IWP did not specify, and the workers and safety technicians involved could not identify, the non-radiological hazards that necessitated the respiratory requirement on the IWP. The RWP only required a particulate cartridge, which would not be adequate for some non-radiological hazards. Other examples include IWP 107886 for TRU liquid waste processing and IWP 108067 for RHWF buffer cell work, where Special Instruction 3 (SI-3) and/or SI-5 required safety glasses despite the RWP requirement for a full face respirator. These IWPs also required Kevlar gloves when working with sharp objects, but the RWPs required two pairs of anti-c gloves. Neither permit described the proper use or positioning of the Kevlar gloves in addition to or instead of the anti-c gloves. Similar examples were noted in other IWPs and RWPs governing work.

- The WIP for excavation at the EQ Equalization Basin/Tank provides an administrative control to stay 20 feet from the edge of the excavation on the peninsula area, but there are no field controls (e.g., warning line) to ensure that this administrative control is followed.

- There were isolated examples where BZA sampling required by the RWP was not performed (RWP 2018-3016.1 for EDR work and RWP 2018-2010.1 for buffer cell entry).

- A radiological control technician (RCT) and Decontamination and a Decommissioning/Waste Operations operator working on a one-story, low-slope roof were exposed to fall hazards. They were observed not using the fall protection PPE in a manner to prevent a fall and from impacting the ground during a fall. The work package included form WV-3066 Fall Hazard Prevention Analysis (FHPA), which prescribed a fall restraint system, which is intended to prevent the worker from reaching the edge of the elevating working surface. The prescribed system in the work package included a full body harness, 20-foot retractable lanyard, and an extension ladder. However, the workers additionally were using a "Sofshock" shock absorber, which is typically used in a fall arrest system and not in a fall restraint system. The form did not document that the planned restraint system used was of the appropriate length to prevent a fall, or alternatively did not calculate fall clearance and swing travel distances. The competent person (CP) who performed the FHPA, and signed off on the Form WV-3066, did not brief the workers on the fall hazard system to use, as required per SHIP-224, *Fall Protection*.

EA also identified a concern with proper linkage of RWPs to technical work documents (TWDs) such as WIPs and SOPs, requirements for conducting ALARA reviews, and ineffective radiological SME review and approval of a work instruction, as described below:

- RWPs assigned to govern multiple work evolutions were not effectively linked to all the specific TWDs that they were assigned to control, as called for in RC-ADM-6, *Radiological Work Permits*, which has a field for listing all the TWDs that are covered by the RWP. In these cases, TWDs were collectively listed as "WIP" or "SOP," without defining which TWDs were included. The lack of specific linkage of RWPs to authorized TWDs is not consistent with RC-ADM-6 and represents a potential vulnerability in ensuring that workers can verify and sign onto the correct RWP. A similar concern was also identified in the 2014 Office of Enterprise Assessments Report entitled "*Review of*

the West Valley Demonstration Project Radiological Controls Activity-Level Implementation." (See **OFI-CHBWV-2**.)

- A formal ALARA review for TRU waste processing was not conducted as required, in part because of an allowance to exempt "routine" work, including work performed to an SOP, from formal ALARA reviews, even when radiological conditions exceed the ALARA review contamination trigger levels specified in WVDP-010, *WVDP Radiological Control Manual*. Article 312, Item 3C of this manual only requires formal radiological review for "non-routine" work, and the observed liquid TRU waste processing was considered "routine" because it was governed by an SOP. However, WV-984, *ALARA Program*, Section 9.4.1, requires all TWDs, including SOPs, to be part of the ALARA review process, an apparent conflict with WVDP-010. In addition, both WV-984 and RC-ALAR-7, *ALARA Review of Work Instructions*, provide examples of "routine tasks" being "surveillance, tours, inspections and minor maintenance." EA observed two examples in which ALARA reviews were required but not conducted. The first was neutralization of liquid TRU waste under SOP-09-38 and RWP 2018-2100.1. The ALARA review block on the RWP was denoted "NA." However, SOP-09-38 required a specific waste campaign plan, including a separate hazard analysis and control set. The requirement for campaign-specific hazard analysis and controls outside the SOP would make this work non-routine by definition, similar to when developing a WIP, which would also require a formal ALARA review. The second example was an observed TRU waste sorting and repackaging evolution that did require the development of a WIP. While the WIP correctly indicated a need for a formal ALARA review, no ALARA review was performed and the same RWP with "NA" denoted in the ALARA review field was assigned to govern this work. A similar concern was also identified in the 2014 Office of Enterprise Assessments Report entitled "*Review of the West Valley Demonstration Project Radiological Controls Activity-Level Implementation*." (See **OFI-CHBWV-3**.)

- A WIP for non-radiological excavation work (WIP W1703806) for the equalization basin and associated equipment demolition was approved by a radiological SME despite having an inappropriate instruction to "stop work and perform decontamination" if contamination of work areas exceeded 20 disintegrations per minute (dpm)/100 (square centimeters) cm2 alpha or 1000 dpm/1000 cm2 beta-gamma. This work package and the associated RWP was for non-radiological excavation work and was not appropriate to use for performing decontamination work.

Objective:

Work is conducted diligently in accordance with approved work instructions and within established controls. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-4, Criteria #2, 3, and 5)

Waste and Site Operations and Facility Disposition work observed by EA was performed safely and within established controls, with the few exceptions noted in the previous section. During several work observations, workers and supervisors were observed not to be hesitant to stop/pause work as appropriate, and exhibited a questioning attitude. Safety technicians and RCTs were actively engaged in work activities. Examples of work being performed safely and within controls included workers observed to be proficient in the proper donning and use of PPE, including the use of appropriate contamination control techniques, such as frequent glove changes, and the effective use of hazardous energy control procedures to identify and isolate energy sources.

EA observed plan-of-the-day (POD) and plan-of-the-week meetings and found them to be effective in deconflicting work and in sharing information from the Safety Assessment Center (SAC). Daily pre-shift briefings observed were effective in conveying information from POD/plan-of-the-week meetings, reviewing roles and responsibilities of pending work for the day, and ensuring that hazard controls were identified and implemented. Safety technicians, RCTs, and applicable SMEs were generally in

attendance. For example, the daily work briefings of the Vitrification Plant demolition project were informative, interactive, well attended and managed, and effective in identifying, examining, and prioritizing work tasks.

Waste and Site Operations and Strategic Operations and Facility Disposition Divisions Conclusions

The scope of work defined within Waste and Site Operations and Facility Disposition WIPs and SOPs that EA reviewed was generally sufficient to permit identification of most hazards and mitigating controls. However, implementation of the hazard analysis process only defines hazards globally and is not used to document task-specific work hazards as required by the institutional program. While the use of IWPs, RWPs, and one or more specific safety work permits (e.g., hot work permit) provides a useful level of activity-level hazard analysis, it does not ensure that all hazards are identified, particularly for complex, higher hazard, and longer duration work activities.

Engineered controls are extensively and appropriately used to mitigate many hazards associated with D&D work. The radiological air sampling across WVDP is robust and was consistently performed across numerous work evolutions. However, EA observed some examples where controls were not identified, properly implemented, or consistent across IWPs and RWPs controlling the same work. In addition, RWPs did not always properly list all work documents they controlled, and ALARA review requirements were not always effectively implemented. Concerns were also noted with incomplete training for fall protection and competent person.

Waste and Site Operations and Facility Disposition work that EA observed was performed without incident and generally within established controls. Workers and supervisors observed and interviewed were not hesitant to stop/pause work as appropriate, and exhibited a questioning attitude. Safety technicians and RCTs were actively engaged in work activities. POD meetings were effective in deconflicting work and in sharing information from the SAC. Elements of the work planning process that EA deemed to be particularly effective in ensuring that work was performed within controls included work planning meetings, tabletop walkdowns, pre-job briefings and the use of mock-ups. Workers were observed to be proficient in the proper donning and use of PPE, including the use of appropriate contamination control techniques, such as frequent glove changes, and the effective use of hazardous energy control procedures to identify and isolate energy sources

5.2.2 Maintenance

The maintenance organization resides within the Balance of Site Facilities organization, and includes the manager, a work authorization manager, the Plant Systems Operations group, and a maintenance supervisor. The maintenance supervisor is responsible for the work performed by the three craft areas, mechanical, electrical, and instrumentation. There is one maintenance fabrication shop and one machine shop area. Maintenance uses the same WP&C processes described in Section 5.1.

Maintenance work involving repetitive tasks includes instrument recall and calibration, preventive maintenance (PM), activities governed by SOPs, and approved routine work involving skill of the worker (SOTW). Complex tasks that are non-repetitive are performed using a detailed WIP. SOTW non-repetitive tasks are accomplished through minor work packages, electrical troubleshooting and repair, and approved routine work. EA observed evolutions performed with WIPs and minor work requests, and instrument calibrations, PM, and SOTW activities.

