



**Independent Assessment  
of Environmental Radiation  
Protection for Planned  
Open-Air Demolition  
at the  
West Valley Demonstration Project**

**December 2021**

Office of Enterprise Assessments  
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## Acronyms

AAMN	Ambient Air Monitoring Network
ALARA	As Low As Reasonably Achievable
CAD	Computer Aided Design
CFR	Code of Federal Regulations
CHBWV	CH2M HILL BWXT West Valley, LLC
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
DOE-WVDP	DOE WVDP Field Office
EA	Office of Enterprise Assessments
EMPP	Environmental Monitoring Program Plan
EPA	U.S. Environmental Protection Agency
MAR	Material at Risk
mph	miles per hour
MPPB	Main Plant Process Building
NESHAP	National Emission Standards for Hazardous Air Pollutants
OFI	Opportunity for Improvement
TWD	Technical Work Document
VF	Vitrification Facility
WVDP	West Valley Demonstration Project
WVLL	WVDP Lessons Learned

# INDEPENDENT ASSESSMENT OF ENVIRONMENTAL RADIATION PROTECTION FOR PLANNED OPEN-AIR DEMOLITION AT THE WEST VALLEY DEMONSTRATION PROJECT

## Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the environmental radiation protection program associated with the planned open-air demolition of the Main Plant Process Building (MPPB) at the West Valley Demonstration Project (WVDP) from July to August 2021. This assessment was conducted remotely and therefore did not include an onsite evaluation of the implementation of the program by the prime contractor, CH2M HILL-BWXT West Valley, LLC (CHBWV). This assessment also evaluated the DOE WVDP Field Office's processes for conducting oversight of demolition planning activities at WVDP.

EA identified the following strengths, including one best practice:

- CHBWV has established an effective environmental radiation protection program that is compliant with DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This program was implemented successfully in previous WVDP demolition activities and is adequate for the MPPB demolition work.
- CHBWV has incorporated prior demolition experience and lessons learned from across the DOE complex to minimize potential dose to the public.
- CHBWV has innovatively combined the detailed wall/ceiling/floor-level and component-level radionuclide contamination inventory of the MPPB with its as-built structural diagrams to develop a sequential demolition plan phased over a three-year period that has the potential to minimize cross-contamination of facility areas, restrict the migration of contamination, and reduce the time and resources needed for demolition. (**Best Practice**)
- Radiological doses to members of the public are effectively estimated to demonstrate compliance with National Emission Standards for Hazardous Air Pollutants.

EA also identified two weaknesses, as summarized below:

- The draft work instruction package W1904751 does not contain written instructions or appropriate references to ensure effective and consistent implementation of controls necessary to minimize radionuclide releases during demolition. Consequently, contamination controls could be less effective than anticipated.
- The draft as low as reasonably achievable (ALARA) review report on methods to keep exposures to workers and members of the public ALARA during the proposed work lacks sufficient specificity to ensure that radiological controls identified in W1904751 will be adequately implemented.

In summary, CHBWV's professional and detailed planning efforts to date have comprehensively addressed most planned MPPB demolition activities, identified the control mechanisms required to minimize potential releases to the environment, and effectively applied complex-wide lessons learned. However, CHBWV has not yet fully developed the work control mechanisms necessary to ensure that controls are properly implemented to reduce radiological dose consequences from MPPB demolition activities. Until the concerns identified in this report are addressed and effective mitigations are put in place, CHBWV cannot provide reasonable assurance that contamination controls will be optimized and doses to workers and the public minimized. CHBWV has indicated their intent to address the concerns identified in this report during the finalization of work package(s) and include any necessary control mechanisms before the start of demolition.

EA will consider a follow-up assessment during the start of the demolition process to evaluate the implementation of the radiation protection program for both workers and the environment.

# INDEPENDENT ASSESSMENT OF ENVIRONMENTAL RADIATION PROTECTION FOR PLANNED OPEN-AIR DEMOLITION AT THE WEST VALLEY DEMONSTRATION PROJECT

## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the effectiveness of the environmental radiation protection program associated with planned open-air demolition of the Main Plant Process Building (MPPB) at the West Valley Demonstration Project (WVDP), as implemented by the prime contractor, CH2M HILL BWXT West Valley, LLC (CHBWV). Since the passage of the West Valley Demonstration Project Act in 1982, the site has been designated a cleanup project that is managed by the DOE Office of Environmental Management through the DOE WVDP Field Office (DOE-WVDP). Federal oversight at WVDP is provided by DOE-WVDP and augmented by support from the Environmental Management Consolidated Business Center (EMCBC). The EMCBC supports programmatic assessments of the contractor in specialized areas, such as cyber security, that require unique expertise not available within DOE-WVDP. Oversight of radiation protection and environmental protection programs is performed by DOE-WVDP. This assessment was requested by the DOE-WVDP Director and was conducted remotely from July to August 2021 due to the Coronavirus Disease 2019 (COVID-19) pandemic.

