Restart of Higher Risk Activities Concurrent Assessment at the Hanford Site Plutonium Finishing Plant

July 2019

Office of Enterprise Assessments
U.S. Department of Energy

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Acronyms

ADM	Air Dispersion Modeling
ALARA	As Low As Reasonably Achievable
AMW	ALARA Management Worksheet
CFR	Code of Federal Regulations
CHPRC	CH2M HILL Plateau Remediation Company
CL	Confidence Level
CR	Condition Report
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
MA	Management Assessment
MDA	Minimum Detectable Activity
OFI	Opportunity for Improvement
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
PRF	Plutonium Reclamation Facility
RL	Richland Operations Office
RWP	Radiological Work Permit
TP	Technical Position

Office of Enterprise Assessments
Restart of Higher Risk Activities Concurrent Assessment
at the Hanford Site Plutonium Finishing Plant
April 22 – May 3, 2019

Summary

Scope:
This assessment evaluated the effectiveness of the CH2M HILL Plateau Remediation Company (CHPRC) management assessment (MA) in determining CHPRC's readiness to restart higher risk demolition activities at the Hanford Site Plutonium Finishing Plant (PFP), and provided an independent assessment of that readiness. The U.S. Department of Energy Richland Operations Office's (RL's) oversight of the PFP demolition activities was also assessed.

Significant Results for Key Areas of Interest:
Lessons Learned and Changes to Demolition Controls and Radiological Practices
Overall, changes and improvements necessary for safely resuming higher risk demolition work have been effectively established and implemented. However, continued use of low confidence field smear counting techniques may impact the ability to detect a gradual buildup of radiological contamination and prevent early detection of impending failures or breaches in contamination controls during demolition.

Work Planning and Radiological Control Performance
Work packages adequately address a sufficiently narrow scope of work and identify hazards and controls, precautions and limitations, and the steps necessary to complete the work. Radiological hazard analysis conducted through the ALARA Management Worksheet (AMW) process was exemplary. Radiological controls developed in the AMWs were adequately flowed into work instructions or radiological work permits for each observed work activity. Pre-job briefings were effective in conveying hazards and controls for the planned work, and with limited exceptions, work was performed in accordance with established controls. However, an issue was identified concerning CHPRC's method for managing accumulated dust suppression water, which could create a contaminated soil column, contrary to the requirements of DOE Order 458.1.

Contractor Management Assessment
Overall, the CHPRC MA was adequately conducted by an independent team of subject matter experts and was effective at evaluating the readiness of CHPRC to resume higher risk demolition activities.

Federal Oversight
RL's oversight of the CHPRC MA and PFP work activities is effective. RL demonstrated its readiness to provide adequate oversight of higher risk demolition activities at PFP.

Best Practices and Findings
The quality, format, and level of detail of the CHPRC AMWs for PFP are a Best Practice.

There were no Findings identified as part of this assessment.

Follow-up Actions:
No follow-up activities are planned.

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the CH2M HILL Plateau Remediation Company's (CHPRC's) readiness to restart higher risk demolition activities at the Hanford Site Plutonium Finishing Plant (PFP). This EA assessment was concurrent with a CHPRC management assessment (MA) and a DOE Richland Operations Office (RL) surveillance. The purpose of this EA assessment was to evaluate the effectiveness of CHPRC's MA in determining the readiness of CHPRC to restart higher risk demolition activities, and to provide an independent assessment of that readiness. This EA assessment was performed at the Hanford Site from April 22 through May 3, 2019.

2.0 SCOPE

CHPRC's readiness to restart higher risk demolition activities and the effectiveness of CHPRC's MA were assessed in accordance with the *Plan for the Office of Enterprise Assessments Concurrent Assessment of Plutonium Finishing Plant Higher Risk Activities Restart Management Assessment at the Hanford Site, April – May 2019*. RL's oversight of the PFP demolition activities was also assessed.