Objective:

The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-1, Criteria #2 and 3)

The scope of work is adequately defined in the sampling of maintenance work documents that were reviewed during this assessment. For example, EA reviewed WIP W1801789, *Connect New Service Drops to Fire Pump, ANS-0, ANS-2 and ANS-4*, associated with an ongoing job to disconnect the electrical power stations and electric pump from their current electrical supply and connect to a newly installed site substation. The scope included the discernable tasks, and attached photographs including text boxes with descriptions of the work to be performed at the specific location. The combination of work scope description and photographs provided a clear description of the work to be performed. The work scope was sufficiently described during the pre-job briefing, and EA confirmed with one of the electrical workers that he had participated in a walkdown of the work during the planning process. The WIP Form WV-2571, *Work Instruction Package Form*, includes a signature line to confirm that a planning walkdown was completed, which the electrician had signed.

EA reviewed four additional maintenance WIPs (W1802704, W1703817, WI702976, and WI702459) and found the scope to be adequately described and effectively augmented by annotated photographs or engineering drawings. In all cases, a maintenance supervisor or worker documented participation in a planning walkdown.

The minor work request form, WV-3824, includes a section for the description of the scope of work. EA reviewed two minor work requests for maintenance fabrication shop work (W1801787 and W1800800) and found the scope of work description and attached drawings to be sufficient for these requests. EA also reviewed two minor work requests (W1801343 and W1802243) for maintenance work – the first for the repair of a leaking natural gas line and the second for an electrical isolation. In both cases, the work scopes adequately described the work to be performed, and the maintenance supervisor had documented that walkdowns had been completed.

Objective:

All hazards that could adversely impact workers, the public, the environment, and the facility and its equipment are documented and analyzed for severity/significance. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-2, Criteria #2, 4, 5, 7, and 8)

Maintenance WIPs and minor work requests are prepared by work planners and/or engineers. Per discussion with the work control manager, all work planners are required to complete a training program, Q071 WORK PLANNING TRVC TR1486Q, which is comprised of relevant topics. All work planners interviewed have completed the required training. Based upon interviews with work planners and observation of work planners during meetings and at the job sites, EA found the work planners to have appropriate technical and operational backgrounds, as well as a significant amount of experience at WVDP. The work planners perform the initial screening of hazards using the AHA process, and identify SMEs as needed. EA interviewed two SMEs (nuclear safety and waste management) and found both SMEs to be well qualified and knowledgeable in their respective fields.

In addition to the AHA, the WIP and Minor Work Request processes require the work group supervisor or involved worker to conduct a walkdown of the job prior to work start. Reviewed maintenance work documents all included a signoff of the walkdown by an appropriate individual, and the involvement of workers in this process was confirmed by work planners, the maintenance supervisor, and select workers.

One worker confirmed that he was involved with the job planning process including walkdowns and identification of hazards and controls, such as zero energy checks and air gapping in two locations. If identified during the AHA process, additional safety permits are included in the work package. EA observed four maintenance pre-job briefings (Minor Work Package W1802711 for ion exchange columns, WIP W1801789, *Connect New Service Drops to Fire Pumps*, troubleshoot and repair of a variable frequency drive in the RHWF, and skill of craft work for cleanup of electrical waste in an annex) which included thorough discussions of the IWPs by the safety specialist and the RWP by the RCT.

For the most part, the AHA for WIP W1801789 identifies appropriate potential hazards, including industrial, routing of utilities, stored energy, impairment to a fire system, and electrical safety. It does not designate extreme temperatures as a potential hazard, although the work is performed outdoors in the summer. Heat stress is identified as a potential hazard in the IWP and it is emphasized during pre-job briefings. The IWP for this work, as discussed during the pre-job briefing, appropriately identifies job-related hazards including working on electrical systems, noisy environment, elevated work, heat stress, etc. EA reviewed another WIP, W1703817, *Rework ANS-1 Feeder*, and the combination of AHA, IWP, and RWP precautions and limitations and the pre-job briefing are adequate to identify potential hazards.

EA observed the cleanup of electrical waste in the annex, and determined that the associated IWP (108072) appropriately identifies potential hazards with this activity, including lifting, falling objects, heat stress, elevated work, and biological. The IWP does not identify asbestos-containing material (ACM) as a potential hazard because the work did not involve the disturbance of any ACM, although there was ACM in the annex ceiling. This issue was discussed during the pre-job briefing. EA also observed the calibration of differential pressure indicators, including a check of the calibration equipment, and noted that the hazards did not include the use of compressed gas cylinders. The maintenance supervisor agreed to follow up on this observation.

WCDs for the maintenance fabrication shop include minor work requests and associated permits. SOP 00-54, *Minor Work Request*, restricts the use of this process to work activities that involve specific hazards as designated in Attachment B of the SOP. EA reviewed four maintenance minor work requests (W1801343, W1802243, W1800800, and W1801787) and found that the potential work hazards were appropriately bounded by the list of approved hazards. An IWP for general welding and fabrication (IWP 107701) identifies hazards with welding and requires local exhaust ventilation, but does not require respiratory protection or sampling. Per discussion with the fabrication shop foreman, the local exhaust flowrate is periodically checked by IH, and air sampling with a BZA has been conducted; however, no records of the IH survey or sample results were produced. The need for enhancing the IH program is discussed in Section 5.1.

JSAs are used to analyze the hazards associated with the equipment operation in the machine shop. The maintenance supervisor had a notebook of outdated JSAs for the machine shop equipment; however, current versions of two of the JSAs were provided at EA's request. In general, the JSAs appropriately identify the potential hazards associated with the job steps, although the JSA for lathe and mill operations (JSA #1) refers generically to chemical exposure instead of specifying which chemicals are of concern. Issues with maintaining the JSAs are discussed in Section 5.1.

Objective:

Controls are identified and implemented that effectively protect against identified hazards and approved activity-level work control documents can be performed as written. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-3, Criteria #2, 3, 4, 5, 6, 7, and 8)

In general, appropriate controls for maintenance work are established and communicated through the combination of WCDs, permits, JSAs, job briefings, and training. Examples of engineered controls include local exhaust systems in the fabrication shop and machine shop, and the use of physical separation to isolate a connection to a voltage source (air gap) for some of the electrical work. Administrative controls include the WCDs and permits. EA noted appropriate use of PPE for the most part.

Per WV-921, hazard controls shall be documented in the appropriate location (e.g., work document, permits, pre-job briefing form, JSA form, IWP). Controls for maintenance work are found in all of these locations. For WIP W1801789, controls from the AHA were appropriately captured in the IWP, the pre-job briefing, safety equipment release forms for the fire system impairments, and the precautions and limitations section (cautions on electrical circuits, stop work, etc.). Another maintenance WIP, W1703817, addressed controls for hazards identified in the AHA through IWP 107095, *Rework ANS-1 Feeder to Supply Power to the Fire Pump House* (including lockout/tagout (LOTO), noise, ladder inspections, etc.). The pre-job briefing checklist included general hazards, as well as the RWP and IWP. A ground disturbance permit was also included in the work package. The WIP also references a safety equipment removal permit needed to take a fire pump out of service.

Minor work requests rely upon the controls established in SOP 00-54 Attachment B, *Hazards Analysis and Controls*, which includes the requirement to complete permits (IWP, RWP, hot work permits, etc.), take required training (radiological worker II, LOTO, HAZWOPER, etc.), use PPE, and institute other controls as appropriate. The permits for the Minor Work Request W1800800, *Fabricate three VEC duct flanged cover plates*, include IWP 107701, *General welding/fabrication*, and a hot work permit 107701, *Burning/welding/grinding.* In general, the controls are adequate, although the control to ensure that the local exhaust ventilation is in good working order does not specify how this is to be achieved or provide an acceptable flowrate.

Controls for electrical safety include the LOTO program, zero energy checks, air gapping, training and qualification, and appropriate PPE. EA observed LOTO during a SOTW job to replace a variable frequency drive for the conveyer system in the RHWF. The operations group applied its lock to the appropriate breaker, then the qualified electricians applied their personal locks to the breaker. The locks were kept on until the work was completed. The maintenance group conservatively used LOTO for the work to connect new service drops to the fire pump and electrical power stations. The work package included a LOTO on the new substation even though the cables were not yet hooked up and the substation was not energized. The LOTO was included because the work on the new substation was being performed by a subcontractor, and the subcontracted work was not directly under the control of the CHBWV maintenance electricians. This is a good example of ensuring a safe work environment.