In accordance with the *Plan for the Assessment of Planning for Environmental Radiation Protection Associated with Open-Air Demolition of WVDP/MPPB, June 2021*, this assessment evaluated the radiation protection policies, plans, and procedures in place to protect the public and the environment against undue risk from radiological releases that could occur during open-air demolition of the MPPB. The assessment included a review of controls and contingency measures to ensure that potential radiation exposures to the public are kept within dose limits established by DOE directives and the U.S. Environmental Protection Agency (EPA) and as low as reasonably achievable (ALARA). In addition, the assessment reviewed DOE-WVDP oversight of the demolition planning efforts. While the scope of this review did not explicitly include the occupational radiation protection program, the review does provide some observations on this program.

The assessment focused on the planning for the MPPB demolition. At the time of this assessment, demolition of the MPPB was still several months away; some work documents for the demolition were under development. As a result, the adequacy of the planned dust suppression controls could not be evaluated during this assessment.

## 2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which is implemented through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms “best practices, deficiencies, findings, and opportunities for improvement (OFIs)” as defined in DOE Order 227.1A.

As identified in the assessment plan, this assessment considered the requirements of DOE Order 458.1, *Radiation Protection of the Public and the Environment*, as they relate to environmental radiation protection and monitoring during open-air demolition of the MPPB.

EA used all sections of Criteria and Review Approach Document (CRAD) 31-38, *Environmental Radiological Protection and Monitoring During Demolition of Contaminated Facilities*, Revision 0, and selected sections of CRAD 30-07, *Federal Line Management Oversight Processes*, Revision 0.

EA examined key documents, such as demolition plans, work packages, procedures, analytical models, and training and qualification records. EA also interviewed key personnel responsible for developing and executing the environmental radiation protection and monitoring program. Because this assessment was conducted remotely, EA did not directly observe work activities or walk down any portion of the environmental monitoring system.

The members of the assessment team, the Quality Review Board, and management responsible for this assessment are listed in Appendix A.

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

### **3.0 RESULTS**

This section presents the assessment results related to the overall adequacy of CHBWV planning for MPPB demolition, including the environmental radiation protection program, radiological source characterization and minimization, public dose evaluations to demonstrate compliance with dose limits, and onsite environmental monitoring.

#### **3.1 Environmental Radiation Protection Program**

The objective of this portion of the assessment was to evaluate whether the site's environmental radiation protection program appropriately addresses potential impacts from decommissioning and demolition activities through institutional programs, technical work documents (TWDs), and the ALARA program.

##### **Institutional Programs**

CHBWV has appropriately established an environmental radiation protection program described in WVDP-098, *Environmental Monitoring Program Plan* (EMPP). The EMPP has governed previous WVDP decommissioning and demolition activities and effectively addresses the applicable environmental requirements of DOE Order 458.1 that must also be met during MPPB demolition (e.g., identification of possible emission sources, air effluent monitoring, meteorological monitoring, and public dose limits from air emissions using dose assessment modeling and/or air monitoring).

With respect to environmental protection training and qualifications, procedures WVDP-126, *Performance Based Training Program Manual*; WVDP-474, *WVDP Training Implementation Matrix*; and EM-109, *Quality Assurance Plan* effectively define and describe the application of the requirements in DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*. While the level of required experience and training varies depending on position, WVDP appropriately applies the requirements to all staff who support demolition work. Interviews confirmed that the MPPB demolition workforce includes long-term, highly experienced employees with thorough knowledge of the site and the MPPB, and employees with prior experience on the successful demolition of the Vitrification Facility (VF), which was completed in 2018.

## Technical Work Documents

CHBWV is currently developing TWDs, implementing documents used to control work, for the MPPB demolition based on prior VF demolition experience and other lessons learned from across the DOE complex to minimize potential dose to the public. WVDP-586, *WVDP MPPB Decommissioning & Demolition Plan*, is modeled after the VF Demolition Plan, a project that successfully maintained public doses well below the National Emission Standards for Hazardous Air Pollutants (NESHAP) public dose limits. WVLL-2021-001, *Lessons Learned Review for MPPB Startup*, appropriately identifies and incorporates lessons learned from the VF and other open-air demolition projects to reduce emissions, thereby minimizing dose to workers and the public. WVDP-602, *Main Plant Process Building (MPPB) Demolition Contamination and Radiological Air Monitoring Plan (CRAMP)*, adequately describes the approach, monitoring equipment, sampling locations, and sampling frequencies to detect and manage any potential workplace radioactive contamination and airborne radioactivity during MPPB demolition.

The success of the processes described in the above procedures in controlling radiological dose from WVDP operations and prior demolitions of facilities is evident in the results reported in past annual site environmental reports required by DOE Order 458.1 and NESHAP compliance reports submitted to the EPA per NESHAP Subpart H requirements, specifically 40 CFR 61.94, *Compliance and Reporting*. These reports demonstrated that the maximum effective dose equivalent that any member of the public could have received was a small fraction of the 10 millirem/year (0.1 millisievert/year) NESHAP limit.