3.0 BACKGROUND

Under its contract with RL, CHPRC is in the process of demolishing the highly contaminated PFP. Open-air demolition on the first of PFP's four main process buildings began with the 236-Z Plutonium Reclamation Facility (PRF) in November 2016. In June 2017 and again in December 2017, demolition activities resulted in the spread of radioactive contamination outside of established control boundaries, exposure to nearby workers, and a subsequent shutdown of all demolition activities. As of December 2017, approximately 95% of the PRF and 60% of the 234-5Z Building had been demolished. The remaining PRF structure includes small portions of the east and west stem walls and rubble piles consisting of concrete and metal from final demolition activities, which are covered with at least 18 inches of clean overburden and fixative. CHPRC completed a causal analysis and implemented corrective actions to prevent recurrence. After an August 2018 CHPRC MA, lower risk debris cleanup and demolition activities resumed in September 2018. This second MA will be used to confirm CHPRC's readiness to restart the remaining higher risk demolition activities.

4.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*. 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.

The criteria guiding this assessment were based on objectives and criteria selected from the following documents:

- Criteria and Review Approach Document (CRAD) 45-35, *Occupational Radiation Protection Program Inspection Criteria, Approach, and Lines of Inquiry*, December 4, 2012
- CRAD 30-01, *Contractor Assurance System*, February 15, 2018
- DOE Policy 450.4A Change 1, *Integrated Safety Management Policy* (core function statements)
- Specific DOE requirements (e.g., regulations, policies, and orders) associated with 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*

The assessment team examined key documents, such as work packages, procedures, manuals, analyses, condition reports (CRs), and corrective action closure documentation. The assessment team observed interviews conducted by the CHPRC MA team; conducted independent interviews with key personnel; and observed current demolition activities, mockup demonstrations, and tabletop discussions of planned activities. 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 assessed PFP stabilization and recovery activities from February to April 2018 and RL oversight program implementation in June 2018. EA conducted a third, concurrent assessment in August 2018 of the CHPRC MA to resume lower risk demolition activities. This 2019 assessment examined the completion and effectiveness of corrective actions from issues identified during the previous assessments. Results of the corrective action assessments are included in Section 5.0, Results, of this report.

5.0 RESULTS

5.1 Lessons Learned and Changes to Demolition Controls and Radiological Practices

This section discusses the assessment of changes to demolition controls and radiological practices that were implemented after the December 2017 contamination spread and work stoppage.

Criteria:
A corrective action system is established to ensure that deficiencies are fully corrected and prevent recurrence. (DOE Order 226.1B CRD)

Feedback information on the adequacy of controls is gathered; opportunities for improving the definition and planning of work are identified and implemented. (DOE Policy 450.4A)

CHPRC's procedure PRC-PRO-QA-052, *Issues Management*, provides appropriate corporate requirements and responsibilities for identifying, evaluating, and resolving issues stemming from events,

unexpected conditions, or audits and assessments. After the December 2017 work stoppage, CHPRC conducted an in depth causal analysis, identifying different root causes than for the previous June 2017 event. CHPRC's root cause evaluation report dated April 17, 2018, identified two root causes:

- CHPRC was over-reliant on continuous air monitoring data as the primary early indicator of contamination spread, which wasn't effective for the December event

- CHPRC did not adequately analyze and understand the potential impacts and hazards from accelerating the pace of PRF demolition.

In total, 42 new corrective actions were developed to address concerns from the causal analysis. Also after the December 2017 event, several DOE and contractor organizations (including EA) performed numerous assessments and observations of the CHPRC radiological controls program, resulting in additional corrective actions. Although the issues management process implemented after the June 2017 contamination event and work stoppage was not effective in preventing the December 2017 event, the assessment team's review of CR closure packages, MAs, and effectiveness reviews following the December 2017 event indicated that the issues management process was generally being implemented more rigorously and effectively, with no additional contamination spread since that time, including during resumption of lower risk work.