EA found some instances of missing, unnecessary, and conflicting controls. The JSA for the lathe (JSA-1) referred generically to chemical hazards, but did not identify specific chemicals used and directed the worker to obtain a copy of the appropriate Safety Data Sheet and ensure that the controls were implemented. This direction puts the onus on the worker to obtain the information, instead of analyzing the hazard and implementing the controls in the WCD. Also, the JSA requires workers to have a specific millwright proficiency. Although the mechanic using the lathe had qualified to this specific proficiency in 1997, the process to obtain this proficiency is no longer available. In addition, the JSA listed hearing protection as required PPE, even though there was no posting in the machine shop for hearing protection, and the current activity (machining the stainless steel stock) did not appear to produce elevated noise levels. The need to update JSAs is identified in Section 5.1. During the maintenance work to remove electrical waste from the annex, EA noted a posting that was unclear as to which areas of the annex were to be avoided due to asbestos contamination. The maintenance supervisor also noted this issue, advised workers to avoid the area, and took action to have the issue resolved. During SOTW activities, EA noted

confusing postings with regard to the need for eye protection and hearing protection, and inconsistent compliance with the postings. **(Deficiency)**

Objective:

Work is conducted diligently in accordance with approved work instructions and within established controls. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-4, Criteria #2, 3, and 5)

EA observed five POD meetings that included a daily SAC report. The SAC report included a review of safety topics (e.g., emergency response, critical things to review in the daily briefs), weather forecasts, LOTO program managers, emergency management coverage, recent occurrences, lessons learned or safety shares, and other items of interest. Attendance at the POD meeting included appropriate representation to ensure that maintenance work was integrated with ongoing work activities and deconflicted if necessary. New maintenance work was added to the POD and formally authorized by the facility manager. For instance, on July 10, 2018, the POD was revised to add troubleshoot and repair of the variable frequency drive in RHWF and troubleshoot and repair of the K9 system, and was subsequently approved by the facility manager. Additionally, EA observed numerous informal interactions with the maintenance supervisor and other managers related to the scheduling and performance of work. EA also attended a plan-of-the-week meeting, which also had appropriate representation and discussed upcoming work. The scheduling and integration of maintenance work with other plant work is adequate.

Following the POD, the maintenance supervisor conducted a daily briefing with his crew during which he repeated the relevant information from the POD/SAC meeting, including lessons learned, and then he assigned work tasks to the crew. EA observed four pre-job briefings for maintenance activities, one WIP, one minor work request, one troubleshoot and repair and one SOTW. The pre-job briefing checklist is a useful reference tool and includes a discussion of the scope of work and critical work steps, worker training, a discussion of hazards and controls, current facility/area conditions, tools, stop work, and required permits. All observed pre-job briefs were led by the maintenance supervisor, and included the work planner, industrial safety representative, waste management SME, operations, and RCT, as appropriate. Workers were engaged and contributed to the process. The involvement of the work planners and SMEs contributed to the overall understanding of the work procedures, instructions, hazards, and controls. The observed pre-job briefings were conducted in accordance with established procedures, were attended by assigned workers and support staff, reinforced the right to stop work, and provided workers with the opportunity to ask questions and provide feedback.

The maintenance workforce is well qualified and experienced, and was found to be current with regard to all required training for observed maintenance work. Interviews with maintenance workers indicated that many have over 30 years of experience at WVDP.

EA observed maintenance activities including cleanup of electrical waste in a building that was slated to be demolished, the performance of scheduled PMs, work related to the repair of a diaphragm pump, corrective maintenance on the Munter Air Dryer System, calibration of differential pressure indicators, and the replacement of a defective variable frequency drive for the conveyor system in RHWF. For the most part, the work was accomplished safely and in accordance with established work instructions. The cleanup of electrical waste was straightforward and met the definition of approved routine work. The workers wore appropriate PPE and were careful in handling heavy or awkward electrical components. Some of the workers wore dust masks, which were designated as voluntary in the IWP, but were made available to the workers. EA observed the performance of scheduled PM (W1802584-01) for the 20T bridge crane and the PM for the plant water pumps and Limitorque gate valve operator (W1802450-01, W1802451-01, and W1802452-0). A qualified crane operator performed the crane PM. Both workers

had the appropriate WCD (job card) in hand, checked in with operations/facility management, performed general safety inspections, and conducted the work in a careful and thorough manner.

The maintenance superintendent displayed a strong focus on the safe conduct of work activities when he noticed a potentially unsafe act involving a vending machine delivery truck. The truck driver had backed up such that only a small part of the truck gate was overhanging the dock. The maintenance supervisor stopped the truck driver from trying to move the drink vending machines, and offered to have someone bring a forklift so that the vending machines could be safely moved.

EA observed one maintenance work activity that was conducted as SOTW routine work that should have been performed as minor work. The job involved a mechanic performing maintenance repair work on a Munter Air Dryer System which fell outside of the list of approved routine work in WVDP-485. The definition of minor work in this procedure includes maintenance work and minor repairs, which is the appropriate category for this work. The performance of this work as unapproved routine work results in the work not being analyzed for hazards. (**Deficiency**)

Maintenance Conclusions

For the most part, the maintenance organization effectively implements the WP&C processes. The maintenance supervisor, work planners, SMEs, and workers contribute to the work planning process through the development of clearly scoped work packages, the identification of hazards and controls with the AHA process and applicable permits, walkdowns of jobs, and thorough pre-job briefings. Work is appropriately scheduled and authorized, and the POD is an effective process for deconflicting work. The maintenance workforce, work planners, and SMEs are well qualified and experienced. Examples of safety focus were noted by EA with a LOTO use and with the maintenance supervisor noticing and resolving a potential safety issue. Some concerns were noted with the JSA process, postings, and the inconsistent use of PPE. Although most work was performed in accordance with established work instructions, one job involving maintenance work should have been performed as a minor work request.

5.3 CAS/Feedback and Improvement

Objective:

The Contractor Assurance System produced periodic scheduled and non-scheduled evaluations (e.g., self-assessment, independent assessment, management walkthroughs, etc.) of WP&C activities which identified issues, concerns and opportunities for improvement in the WP&C program. (10 CFR 830.122(c); DOE Order 226.1, Att.1 1, 2.a and b. (2); DOE Order 422.1, Att. 2 2.a.(3)b and c; and DOE Order 433.1B, Att. 2 2.b)

The CHBWV CAS is defined in Section 11 of WVDP-310, *Integrated Safety Management System (ISM) Description*, which sets expectations for implementing nuclear safety culture, quality assurance, human performance improvement, environmental management, contractor assurance, voluntary protection, and the worker safety and health programs. The CAS describes the use of assessments, worker feedback mechanisms, issues management, lessons learned, and performance measures as a means to measure performance. Assessments are defined in WV-121 *Integrated Assessment Program*, which describes self-assessments, independent assessments, and management assessments. The Integrated Assessment Schedule (IAS) is developed each calendar year and is based on input and participation from site organizations. EA reviewed the calendar year 2018 IAS, which identifies the functional areas that are assessed quarterly. The schedule includes assessments related to aspects of WP&C, such as hazard controls, operations in progress, and quality assurance.

Based on a CHBWV annual review of the CAS, completed in August 2017, EA gained insights into the status of CHBWV's CAS with respect to WP&C. The resulting CHBWV report identified multiple audits and internal and external reviews conducted within the last two years that collectively provided many opportunities to assess performance in WP&C. For example two internal reviews were conducted of the *Worker Health and Safety Program (10 CFR 851)* between September 2016 and July 2017. In each case, the reviewers concluded that the program "continues to meet" the criteria of 10 CFR 851 and that workplace hazards are adequately identified and mitigated. CHBWV also participated in a review of their Voluntary Protection Program in February 2017. This review evaluated the adequacy and effectiveness of the WVDP Health and Safety Program, and included reviews of CAS and ISMS implementation. The resulting report identified a number of Opportunities for Improvement, including suggestions to: revise its JSAs; ensure current hazard analyses exist; ensure the analyses document any assumptions; ensure the controls are supported by analyses or sample results; and remove all outdated hazard analyses from shop areas. But overall, all three reports concluded that CHBWV's CAS, with regard to WP&C, was adequate. In contrast, this assessment identified significant weaknesses in CHBWV's WP&C program. (See **F-CHBWV-WP&C-1**.)

In addition to reviewing the overall CAS assessments, the EA team reviewed WP&C completed self-assessment checklist forms and management visits in the workplace. The Work Authorization Manager developed self-assessment checklist forms for conduct of operations self-assessments, which include lines of inquiry (LOIs) that are tailored to the specific site procedures and processes. The checklists provide a "yes, no, n/a" response and space for comments. EA reviewed four self-assessment reports conducted by the Work Authorization Manager, including a completed checklist Group 3e *Compliance Evaluation-Work Planning and Control-Specific Activities*, dated 8/21/2017. This checklist was used to review work planning for WIP 1703794, a planned demolition activity. The sections of this form corresponded to the five core functions of ISMS, including "Identify and Analyze Hazards" and "Implement Controls", and each section includes LOIs designed to ensure that key aspects of WP&C are adequately addressed. This assessment format provides the assessor with a method to identify specific areas of concern (i.e., hazard analysis). In this case, no concerns were identified. These checklists, if applied regularly to evaluate WP&C performance, have the potential to be a valuable tool for effective WP&C self-assessments. (See **OFI-CHBWV-4**.)

The Management Workplace Visits (MWVs) program encourages managers to complete three field visits per month. This program promotes management presence in the workplace with expectations to identify areas for additional self-assessment and to provide feedback. EA observed a manager conducting an MWV of a work site for IWP #107906 performed to a general WIP #1605871, involving a radiological survey of ACM roofing material on the Annex building. Two radiation control technicians were working on the one-story, low-slope roof, while one support operator and one supervisor were on the ground. The manager observed the work and discussed the work activities with the supervisor. The manager generated Incident Report #2583 noting the following issues: the IWP did not appear to provide the hazard controls and verifications for all the facilities listed; the Annex was not a listed building; the work status log WV-2573 was not in the work packages; one individual (RCT) supporting the work was not signed in on the pre-job briefing in the package; and one compliance item regarding fall protection tie off was identified (an employee tied off to an incorrect anchorage point). Also, the manager provided positive feedback, such as: the general conditions of work were good; the IWP was adequate for the work performed; housekeeping was excellent; the job was available to be worked in the morning versus in the afternoon (avoiding additional heat stress issues); discussion with the safety technician found him to be knowledgeable of the requirements, and he was able to detail the technical justification for fall protection and PPE prescribed. EA observed similar deficiencies and positive attributes as identified by the manager. Overall, the performance of this MWV was value-added. However, EA determined in interviews and document reviews that not all managers are conducting MWVs. Some managers stated

that conducting an MWV is a low priority for them. The performance assurance manager reported an MWV completion rate of 40-50%. (See **OFI-CHBWV-5**.)

Objective:

External and internal feedback and lessons learned are factored into ongoing and future WP&C activities. (48 CFR 970.5223-1(c)(5); 10 CFR 851.21(a)(7) and (c); DOE Order 226.1, Att.1 2.a and b. (2) and (5); DOE Order 422.1, Att. 2 2.a.(6)a; DOE Order 433.1B, Att. 2 2.l; and DOE Policy 450.4A)

EIP-104, *Operating Experience Program*, establishes the process for identifying and disseminating lessons-learned information to all levels of the organization. External and internal lessons learned are captured, documented, and distributed to parties within CHBWV, including via the site intranet, and are incorporated into CHBWV safety training. One recent example is the dissemination of lessons learned from demolition activities at the Plutonium Finishing Plant in Hanford, WA. This information was both timely and topical for work planners at WVDP, as both sites are engaged in decommissioning and open-air demolition of radiologically-contaminated structures and equipment. Work planners and supervisors for work planning are routinely provided with information specific to their planning activities by the lessons learned coordinator. CHBWV issued a total of 15 internal lessons learned in 2017 and has issued 5 to date this year. DOE also issued a DOE-wide notification of a manufacturer recall on certain models of a Square D Safety switch that posed an electrical shock or electrocution hazard to consumers. CHBWV found at least seven of these devices at WVDP, tagged them for identification, and issued a standing order including a LOTO procedure designed to protect workers while awaiting replacement switches.

Mechanisms to formally capture activity-level feedback and lessons learned are provided in the WIP and Minor Work Request forms. Preventive Maintenance Card and Task Order work activities did not have a process to capture feedback and lessons learned. The Work Authorization Manager reviews the completed work packages and screens them for useful feedback before passing on to the lessons-learned coordinator. Section 4.10 of WVDP-485 requires work group supervisors to prepare and submit feedback and lessons learned in a timely manner to capture information for process improvement. However, supervisors are not promptly returning these work packages for completed work activities to the Work Authorization Manager. A sample of WIPs reviewed show that the feedback and lessons learned information was not always provided. CHBWV metrics indicated that 58 work packages older than 6 months, 43 work packages 1-2 years old, 18 work packages 2-3 years old, and 6 greater than 3 years were not returned. (See **OFI-CHBWV-6**.)

While some positives were noted with the WVDP operating experience program, the feedback process has not been consistently effective, due to the concerns discussed above.

CAS/Feedback and Improvement Conclusions

CHBWV has procedures in place for implementation of CAS/feedback and improvement, including assessment planning and performance, operational awareness activities, and identifying and implementing improvements to the WP&C process. Lessons-learned information is provided to all levels of the organization through multiple mechanisms, and is generally incorporated into the work planning process. The WP&C self-assessment templates are a useful tool, and the performance of MWV's was value-added. However, EA determined in interviews that not all managers are conducting MWVs, with some managers indicating that conducting an MWV is a low priority for them. Multiple assessment activities such as the annual review of the CAS, reviews of the Worker Health and Safety Program, the VPP review, and MWVs represent missed opportunities to identify and address the types of WP&C issues that EA described in Sections 5.1 and 5.2. The feedback process overall has not been consistently effective in that

not all work control documents have a formal feedback mechanism, and feedback information is not consistently provided to the Work Authorization Manager in a timely manner.

5.4 DOE-WVDP Site Office Oversight

This section discusses EA's assessment of the DOE-WVDP Federal oversight programs and how effectively they evaluated CHBWV's safety programs and WP&C implementation.

Criteria:

DOE Oversight processes must evaluate contractor and DOE programs and management systems, including site assurance systems, for effectiveness of performance (including compliance with requirements). Such evaluations must be based on the results of operational awareness activities; assessments of facilities, operations, and programs; and assessments of the CAS. (DOE Order 226.1B, 4b(1))

The DOE field element line oversight program includes written plans and schedules for planned assessments, focus areas for operational oversight, and reviews of the contractor's self-assessment of processes and systems. (DOE Order 226.1B, 4b(2))

Oversight processes are tailored according to the effectiveness of CASs, the hazards at the site/activity, and the degree of risk, giving additional emphasis to potentially high consequence activities. (DOE Order 226.1B, 4b(5))

DOE-WVDP has established programmatic documents adequate to conduct safety oversight of contractor work activities, including:

- DOE-WVDP-002, *DOE-WVDP Quality Assurance Program Description*
- DOE-WVDP-003, *DOE-WVDP Facility Representative Program Description*
- DOE-WVDP-010, *DOE-WVDP Assurance Oversight Program Description*
- DOE-WVDP-011, *DOE-WVDP Integrated Safety Management System Description (ISMSD)*
- QP-414-02, *Management and Independent Assessments and Corrective Action Disposition*.

The DOE-WVDP Deputy Director manages and directs the oversight program, which is primarily implemented by the Safety and Site Programs Team (with an acting team lead, two Federal employee SMEs, and three augmented SMEs provided by the DOE-WVDP technical assistance contractor) and one Facility Representatives (FR). In late 2017, the Safety and Site Programs Team lead, the safety and IH SME, and one of the two FRs retired. At the time of this assessment, recruitment efforts for these vacancies were in place with some vacancies starting to be filled.

A three-year oversight planning schedule is maintained by the quality assurance SME and used to facilitate development of a detailed annual program oversight schedule through coordination with the SMEs, FRs, and office team leads. As required by QP-414-02, *Management and Independent Assessments and Corrective Action Disposition,* the Deputy Director approved the fiscal year (FY) 2016 – 2018 annual oversight schedules, tracked schedule performance quarterly, and approved schedule changes in advance of scheduled oversight. An ISM performance measure, commitment, and objective goal of a 90% completion rate of scheduled oversight was met in FY 2016 – 2017. However, DOE-WVDP had only completed 50% of scheduled assessments through the first half of FY 2018. Reports of completed oversight (assessments and surveillances) were formally conveyed to CHBWV in a timely manner.

On the assessment schedule, planned assessments and surveillances are identified as either standards based, such as criticality safety and fire protection, or risk based, such as conduct of operations, radiation safety, and the IH and safety program. EA reviewed recent radiation safety, IH and safety program surveillance reports:

- Radiation Safety Surveillance S18-009E, *RadCon Program Implementation during Vitrification Facility Demolition*, evaluated Vitrification Facility D&D work. This surveillance was found to be comprehensive, addressing radiological control efforts during work activities that have a high risk for potential personnel exposures and radiological contamination events.

- Safety and IH Surveillance S16-059E, *Industrial Hygiene and Safety Program – Hazard Identification and Control*, conducted in October 2016, evaluated Vitrification Facility component movement activities on 4 separate days over a 4-week period around the October 2016 timeframe. This surveillance mostly described what was observed regarding CHBWV's, and its subcontractor's, hoisting and rigging work activities. No work activities generating IH hazards were selected for evaluation. From 2016 to present, DOE-WVDP has not evaluated the CHBWV IH programs or identified any IH issues. (See **OFI-DOE-WVDP-1**.)

DOE-WVDP safety SMEs hold frequent meetings with their CHBWV counterparts to discuss DOE and contractor assessments schedules, upcoming oversight activities, and areas where it may be beneficial for DOE to either observe or participate. EA observed the quality assurance, CAS, and nuclear and worker safety and health enforcement meetings and found them to be focused on safety issues relevant to recent and upcoming work. In addition, EA noted that participants provided value-added viewpoints on the meetings topics.