In June 2018, CHPRC issued CHPRC-03689, *Plutonium Finishing Plant Work Resumption Plan*, which outlined the basis and strategy for resuming work, including the use of a risk-based phased approach using enhanced control sets during each work phase, with a stronger emphasis on using air dispersion modeling (ADM) to set appropriate demolition rates and controls. Pacific Northwest National Laboratory (PNNL) supports DOE and the CHPRC demolition planning effort by making engineering estimates of potential releases and dose consequences for various potential demolition alternatives. The original ADM provided predictions based on assumptions on how demolition would be conducted and provided the basis for the established controls for rate of demolition and accumulation of rubble/debris. However, re-suspension of material at risk from accumulated demolition rubble was not incorporated into the dispersion model (PNNL-20173) because it was assumed that demolition debris would be removed as generated, which was not the case. Concurrent with the development of the work resumption plan, PNNL revised the original ADM to better account for the remaining material at risk and current facility configuration. This revision included engineering estimates of potential releases during the phased demolition of remaining PFP structures using CHPRC-proposed demolition rates, schedules, and methods. The modeling indicated that while some releases of radioactive material were to be anticipated during the demolition, radiological exposures and air concentrations would be well below any applicable limits for air and soil exposures. The assessment team reviewed the ADM and the proposed demolition rates, schedules, and methods and found them to be reasonable. In addition, well thought out enhanced control sets were developed based on the CHPRC causal analysis and the revised ADM and have been effectively incorporated into demolition work packages, as further discussed in Section 5.2, below.

Significant changes and improvements to demolition controls and radiological practices were made based on causal analysis, lessons learned, and assessment results. The assessment team confirmed that CHPRC has effectively established and implemented the following changes and improvements:

- Radiological boundaries: Posted radiological boundaries, including contamination, high contamination, airborne radioactivity, and radiological buffer areas, have been significantly enlarged to ensure that contamination, even below posting limits, is controlled inside posted radiological areas.

- Horizontal surface (cookie sheet) surveys: The number and frequency of cookie sheet surveys have

been increased from 45 sheets once per day to 77 sheets twice per day whether or not demolition is occurring.

- Air sampling and monitoring: The 14 continuous air monitors surrounding the demolition zone have not changed, but the number of fixed air samplers has increased from 22 to 35. Three of these fixed air samplers are elevated 20 feet above ground level to better assess the potential for releases that would not be detected at ground level. Air sample turnaround time has been shortened from three days to one.

- Personnel exit surveys: Automated personal contamination monitors are now required for exiting contamination and radiological buffer areas. Previously, workers performed self-frisking to exit these areas.

- Site access wind restrictions: After high wind events, access to the demolition area and demolition work is now restricted until high wind event cookie sheet surveys confirm that no spread of contamination has occurred. Previously, there were no access restrictions after high wind events.

- Demolition sequence and rate: Demolition is now required to be sequential, starting with lower radiological risk and moving to higher radiological risk. Previously, parallel sequencing was allowed. Demolition rate limits are incorporated into work instructions based on ADM assumptions, whereas previously the rate was not specified in the work instruction. Also, waste/debris pile accumulation limits on the ground that must be met for demolition to proceed are now incorporated into work instructions.

- Fixative application: Fixatives must be used per manufacturers' specifications, with technical evaluations supporting their use. Previously, there were no requirements to ensure that fixatives were used in accordance with the manufacturers' specifications.

In March and April 2019, CHPRC conducted internal worksite assessments of lessons learned from lower risk debris loadout activities and readiness of the PFP radiological controls program for higher risk work. Both worksite assessments were comprehensive and provide additional evidence of incorporation of lessons learned and corrective actions into processes and work packages. All of the changes to demolition controls and radiological practices were designed to detect and prevent airborne contamination and any spread of contamination during both lower risk work and higher risk work. The lower risk work has been performed to date without incident or additional spread of contamination, indicating reasonable readiness to resume higher risk demolition work.

Despite these positive enhancements, previously conveyed concerns about field counting practices for smears continue. These concerns relate to current smear counting practices used for operational surveys (e.g., cookie sheet and boundary control smears), which do not ensure the ability of CHPRC to reliably detect gradual buildup of low levels of removable contamination. CHPRC uses handheld instrument field counting techniques per PRC-PRO-RP-40299*, Ludlum 2360, 2224 Series Scaler/Ratemeter*, that provide survey results at the 67% confidence level (CL), rather than using bench scalers and a higher CL (95%) as directed by PRC-PRO-RP-40035, *Analyzing Smear, Lapel, and Air Samples*. CHPRC's current field counting practices, under ideal field conditions, are only marginally capable of accurately detecting the contamination area threshold of 20 decays per minute per 100 square centimeters (dpm/100 cm^2). However, PRC-PRO-RP-40035 is consistent with 10 CFR 835 implementation guidance that refers to the 95% CL method outlined in industry consensus standard N13.49-2001 (R2011), *Performance and Documentation of Radiological Surveys*. CHPRC's own benchmarking results of nine DOE sites showed that the Hanford Site is the only site with significant radiological contamination hazards that uses a 67% CL for operational surveys. (See **OFI-CHPRC-01**.)