CHBWV is required to submit various safety and health program updates on an annual basis, such as the review and/or updates to their *Worker Safety and Health Plan*, the Integrated Safety Management System Description, and the CAS, for approval by the DOE-WVDP Director. EA reviewed the DOE-WVDP evaluation and approval of these latest submittals. Appropriate DOE SMEs were assigned to evaluate the documents. These deliverables were approved without comment. The EA review found that DOE's evaluation and approval of the CHBWV *Worker Safety and Health Plan* did not identify the lack of required implementing procedures for IH requirements (e.g., use of qualified industrial hygienists and planning, conducting, and documenting monitoring results for IH hazards), as required by 10 CFR 851.10(b) and DOE-WVDP-010, Section 6.1.1.1. (**Deficiency**) (See Section 5.1 for further discussion related to CHBWV IH implementation issues that adversely affect the integration of IH into WP&C activities.)

A comprehensive FY 2017 ISMS effectiveness review was conducted by a DOE-WVDP/CHBWV team lead by an SME from the Environmental Management Consolidated Business Center using a CRAD designed to meet the review criteria for the DOE-WVDP annual ISMS Declaration to EM Headquarters. While this annual ISMS review adequately evaluated a number of important areas, such as the review of CHBWV's safety conscious work environment, the assessment of WP&C was not of the breadth and depth to ensure CHBWV WP&C is fully effective. For example, the WP&C CRAD only addressed whether WP&C programmatic documentation was in place and did not evaluate the implementation of ISM core functions at the work activity level. Based on discussions with the DOE-WVDP Director, Deputy Director, and SMEs, DOE-WVDP plans to use the EA WP&C assessment to support this year's annual ISMS effectiveness review and additional indicators to determine the effectiveness of the CHBWV CAS.

Criterion:

DOE line management must establish and communicate performance expectations to contractors through formal contract mechanisms. (DOE Order 226.1B, 4c)

The assurance oversight plan includes conveying contractual feedback to the contractor regarding safety performance. DOE-WVDP, along with the EM Consolidated Business Center, have established an award fee plan to base award fee payments to CHBWV on a semi-annual basis. Safety performance accounts for 25% of the award fee. The award fee evaluations since August 2016 were appropriately based on DOE oversight results, including periodic analysis of safety metrics. The bulk of the potential fees earned by the contractor are derived from schedule completion incentives. DOE has been effective in using this award fee plan feedback, along with the recent information available from the enhanced operational awareness mechanisms, to ensure that work is conducted safely as the contractor attempts to accelerate work ahead of contractual fee-incentivized schedule milestones.

Criterion:

The DOE field element has an issues management process that is capable of categorizing findings based on risk and priority, ensuring relevant line management findings are effectively communicated to the contractors, and ensuring that problems are evaluated and corrected on a timely basis. (DOE Order 226.1B, 4b(4))

DOE-WVDP's issues management procedure (QP-414-02) adequately outlines processes to categorize oversight issues, convey assessment results to the contractor for action, and track contractor corrective actions to closure. DOE-WVDP-identified issues in reviewed assessment reports were properly categorized, and assessments were communicated formally and in a timely manner to the contractor for action. For example, surveillance reports reviewed were formally conveyed to the contractor within three weeks, and a large 2017 ISM assessment report (A17-40E) was conveyed to the contractor within four weeks of its completion. The ISM assessment report properly classified issues into 3 findings and 18 comments.

Each issue from the reviewed assessment reports requiring a response from the contractor was documented in a *Corrective Action Request* (CAR) and logged on the CAR log. The contractor uses Form J-2, *Site Contractor External Commitment*, to submit to DOE-WVDP their corrective actions planned or taken (including linkage to the contractor's internal OITS number), along with objective evidence of completion of actions taken. The DOE-WVDP SME responsible for the issue, reviews and verifies completion of the corrective actions on the Form J-2 and ensures that issues are closed by DOE. From the review of several issues requiring corrective action, as well as completed Form J-2s, EA found that the process was effective in tracking contractor corrective actions for DOE oversight issues. An example is the corrective actions related to a conduct of operation finding from the ISM Assessment A17-040E where the Form J-2 identified the finding and the corrective actions taken, with objective evidence included for DOE-WVDP review and concurrence. This J-2 was found to satisfactorily address the original issue and provided sufficient evidence of the actions taken.

Criterion:

The DOE field element has implemented an effective Facility Representative program. (DOE Order 422.1)

The DOE-WVDP FR program is satisfactorily based on the DOE Standard 1063-2011, *Facility Representatives* and is documented in DOE-WVDP-003, *Facility Representative Program Description*.

The required triennial self-assessment of the FR program was last conducted in June 2017. This assessment was led by and supported with a team member from the DOE Headquarters office responsible for administering the DOE-wide FR program (AU-32, Office of Quality Assurance and Nuclear Safety Management Programs) and no deficiencies were noted. At the same time, the annual FR staffing analysis was developed and approved by the DOE-WVDP Director. This staffing analysis identified the need for 2.9 full-time equivalent FRs to cover the WVDP facilities, with two fully qualified FRs onboard through December 2017. EA conducted interviews with the Director and the current FR, and reviewed the FR quarterly performance indicator reports, and found the FR coverage was satisfactory until the recent retirement of one FR in December 2017. This has caused only a minor delay in documenting FR surveillance reports, and essential daily oversight is being maintained. As a compensatory measure until another FR is hired, the senior technical safety manager (STSM)-qualified Director has provided backup for the FR since January 2018 for short periods when the FR is absent or away from work. There is adequate email documentation of how this backup is requested and communicated to the contractor in case there is a need for reporting occurrences to DOE. A replacement FR is being recruited; however, DOE-WVDPs strategy to qualify the new FR requires the current FR to mentor the new FR. (See **OFI-DOE-WVDP-2**.)

EA interviewed and observed the FR conducting operational awareness activities over several days, including attending the contractors POD and SAC briefings. The FR relayed pertinent information to the Director, Deputy Director, and safety SMEs during the DOE Morning Meeting and follow-on oversight discussions. The FR demonstrated in-depth knowledge and experience concerning the operations and safety requirements, as the FR conducted a walkdown of the RHWF and demolition work at the Vitrification Facility. The FR's communication with the contractor was frequent, particularly when an event occurred. A review of the Occurrence Reporting and Processing System (ORPS) reports for the last two years indicated that the FR was contacted as required for ORPS-reportable occurrences. EA observed the FR receive a notification of a potential reportable occurrence and the FR's action to evaluate the issue. The evaluation was immediately started and viewed as comprehensive (including discussion of the occurrence with the Director, Deputy Director and SMEs, observation of the site first-hand, and communicating with the contractor on reportability and corrective actions).

Criterion:

Maintain sufficient technical capability and knowledge of site and contractor activities to make informed decisions about hazards, risks, and resource allocation; provide direction to contractors; and evaluate contractor performance. (DOE Order 226.1B, 4.a.(2))

DOE-WVDP has implemented the DOE technical qualification program (TQP) through its ISMS Description; Quality Assurance Plan; PD-364-01, *Technical Qualification Program Description*; and QP-364-01, *Implementation of the Technical Qualifications Program*. The individuals responsible for safety oversight who are required to complete the TQP are the Director (STSM-qualified), the Deputy Director (who is just short of full STSM qualification) and the FR (fully-qualified). However, two DOE Pathways interns have been with DOE-WVDP for over two years and are actively conducting oversight, but neither has been assigned a TQP functional area qualification standard to complete.

The administration of the TQP has not been maintained as required. (**Deficiency**) For example, the administrative assistant position assigned as the DOE-WVDP TQP coordinator has been vacant for over a year and no one is fulfilling TQP coordinator responsibilities; required oversight personnel have not been assigned TQP functional areas as noted above; and a required annual workforce and staffing plan to identify DOE-WVDP technical needs has not been developed in recent years.

The technical qualification for the three contracted safety and quality assurance SMEs who augment the Safety and Site Programs Team are established by contract specifications. Based on interviews, observations of work activities, and review of oversight documentation generated by these individuals, they are generally qualified for the responsibilities they are assigned. For example, the radiological safety SME is a certified health physicist with 14 years of experience as lead radiological engineer with the Pacific Northwest National Laboratory prior to coming to DOE-WVDP, and has a total of 29 years radiation engineering experience. Three SMEs are fully qualified as Nuclear Quality Assurance (NQA)-1 auditors, with one SME nearing completion of the NQA-1 qualification.

DOE-WVDP has sufficient qualifications when including its contractor technical support to oversee all hazards at the site with one exception; it lacks fully qualified IH expertise to oversee contractor IH programs and IH implementation and integration with the contractor's WP&C activities. (See **OFI-DOE-WVDP-1**.)