Overall, CHPRC has made significant changes and improvements to demolition controls and radiological practices based on the lessons learned after the December 2017 work stoppage. The assessment team confirmed that the changes and improvements have been effectively established and implemented during ongoing lower risk work activities, which have been performed without incident or additional spread of contamination. However, EA continues to have concerns about the use of low confidence field smear counting techniques that impact the ability of the project to detect the gradual buildup of contamination, which could give an early indication of impending failures or breaches in contamination controls during demolition.

5.2 Work Planning and Radiological Control Performance

This section discusses the assessment of work planning and radiological control performance based on implementation of work packages governing ongoing lower risk work, demonstrations, and drills conducted during the MA, and based on available draft versions of higher risk demolition activity work packages.

Criterion:
Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated. Hazards associated with the work are identified, analyzed, and categorized. Applicable standards and requirements are identified and agreed upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented. Readiness is confirmed and work is performed safely. (DOE Policy 450.4A)

The assessment team reviewed three work packages covering ongoing lower risk work being performed during the MA and two additional draft work packages for higher risk activities that will be conducted following successful completion of the MA. All work packages concisely defined and bounded the scope of work and adequately addressed the required hazards and controls, precautions and limitations, and steps necessary to complete the work. Each work package also made good use of color photographs, drawings, and/or sketches to support the written information and to convey proper identification and completion of work in various physical locations, where appropriate.

With one exception noted below, the reviewed work package radiological hazard analyses conducted through the ALARA Management Worksheet (AMW) process were exemplary. The AMWs associated with the five reviewed work packages provided meticulous details on the proposed work and the associated radiological hazards, including source term composition and calculation of potential releases for air and contamination levels, worker dose estimates, radiological controls for airborne radioactivity and contamination, radiological survey and sampling requirements, and related information. Where appropriate, the AMWs also included detailed sketches, photographs and/or visual aids supporting the written information. The assessment team considers the PFP AMWs for these five work packages to be a **Best Practice**.

The assessment team observed pre-job briefings for two work packages authorized for lower risk work relating to Building 234-5Z demolition and planned Ionex exhauster filter removal. The assessment team also observed two higher risk work packages whose performance was being simulated, one to establish the initial conditions for an emergency drill during A and C line demolition, and a second for the PRF rubble pile cleanup accomplished at an uncontaminated mock up. Pre-job briefings were conducted appropriately, confirmed readiness to perform work in accordance with PRC-PRO-WKM-14047, *Pre-Job Briefings and Post-Job Reviews*, and included a comprehensive review of the associated radiological work permits (RWPs) by the assigned lead radiological control technician. During the pre-job briefings, the field work supervisors used the CHPRC human performance improvement and 5-step questioning process, such as querying workers as to proper responses to abnormal conditions and what might go

wrong during the work.

At the pre-job briefing for the Ionex exhauster filter removal, workers demonstrated an appropriate questioning attitude and willingness to raise questions and concerns. During this briefing, a worker expressed the possible need to reach into the Ionex filter housing for leverage while using long-handled tooling. The worker's concern was whether this action was allowed by the RWP and/or if any additional personal protective equipment was needed. The radiological engineer who developed the AMW expressed that he was unaware of the need or intent to reach into the filter housing, which was not considered during development of the AMW and RWP. He further expressed concern over the idea that reaching in without having analyzed the inside of the filter housing for cut hazards could have an unintended radiological dose consequence, highlighting a possible work planning weakness. RL surveillance team members were also present and involved in these evolutions, where they appropriately expressed their work planning concerns, as documented in RL's surveillance report S-19-AMSE-PFP-001, *Verification for PFP High Risk Resumption of Demolition Activities*.