Criteria:

An effective employee concerns program (ECP) has been established and implemented. (DOE Order 442.1A)

An effective differing professional opinion (DPO) process or program has been established and implemented. (DOE Order 442.2)

The DOE ECP at WVDP is implemented through QP-442.02, *Employee Concern Program*, and the DOE-WVDP DPO process is integrated within QP-442.02. The DOE order for processing a DPO submitted to headquarters organizations is also referenced in QP-442.02. Since there were no DPO submittals, this area was not further reviewed. The individual currently assigned as the DOE-WVDP ECP manager is adequately qualified. She was formally designated to that role in January 2018 and was provided offsite DOE ECP training in February. In addition, she has adequate technical knowledge, is qualified as an NQA-1 auditor, and has experience with operations at the site that are supportive of the evaluation of concerns received by the ECP.

ECP records of previous concerns were adequately maintained in locked file cabinets within a controlled access area as required. One ECP concern was received in 2018 related to radiological control activities for the Vitrification Facility. The ECP manager assigned DOE-WVDP safety SMEs to evaluate the concern. The ECP investigation report was thorough and complete. However, it took four months to complete and report the investigation results back to the concerned individual. The DOE-WVDP missed its goal to respond within 30 days.

Annual self-assessments of the ECP are required by DOE Order 442.1A, Section 4.f; however, the last ECP self-assessment was conducted and documented in 2012. (**Deficiency**) The 2017 DOE-WVDP annual assessment schedule included an ECP self-assessment, but it was not conducted as scheduled.

The 2012 revision to QP-442.02 and the current DOE ECP poster (posted at the main gate) have outdated contact information for a retired ECP manager. DOE-WVDP has not updated its procedure and poster to ensure that the current DOE ECP manager's contact information is provided, as required by DOE Order 442.1, Section 4.a.(3). (**Deficiency**) (See **OFI-DOE-WVDP-3**.)

While there was some evidence that the previous ECP manager communicated results to the contractor to take corrective actions when needed, the ECP program does not have a requirement to communicate any corrective actions that are needed for substantiated concerns.

Criterion:

An operating experience program (OEP) has been developed and implemented, and an OE Program Coordinator has been designated. (DOE Order 210.2A)

The QP-235-01, *DOE-WVDP Corporate Operating Experience Program*, adequately provides the framework for implementing the DOE OEP requirements. For example, DOE WVDP formally conveyed lessons learned documented in EA's report "Lessons Learned from Assessments of Emergency Management Programs at U.S. Department of Energy Sites," and the DOE Lessons Learned G-2018-OR-UCOROOCE-0601, "Application of Fixative to Reduce Migration of Removable Contamination" to CHBWV for action. EA also found that DOE-WVDP adequately participated in review and publishing of a project management lessons learned for sharing through the DOE Lessons Learned database, such as the WVLL-2017-012, *Vitrification Facility Demolition Readiness Lessons Learned*.

The trending and analysis of both DOE-WVDP and CHBWV safety and WP&C performance is conducted quarterly by DOE-WVDP SMEs and provided to the Director and Deputy Director. The analysis provides insights to occupational injuries, trends, and conduct of operations work planning and control issues. The analysis also views how DOE-WVDP and CHBWV is progressing against their annual ISM performance measures, objectives, and commitments. EA found these activities to be useful as a feedback and improvement mechanism in that the results from the analyses supported the DOE-WVDP to CHBWV contract award fee reports.

The outreach with EM and the Office of Nuclear Safety and Environmental Assessments to identify lessons learned from the PFP contamination and exposure events for application to current and upcoming demolition work is notable. In 2017, radiological contamination and worker exposure events occurred during the open-air D&D work of the PFP at the DOE Hanford Site. As information emerged regarding the causes of these adverse events, EM and the DOE Chief of Nuclear Safety recognized that WVDP was planning similar open-air demolition of the radiologically contaminated Vitrification Facility and the Main Plant Process Building (MPPB). Starting in February 2018, EM and the Chief of Nuclear Safety conducted a series of oversight assistance visits at WVDP, in part to ensure that lessons learned from the PFP events were incorporated into radiological controls for planned open-air demolition work at the Vitrification Facility and MPPB. The resulting trip report provided a number of suggestions regarding radiological controls. During this time, the DOE-WVDP Director established additional DOE site operational awareness mechanisms to focus attention on the work to prepare for and conduct open-air demolition of the two contaminated structures. These mechanisms include the addition of a follow-on operational awareness meeting after the DOE-WVDP Directors "Morning Meeting" with all DOE-WVDP safety and project management SMEs, and the FR, that is led by the Deputy Director; and increased daily walkdowns of the site and work activities. The walkdowns are documented and sent to a shared email folder for viewing by DOE Director/Deputy Director and Safety and Site Programs Team personnel. EA observed five of these daily meetings, along with reviewing the shared email walkdown report folder, and found that these enhanced operational awareness mechanisms have added significant value to the DOE assurance oversight program. In addition, these mechanisms supported informed DOE decisions on plans for future work. For example, the open-air demolition of the Vitrification Facility was allowed to proceed with lessons learned incorporated from the PFP events, while the demolition of the MPPB is planned to be deferred until radiological source terms are further reduced. Additionally, these mechanisms provide

for real-time understanding of contractor work and provide an opportunity to target DOE oversight resources where needed, such as off-shift work being planned by the contractor.

DOE-WVDP Site Office Oversight Conclusions

Overall, DOE-WVDP has generally developed and implemented appropriate processes for Federal line oversight of WP&C, including assessment planning and performance, issues management, and performance assurance analysis. Recent enhanced operational awareness mechanisms implemented since February 2018 have added significant value to DOE's real-time understanding of WP&C during high-risk D&D activities and emerging safety issues. Identified areas needing improvement include the oversight of the contractor IH program and its integration into all aspects of WP&C activities, and the implementation of the technical qualification program and the DOE ECP.

6.0 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 corrective action plans for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion. In addition to the findings, deficiencies that did not meet the criteria for a finding are listed in Appendix C, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

CHBWV

F-CHBWV-WPC-1: The WP&C process does not ensure that all IH hazards are identified, analyzed, controlled, and effectively communicated to workers as required by 10 CFR 851 and CHBWV procedures.

Specific elements of the WP&C process that are deficient with respect to integration and performance of IH into the work control process are as follows:

- The WP&C process does not include effective mechanisms for proactively involving IH SMEs in the WP&C process, such as in the review and approval of WCDs, as required by Section 4.9 of the CHBWV WVDP-485.

- CHBWV has not implemented an IH exposure assessment process using recognized exposure assessment methodologies as required by 10 CFR 851.21(a)(2) and 10 CFR 851, Appendix A.6 (a).

- Most work tasks observed have limited or no IH sampling or monitoring data to assess worker exposures, and lack a documented IH exposure assessment that explains the basis for not sampling or monitoring workers' exposures, as required by 10 CFR 851.21(a)(1); 10 CFR 851, Appendix A.6 (a); Section 5.0 of the CHBWV procedure SHIP-207; and Section 3.0 of SHIP-105.

- There are no effective work control mechanisms to ensure that hazard control recommendations provided by IH SMEs are incorporated into WCDs as required by Sections 4.9 and 5.4 of WVDP-485.

- The WP&C process assigns planning of work involving IH hazards to individuals who may not have sufficient IH training or expertise (e.g., safety technicians), as required by 10 CFR 851 Appendix A(6)(e), resulting in occasional missed or inappropriate IH hazard controls.

- Noise exposure data communicated to employees does not include results from noise dosimetry data based on ACGIH criteria, as required by SHIP-210.

DOE-WVDP

None.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified some OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also address other conditions observed during the appraisal process. EA offers these OFIs 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.

CHBWV

- **OFI-CHBWV-1:** Consider developing and implementing a process for conducting and documenting IH exposure assessments for all work activities for which IH hazards have been identified on the AHA form, incorporating the guidance provided in the AIHA publication *A Strategy for Assessing and Managing Occupational Exposures*. Consider benchmarking the IH exposure assessment process against other DOE sites that have developed such a process, such as the Pantex Plant and the Los Alamos National Laboratory.

- **OFI-CHBWV-2:** Consider developing a mechanism to ensure specific linkage of all applicable TWDs authorized for use under an RWP. This could consist of a physical file arranged by RWP that includes a running list of all TWDs assigned to each RWP. The TWD field on the RWP could then reference the RWP file where workers could verify that the RWP is appropriate for the work to be performed.

- **OFI-CHBWV-3:** Consider eliminating exemptions from ALARA reviews based on whether the work is considered routine or performed under an SOP, when the radiological hazard level exceeds the ALARA review trigger levels specified in the Site Radiological Control Manual.

- **OFI-CHBWV-4:** Consider increasing the frequency and depth of self-assessments that focus on ISMS core functions, with a particular focus on the effectiveness of the activity-level hazard analysis (ISMS Core Function #2) and developing and implementing hazard controls (ISMS Core Function #3.)

- **OFI-CHBWV-5:** Consider increasing focus on the conduct of MWVs, such as requiring, instead of encouraging, periodic MWVs in EMD-010, Rev-1, *Management Workplace Visit Program*, and by developing performance metrics.

- **OFI-CHBWV-6:** Consider developing a mechanism to ensure that Preventive Maintenance Card and Task Order work have formal mechanisms to capture feedback and lessons learned.

DOE-WVDP

- **OFI-DOE-WVDP-1:** Consider developing in-house or obtaining external IH expertise to review contractor IH programs and IH implementation during all phases of the contractor WP&C activities. Also, consider developing an IH-specific CRAD for use by the FRs and safety SMEs during their walkdowns of contractor work activities.

- **OFI-DOE-WVDP-2:** Consider providing the new FR with opportunities to observe/participate in FR oversight at other sites that have similar D&D missions, for example Richland Operations Office, EM Oak Ridge Field Office, or the Savannah River Operations Office, to gain differing perspectives on oversight methods. Also, consider contracting with former DOE FR(s) to assist in the mentoring of the new FR during the qualification training period.

- **OFI-DOE-WVDP-3:** Consider revising QP-442-02 to: (1) identify a toll-free ECP hot line phone number that can be rolled-over to any current ECP manager, along with a standalone email address for submitting ECP concerns; and, (2) address designating and training a backup ECP manager.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: June 18-21 and July 9-12, 2018

Office of Enterprise Assessments (EA) Management

William A. Eckroade, Acting Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
William E. Miller, Deputy Director, Office of Environment, Safety and Health Assessments
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments
Kevin G. Kilp, Director, Office of Worker Safety and Health Assessments
Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

Steven C. Simonson
John S. Boulden III
Kevin L. Dressman
Michael A. Kilpatrick
Kevin L. Nowak

EA Site Lead for WVDP

C.E. (Gene) Carpenter, Jr.

EA Assessors

Kevin G. Kilp, Lead
Terry E. Krietz
James R. Lockridge
Nimalan Mahimaidoss
Terry B. Olberding
Mario A. Vigliani

Appendix B
Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

CHBWV

- EMD-010, *Management Workplace Visit Program*, Rev. 1, 9/1/2015
- EIP-104, *Operating Experience Program*, Rev. 2, 10/12/17
- EM355D.05, *Elevated Work TTD Fall Protection Basic Calculations*
- Hot Work Permit 107701, *Burning, Welding, Grinding*
- HS22TC, *Fall Protection Training*, Rev-3
- IWP 107095, Rework ANS-1 Feeder to Supply Power to the Fire Pump House
- IWP 107656, Perform Calibrations, Trouble Calls and Minor Maintenance
- IWP 107701, General welding/fabrication
- IWP 107906, Perform Pre-Demolition Surveys of Various WVDP Facilities
- IWP 108072, Cleanup of e-waste in Annex
- JSA #1, Lathe and Mill Operations
- Memorandum From Performance Assurance Department to CHBWV Managers, Subj: *CY 2018 Integrated Assessment Schedule*
- Memorandum From Work Authorization Department to CHBWV Personnel, Subj: *2018 CONOPS Self-Assessment Program Schedule*
- MWR W1800800 and MWR W1801787, VEC (System 15-2)
- MWR W1801343, System 15 – Natural gas line in Utility Room
- MWR W1802243, PP-103 and LP-1 Admin Building
- RC-Adm-6, *Radiological Work Permits*, 04/10/2018
- RC-ALAR-7, *ALARA Review Of Work Manager Radiation Safety Instructions*, 10/23/2017
- RC-RPO-301, *Air Sampling And Monitoring*, 01/08/2018
- SHIP-105, *Industrial Hygiene and Safety Hazard Control Program – Identification, Evaluation and Control of Hazards*, Rev. 0, 02/28/12
- SHIP-108, *Job Safety Analysis*, Rev. 1, 02/16/15
- SHIP-109, *Personal Protective Equipment*, Rev. 4, 02/27/18
- SHIP-201, *Industrial Work Permits*, Rev. 12, 11/29/17
- SHIP-207, *Industrial Safety Standard Sampling Methods*, Rev. 4, 05/10/2016
- SHIP-209, *Heat and Cold Stress*, Rev. 3, 09/15/16
- SHIP-210, *Hearing Conservation Program*, Rev. 3, 04/03/18
- SHIP-224, *Fall Protection*
- SOP 00-38, *Administration of Hoisting and Rigging*, 04/13/2016
- SOP 00-46, *Work Instruction Walkdowns, Pre-Job and Daily Briefings, and Post-job Feedback/Lessons Learned*, Rev. 15, 01/18/18
- SOP 00-54, *Minor Work Request*, 06/13/2017
- SOP 03-31, *EDR Crane Operation*, 08/31/2015
- SOP 09-38, *TRU Waste Processing*, 04/30/2108
- SOP 15-56, *Inspecting Mechanized Hoisting Equipment*, June 2, 2017
- SOP 300-07, *Waste Generation, Packaging, and On-Site Transportation*
- TR1756B, *Additional Lock Out/Tag Out Requirements Involving Recalled Square S Safety Switches*
- Training records
- WIP W1601472, *Vitrification Plant Demolition*, and associated RWPs and IWPs

- WIP W1605871, *Perform Pre-Demolition Surveys of Various WVDP Facilities*
- WIP W1702459, *UR Transformer Deluge System Air Compressor Installation*
- WIP W1702976, *Connect a portable air compressor and backup air bottle to the VEC instrument air header*
- WIP W1703806, *Equalization basin and Associated Equipment Demolition*, and associated RWPs and IWPs
- WIP W1703817, *Rework ANS-1 Feeder to Supply Power to the Fire Pump House*
- WIP W18002234, *Grout Boxes Containing 3C-1 in the RHWF Buffer Cell and Receiving Area*, and associated RWPs and IWPs
- WIP W1801762, *CPC/CCR Waste Cleanup and Removal*, and associated RWPs and IWPs
- WIP W1801789, *Connect New Service Drops to Fire Pump, ANS-0, ANS-2 and ANS-4*
- WIP W1802702, *Process TRU Waste in WPA*, and associated RWPs and IWPs
- WIP W1802704, *Perform Partial Site Power Outage to Support Safe to Work Condition for electrical subcontractor*
- WV-2571, *Work Instruction Package Form*
- WV-921, *Hazards Identification and Analysis*, Rev. 31, 03/12/18
- WV-984, *ALARA Program*, 04/10/2018
- WVDP-010, *WVDP Radiological Controls Manual*, 03/21/2018
- WVDP-011, *WVDP Industrial Hygiene and Safety Manual*, 03/27/18
- WVDP-216(015), *WVDP Workplace Radiological Air Sampling And Monitoring Program And Technical Basis Document*, 05/29/2018
- WVDP-310, *Integrated Safety Management System (ISMS) Description*, Rev. 26, 08/16/17
- WVDP-477, *CH2MHILL- B&W West Valley, LLC Documented Radiation Protection Program And Implementation Plan For Title 10, Code Of Federal Regulations, Part 835*, As Amended May 2011, 02/13/2012
- WVDP-485, *Work Control*, 06/13/17
- WVDP-585, *WVDP Worker Safety & Health Plan*, Rev. 2, 12/07/17
- WD:2017:0860, *Annual Review of Contractor Assurance System*
- WV-121, *Integrated Assessment Program*, Rev. 24, 12/11/17
- WV-3824, *Minor Work Request Form*

DOE-WVDP

- A17034I, *Department of Energy West Valley Demonstration Project FY2017 Triennial Facility Representative Assessment*, July 31, 2017
- Award Fee Plan Score Cards (Semiannual Cards from March 2015 - February 2018)
- Current Technical Qualifications and Training Certificates for DOE-WVDP Oversight Staff, May 31, 2018
- DLVR # 100, *Annual Review of Contractor Assurance System*, Received August 30, 2017, Approved by Bryan Bower, September 20, 2017
- DLVR# 104, *Worker Safety and Health Program Update*, Received January 17, 2018, Approved by Bryan Bower, January 24, 2018
- DLVR # 204, *Contract No. DE-EM0001529, Section J-3, Item 204, Integrated Safety Management System Declaration*, Received December 20, 2017, Approved by Angela Cooney, DOE-WVDP Contract Officer, February 5, 2018
- DOE Contract Number DE-EM0001529 with CHBWV, July 7, 2011
- DOE Environmental Management Project Lessons Learned Number PMLL-2013-WVDP-VF-02, *Dismantling the Vitrification System at the West Valley Demonstration Project*, November 25, 2013