The assessment team observed lower risk work being performed under a work package for resuming Building 234-5Z vault demolition, which had work instructions that conveyed implementation of the enhanced controls discussed in Section 5.1, above. This observed work was conducted safely in accordance with work package requirements and without incident, with one exception related to a worker who got too close to the vault building. This noncompliance is identified in the RL surveillance report S-19-AMSE-PFP-001. Additionally, during application of water for dust suppression, the accumulated water was pumped away from the demolition area to another area within the high contamination area boundary, where the contaminated liquid accumulated within a bermed soil area. This condition represents the possible creation of a contaminated soil column, contrary to the requirements of DOE Order 458.1, *Radiation Protection of the Public and Environment*, (g)(9), which prohibits the use of soil columns, and (g)(10), which states, "Manage the disposition of non-process water potentially containing radionuclides from DOE activities to protect soil and ground water and prevent the creation of future cleanup sites." (**Deficiency**)

Other observations included a walkdown of radiological buffer and contamination area boundary postings, which were appropriately demarcated, with accurate and sufficient signage and use of radiological roping and/or chain affixed to stanchions.

EA observed CHPRC's post-job reviews after demolition work on the Building 234-5Z vault and a mockup demonstration of soil and debris material handling, which was conducted for evaluation by the CHPRC MA team. Each post-job review was conducted in accordance with PRC-PRO-WKM-14047. The post-job reviews sufficiently addressed adequacy of hazard identification, adequacy of pre-job briefing content, work instructions, work planning, balance of craft skills, availability of tools and equipment, and any issues that arose during the work conduct, as well as how they were addressed.

Overall, work packages covering ongoing work adequately address the scope of work, identify hazards and controls, precautions and limitations, and the steps necessary to complete the work. Radiological hazard analysis conducted through the AMW process is noted as a best practice, and radiological controls developed in AMWs are adequately flowed into work instructions or RWPs. Pre-job briefings are effective in conveying hazards and controls for the planned work, and with limited exceptions, work was performed in accordance with established controls. Post-job reviews are adequately conducted.

5.3 Contractor Management Assessment

This section discusses the assessment of the adequacy and effectiveness of the CHPRC MA.

Criteria:
Management assessments) are effectively performed by contractor management, and are adequately developed (scope and review criteria) based on the nature of the facility/activity being assessed and the hazards and risks to be controlled. (DOE Order 414.1D CRD Attachment 2, Criterion 9)

Self-assessments appropriately focus on hands-on work and the implementation of administrative processes and involve workers, supervisors, and managers to encourage identification and resolution of deficiencies at the lowest level practicable. (DOE Order 414.1D CRD Attachment 2, Criterion 10)

Self-assessment results are documented commensurate with the significance of risks associated with activities being evaluated. (DOE Order 226.1B CRD 2.b(3)(b))

The CHPRC MA was adequately conducted in accordance with PRC-PRO-QA-246, *Management Assessment*, and effectively incorporated key principles of readiness reviews from PRC-PRO-OP-055, *Startup Readiness*. The MA plan defined an appropriate scope for the assessment. The CHPRC MA team composition included an adequate number of independent assessors with appropriate technical and managerial expertise to effectively evaluate the readiness of CHPRC to resume higher risk demolition activities.

The MA was performance-based, with sufficient demonstrations to allow the CHPRC MA team to observe implementation of the enhanced controls important to the safe resumption of higher risk demolition activities. This included observing previously restarted lower risk demolition activities, which implemented essentially the same control set applicable to higher risk demolition activities (the primary exception being the use of a filtered exhaust ventilation system during the A and C line demolition). The PRF rubble removal simulation was effectively conducted at a non-contaminated mockup area. However, the radiation and contamination monitoring were simulated in a way (i.e., the survey instruments were turned off) that reduced the effectiveness of the demonstration. The tabletop review conducted for the CHPRC MA team to demonstrate CHPRC's readiness to perform 2Z-18-04299/W WCN #001, *Demolition of Building 234-5Z A & C Lines*, was of reduced value due to the way it was conducted, consisting primarily of the fieldwork supervisor reading through the work instruction, with only limited engagement of the workers for input.

The assessment team observed many of the interviews conducted by the CHPRC MA team. The interviews in general were effectively conducted and useful in evaluating the readiness of the PFP personnel to perform higher risk demolition activities. A realistic, challenging emergency drill scenario was selected for the MA and was useful in demonstrating CHPRC's readiness to respond to upset and emergency situations. Performance of the drill within the demolition zone allowed the CHPRC MA team to effectively evaluate CHRPC's ability to respond to a simulated injured person within a high contamination area and airborne radioactivity area with simulated changing radiological conditions. CHPRC MA report PFP-2019-MA-22354, *Management Assessment of Corrective Actions for Resumption of Plutonium Finishing Plant Higher-Risk Demolition Work*, issued at the conclusion of the CHPRC MA, adequately described the results of the CHPRC MA.