- DOE Environmental Management Project Lessons Learned Number PMLL-2014-WVDP-Bldg 01-14 D&D-01, *Lessons Learned from the Open Air Demolition of Radiologically-Contaminated Building 01-14 at the West Valley Demonstration Project*, July 17, 2014
- DOE-WVDP Award Fee Plan Performance Evaluations of CHBWV (August 2016 - February 2018)
- DOE-WVDP Employee Concern Investigation, *Concerns with the Radiological Controls/Monitoring of the Vitrification Facility Demolition Project*, June 14, 2018
- DOE-WVDP Organizational Chart, July 2017
- DOE-WVDP Oversight Schedule Summary Through Second Quarter, FY2018, April 20, 2018
- DOE-WVDP Oversight Schedules Final Summaries for FY2015-2017
- DOE-WVDP-002, *DOE-WVDP Quality Assurance Program Description*, Rev. 7, October 19, 2015
- DOE-WVDP-003, *DOE-WVDP Facility Representative Program Description*, Rev. 8, June 21, 2017
- DOE-WVDP-010, *DOE-WVDP Assurance Oversight Program Description*, Rev. 4, November 9, 2016
- DOE-WVDP-011, *DOE-WVDP Integrated Safety Management System Description (ISMSD)*, Rev. 4, May 1, 2018
- EA-31 Talking Points, Subj: Outline for Discussion of PFP Lessons Learned with West Valley
- Email from Bryan Bower to Craig Rieman, Subj: FW: Draft Trip Report, February 17, 2018, with Attachment *EM-3.112 Site Visit Trip Report*
- Email from Bryan Bower to David Gray, Subj: *FY2018 FR Staffing Analysis*, June 20, 2017
- Email from David Gray to CHBWV Distribution, Subj: *DOE-WVDP Facility Representative On Duty Coverage*, June 9, 2018
- *Environmental Management (EM) Field Elements Performance Trends & Recurring Occurrences Analyses Report*, Second Quarter, FY 2018, WVDP, with Attached CHBWV *Contractor Assurance System Report*, March 2018
- *Facility Representative Site-Specific Requalification Card Qualification Card* for David Gray, June 2, 2017
- Letter from Bryan Bower to James Hutton, Subj: *West Valley Demonstration Project (WVDP) Integrated Safety Management ISMS) Declaration for Fiscal Year (FY) 2017*, with attached *WVDP FY2017 Annual ISMS and QA Effectiveness Review Declaration*
- Letter from Bryan Bower to Jeffrey Bradford, President and General Manager CHBWV, Subj: *Integrated Safety Management System (ISMS) Fiscal Year (FY 2017 Annual Review (A17-040E)*, November 16, 2017
- Office of Environment, Health, Safety and Security Report, *CH2M HILL BWXT West Valley, LLC West Valley Demonstration Project Report from the Department of Energy Voluntary Protection Program Onsite Review*, April 2017
- PD-364-01, *DOE-WVDP Technical Qualifications Program Description*, Rev. 0, June 19, 2013
- QP-111-01, *Mission and Function Statement*, Rev. 11, April 5, 2011
- QP-235-01, *DOE-WVDP Corporate Operating Experience Program*, Rev. 6, March 29, 2016
- QP-235-06, *DOE-WVDP Corporate Operating Experience Program*, Rev. 6, March 29, 2016
- QP-354-01, *Implementation of the Technical Qualifications Program*, Rev. 0, June 3, 2013
- QP-364-01, *Implementation of the Technical Qualifications Program*, Rev. 0, June 3, 2013
- QP-414-02, *Management and Independent Assessments and Corrective Action Disposition*, Rev. 12, May 1, 2018
- S14-002E, *Lessons Learned/Operating Experience (Triennial)*, February 20, 2014
- S15-022E, *Conduct of Operations - Operator Aids*, June 25, 2015
- S15-0501, *Oversight Assurance Program*, November 12, 2015
- S16-059E, *Industrial Hygiene and Safety Program - Hazard Identification and Control*, November 11, 2016
- S17-013E, *Triennial Lessons Learned/Operating Experience*, March 6, 2017

- S18-009E, *Radcon Program Implementation During Vitrification Facility Demolition*, with Transmittal Letter from Bryan Bower to Jeffrey Bradford, Subj: *Contract No. DE-EM0001529 – U.S. Department of Energy West Valley Demonstration Project (WVDP) Surveillance Report S18-009E, RadCon Program Implementation during Vitrification Facility (VF) Demolition*, May 16, 2018
- Senior Technical Safety Manager Qualification Certificate for Bryan Bower, January 27, 2014
- Walk-Down Reports Documented as Emails to DOEWalkdowns@emcbc.doe.gov (10)
- *WVDP Phase 1 Decommissioning – Facility Disposition Award Fee Plan*, Rev. 0, August 29, 2015

Interviews

CHBWV

- Maintenance Manager
- Maintenance Supervisor
- Maintenance SOS (Foreman)
- Maintenance Work Planner/engineer
- Waste and Site Operations and Facility Disposition Workers, Work Planners, and Supervisors
- Subject Matter Experts: Waste Management, Nuclear Safety, Safety Engineer, Industrial Hygienist, Safety Technicians
- CMMS CHAMPS Administrator
- Facility Manager
- Training Manager
- Performance Assurance Manager
- Work Control Manager
- Radiation and Industrial Safety Manager
- Radiological Engineering Manager
- Radiological Engineer
- Radiological Operations Manager
- Radiological Control Supervisors
- Radiological Control Technicians
- D&D Program Support Work Planners (2)

DOE-WVDP

- Manager
- Deputy Manager
- Acting Safety and Site Programs/Project Management and Execution Team Leader
- Facility Representative
- Oversight Subject Matter Experts (5)
- ECP Manager

Observations

CHBWV

- Plan-of-the-Day Meetings, including the SAC
- Various Planning Meetings, Plan of the Week

- Pre-Job Briefings & Daily Briefings
- W1703806, *Equalization and Associated Equipment Demolition,* 11/06/17
- W1601472, *Vitrification Facility Demolition*, 6/28/18
- W1802234, *Grout Boxes Containing 3C-1 in the RHWF Buffer Cell and Receiving Area,* 6/28/18
- SOP 313-14, *RHWF Waste Sorting*, 01/31/17
- Liquid TRU Waste Neutralization operations in WPA
- Dry TRU Waste sorting and repackaging in WPA
- Vitrification Facility Perimeter Radiological Air Sampling and Daily checks of Air Filters and Deposition Plates
- Vitrification Facility Demolition work
- Waste packaging work in EDR
- RWHF buffer cell entry and application of fixative to dissolver
- Cleanup of electrical waste in the Annex building
- Evolution for transport of intermodal shipping container
- Preventive Maintenance jobs
- Walkaround of electrical job for new service drops
- Repair of the Munter Air Dryer system
- Replacement of Variable Frequency Drive for RHWF conveyor system
- Calibration of Differential Pressure Indicators
- CHAMPS Demonstration

DOE-WVDP

- Oversight Database Demonstration
- Correspondence Tracking System Demonstration
- Shadowed Facility Representative and Subject Matter Experts (Various Facilities/Work Activities/Safety Assessment Center/Plan of the Day)
- DOE-WVDP/CHBWV Counterpart Meetings (Quality Assurance and Price-Anderson Amendment Act Enforcement)
- Conference Call Between DOE-WVDP Safety and Site Team and EA-31, Subj: *Discussion of PFP Lessons Learned with West Valley*
- Morning Meeting and Operational Awareness Meetings (5)

Appendix C
Deficiencies

Deficiencies that did not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

CHBWV

Work Planning & Control Program and Implementation

- Implementation of the hazard analysis process does not ensure that all hazards associated with a given work scope are identified in a manner specific to the individual job tasks and appropriately documented, as required by WV-921, Sections 7.2.2 and 7.2.3.

- CHBWV has not ensured that RWPs and IWPs are properly reviewed to identify and resolve any hazard and control discrepancies between these permits before work is performed, as required by WV-921, Section 7.2.2 D.

- Required hazard identification, analysis, and/or controls were not identified and/or properly implemented during several observed work activities, as required by WVDP-310 and WV-921, Sections 7.2.2 and 7.2.3.

- The maintenance department is not properly using the minor work control process required by WVDP-485 to analyze hazards and identify controls associated with some maintenance work and minor repairs classified as non-repetitive SOTW-type work.

DOE-WVDP

- DOE-WVDP did not identify that CHBWV lacked required implementing procedures for the IH program (e.g., use of a qualified industrial hygienist and planning, conducting, and documenting monitoring results for IH hazards) in its evaluation and approval of the CHBWV *Worker Safety and Health Plan*, as required by 10 CFR 851.10(b) and DOE-WVDP-010, Section 6.1.1.1.

- The administration for the TQP has not been maintained in accordance with QP-364-01.

- DOE-WVDP has not conducted an annual self-assessment of the ECP since 2012, as required by DOE Order 442.1A, Section 4.f.

- DOE-WVDP has not maintained current DOE ECP contact information in QP-442-02, *Employee Concern Program*, and the DOE ECP poster (posted at the main gate), as required by DOE Order 442.1, Section 4.a.(3).