Overall, the CHPRC MA was effectively conducted by an independent team of subject matter experts and was effective at evaluating the readiness of CHPRC to resume higher risk demolition activities.

5.4 Federal Oversight

This section discusses the assessment of RL's readiness to effectively oversee the PFP higher risk demolition activities.

Criteria:
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))

The DOE field element has an issues management process that categorizes findings commensurate with the level of risk and prioritized relevant to potential consequences, ensures relevant line management findings are effectively communicated to the contractors, and ensures that problems are evaluated and corrected on a timely basis. (DOE Order 226.1B 4b(4))

Oversight processes are tailored according to the effectiveness of contractor assurance systems, 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))

The assessment team observed RL personnel conducting oversight at PFP during the two weeks of the CHPRC MA and interacting with both the PFP personnel and the CHPRC MA team. The RL Facility Representatives and radiation protection subject matter experts demonstrated a thorough knowledge of work packages, the enhanced demolition and radiological controls, the facility layout, and the CHPRC programs and procedures implementing DOE safety requirements applicable to the PFP demolition project. The RL personnel demonstrated good working relationships with both the CHPRC management team and workers assigned to PFP. The RL personnel were trained and qualified to access the PFP demolition zone, including the high contamination areas, airborne radioactivity areas, and the beryllium control areas. The RL surveillance plan established an appropriate strategy and approach for overseeing the CHPRC MA and was effectively implemented. The RL surveillance team was adequately staffed to provide thorough oversight of the CHPRC MA.

The assessment team reviewed RL surveillance report S-19-AMSE-PFP-001, which adequately documented the results of the surveillance and reflected the thoroughness and level of detail of the RL team oversight. The RL report effectively captured and communicated 12 adverse conditions (noncompliances to requirements), 6 OFIs, 2 good practices, and their respective bases.

Overall, RL's oversight of the MA and the PFP activities conducted during the two week period observed by the assessment team was effective, and RL demonstrated its readiness to provide adequate oversight of the PFP higher risk demolition activities.

6.0 FINDINGS

The assessment team did not identify any findings during this assessment. Deficiencies that did not meet the criteria for a finding are listed in Appendix C of this report, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

7.0 OPPORTUNITIES FOR IMPROVEMENT

The assessment team identified an OFI 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.

CHPRC

OFI-CHPRC-1: Consider improving current smear counting practices for operational removable contamination surveys to ensure accurate detection of the presence or buildup of low levels of surface contamination during demolition activities. Specific actions to consider include:

- Similar to the recent change to CHPRC clearance survey protocols, discontinue exclusive use of 67% CL field surveys for operational and boundary control surveys intended to demonstrate compliance with 10 CFR 835 requirements, which hinders the ability to reliably detect the gradual buildup of low levels of contamination. A specific action to consider would be to use current practices to field count smear samples using PRC-PRO-RP-40299, but require later follow up counting in a bench counter at the 95% CL using PRC-PRO-RP-40035 as the count of record. If this is not considered feasible in the short term, at a minimum establish a requirement for a reasonable percentage of smears associated with each survey to be collected and later counted using PRC-PRO-RP-40035.

- Revise PRC-PRO-RP-40299 to include only the actions necessary to ensure proper instrument operation, and remove count time parameters that are associated with a particular statistical CL and MDA. The selection of appropriate CLs, count times, and MDA calculations would be better suited for inclusion in a separate procedure.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: April 22 – May 3, 2019

Office of Enterprise Assessments (EA) Management

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Appendix B
Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

- Management Assessment Plan PFP-2019-MA-22354, *Management Assessment of Corrective Actions for Resumption of Plutonium Finishing Plant Higher-Risk Demolition Work*, 4/22/2019
- Management Assessment Report PFP-2019-MA-22354, *Management Assessment of Corrective Actions for Resumption of Plutonium Finishing Plant Higher-Risk Demolition Work*, 5/3/2019
- RL Surveillance Plan, *Verification of Corrective Actions for Resumption of Plutonium Finishing Plant (PFP) Higher-Risk Demolition Activities*
- RL Surveillance Report S-19-AMSE-PFP-001, *Verification for PFP High Risk Resumption of Demolition Activities*, 6/5/2019
- CHPRC-00328, *PFP Project Site Specific Safety and Health Plan (HASP)*, Rev. 10, 1/21/2019
- Work Instruction 2Z-18-01979, *Debris Size Reduction and Load Out*, WCN #001
- ALARA Management Worksheet Z-AMW-1216, *Debris Size Reduction and Load Out*
- CHPRC Radiological Work Permit ZS-1035, *PFP- Demolition, Debris Size Reduction and Load Out of 234-5Z excluding RMA and RMC Lines*, Rev 04, 4/22/2019
- Work Instruction 2Z-18-03721/W, *Resumption of Building 234-5Z Demolition*, WCN #001
- ALARA Management Worksheet Z-AMW-1226, *Resumption of Building 234-5Z Demolition, excluding RMA and RMC Lines*
- Work Instruction 2Z-18-04863/W, *Repair or Replace Components and Filters on Ionex Exhausters*, WCN 1
- ALARA Management Worksheet Z-AMW-1240, *Repair/Replace Components and Filters on Ionex Exhausters*
- CHPRC Radiological Work Permit ZS-1042, *Repair/Replace Components and Filters on Ionex Exhausters*, Rev 04, 4/22/2019
- Work Instruction 2Z-18-03721/W, *Demolition of Building 234-5Z A and C Lines*, WCN #001
- ALARA Management Worksheet Z-AMW-1226, *Demolition of Building 234-5Z Zones 5 and 6 (A and C Lines)*
- CHPRC Radiological Work Permit ZS-1038, *Demolition of Building 234-5Z Zones 5 and 6 (A and C Lines)*, Rev 04, 4/22/2019
- Work Instruction 2Z-18-05422/W, *Final Demolition and Loadout of Building 236Z*
- ALARA Management Worksheet Z-AMW-1234, *Demolition of Building 234, Final Demolition and Loadout of Building 236Z*
- CHPRC Radiological Work Permit ZS-1043, *PFP – Final Demolition and Loadout of Building 236-Z*, Rev. 1, 4/1/2019
- PRC-PRO-OP-055, *Startup Readiness*, Rev. 3, Change 2, 1/3/2018
- PRC-PRO-QA-246, *Management Assessment*, Rev. 5, 1/3/2019
- CHPRC-03589, *Plutonium Finishing Plant Work Resumption Plan*, Rev. 0, 6/28/2018
- PRC-PRO-QA-052, *Issues Management*
- PRC-PRO-RP-40299*, Ludlum 2360, 2224 Series Scaler/Ratemeter*
- PRC-PRO-RP-40035, *Analyzing Smear, Lapel, and Air Samples*
- HRCF-TP-2018-001, *Recommended Statistical Basis for Radiological Contamination Surveys at the Hanford Site*
- DOE/RL-2012-12, *Hanford Radiological Health and Safety Document*
- PFP-2019-WSA-23320, *Plutonium Finishing Plant (PFP) Closure Project Radiological Control Program High Risk Work Activities Management Assessment Readiness*
- PFP-2019-WSA 23542, *Review and Discussion of Lessons Learned During Debris Load out Activities 9/1/2108-4/1/2019*

- CHPRC-03982, *Mid-Point Effectiveness Review Report Rev 1 Radiological Protection Midpoint Evaluation*

Interviews
- CHPRC MA team members
- CHPRC PFP Radiological Controls subject matter experts
- RL Oversight team members
- Follow-up during CHPRC MA team interviews, where appropriate

Observations
- Pre-job briefs
- Demolition demonstration (PFP vault) – lower risk demolition
- Plan of the Day meetings
- CHPRC MA team interviews with PFP personnel
- CHPRC MA team daily briefings
- Emergency drill including pre-briefs and post-drill hot wash
- PRF debris work package demonstration
- PFP A and C Lines demolition work package tabletop
- RL daily team meetings
- Walkdown of boundary postings
- Vehicle and personnel clearance surveys
- Post-job briefs

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.

- CHPRC pumped contaminated dust suppression water away from the demolition area into a bermed soil area within the PFP high contamination area boundary, possibly creating a contaminated soil column, contrary to the requirements of DOE Order 458.1.