CHBWV is developing draft work instruction package W1904751, *Main Plant Process Building Demolition*, to govern the demolition process and minimize radiological doses. However, because W1904751 is a draft document that does not yet contain or reference sufficient written instructions, the adequacy of proposed controls could not be evaluated. This EA report provides some observations to improve W1904751 before it is finalized and issued. (See **OFI-CHBWV-1**)

## ALARA

CHBWV has established and is implementing adequate processes to optimize control and management of radiological activities to keep doses to members of the public (both individual and collective) and releases to the environment as low as reasonably achievable. WV-984, *ALARA [As Low as Reasonably Achievable] Program*, effectively addresses the environmental ALARA requirements stipulated in DOE Order 458.1 and the requirements of 10 CFR 835, *Occupational Radiation Protection Program*, to minimize the potential for spread of radiological contamination to the environment. The document addresses goals and performance indicators, radiological design and engineered controls, TWD reviews, operational trigger levels, and the use of an ALARA independent review committee.

CHBWV provided EA with one draft ALARA review, 2020-1001, *Demolition of MPPB*. EA identified weaknesses in its level of rigor, in that it was overly general, contained little detail, and did not effectively implement the program as defined in WV-984. For example, it was not sufficiently specific in addressing engineering and administrative controls to minimize the dispersion of radiological contamination and public dose; although it identified the lesson learned that “Dust suppression needs to have the correct position, height, velocity, amount,” the discussion of engineering controls only stated, “Fixatives will be used liberally as well as water for dust suppression.” This level of detail is inadequate to address the identified lesson learned and limits CHBWV’s ability to ensure that specific identified controls are properly specified in W1904751. (See **OFI-CHBWV-2**)

## **Environmental Radiation Protection Program Conclusions**

The CHBWV EMPP, which has governed past WVDP deactivation and demolition activities, effectively addresses air emission monitoring, meteorological monitoring, and public dose limits from air emissions based on ambient air monitoring data. TWDs are being developed based on prior demolition experience and lessons learned from WVDP and across the DOE complex to minimize potential air emissions and the resulting dose to the public. CHBWV's ALARA review process is adequate to optimize planned radiological activities to minimize doses to workers and members of the public (individual and collective), but the draft ALARA review of the MPPB demolition lacked sufficient rigor and did not adequately implement the requirements of WV-984.

### **3.2 Radiological Source Characterization and Minimization**

The objective of this portion of the assessment was to evaluate whether methods are in place to characterize and minimize the release of radiological contamination from the MPPB demolition activities.

#### **Characterization of Facility Contamination**

CHBWV has established and implemented an adequate process to characterize the radiological contamination of WVDP facilities in preparation for demolition. WVDP-586 invokes procedure RC-RPO-104, *Performing Radiation and Contamination Surveys*, which provides general guidelines for performing pre-demolition radiological surveys. Throughout the decontamination and deactivation phases, CHBWV has maintained a Characterization Database that details all historical WVDP facility radionuclide-specific contamination survey data unique to each room surface (e.g., wall, ceiling, floor, and pipes).

WVDP-606, *West Valley Demonstration Project Main Plant Process Building Radionuclide Inventory for 40 CFR 61 Subpart H*, provides adequate instructions to: (1) use the MPPB portion of the Characterization Database – hereafter referred to as the MPPB material at risk (MAR) database – to identify facility room surfaces that will pose the potential for airborne radiological contamination during demolition, and (2) calculate the MAR for each planned demolition technique for radionuclides that have the greatest potential to contribute to the public dose, as required by 40 CFR 61.93, *Emission monitoring and test procedures*, section (b)(5)(ii). WVDP-605, *Estimated Radiological Air Emission During Open-Air Demolition Main Plant Process Building*, provides an effective source characterization methodology using the MPPB MAR database to estimate the fraction of radiological contamination that could become airborne. CHBWV appropriately validated its source characterization methodology and modified emission factors based on the VF demolition experience, as documented in WVDP-579 *Vitrification Facility Air Emissions During Open-Air Demolition, Measured vs. Predicted*. EPA Region 2 reviewed these validation results and approved the use of this source characterization methodology for the MPPB demolition.

#### **Minimization of Radiological Contamination**

CHBWV plans and procedures set out in W1904751, Appendix A (e.g., *Phase Sequencing and Demolition Plan*) appropriately incorporate methods and lessons learned that limited airborne dispersion of radiological contamination during previous demolition activities. Work planning documents define a sequenced approach to the demolition of MPPB structures, which is detailed in project planning documents including WVDP-586, W1904751, the MPPB MAR database, the Microsoft Project Schedule, and detailed computer aided design (CAD) drawings. The CAD drawings were used to develop a sequential demolition plan phased over a three-year period, designed to minimize cross-contamination of facility areas, restrict the migration of contamination, and reduce the time and resources for demolition.



This level of sequencing effectively limits the source term available for release during each sequenced step. **(Best Practice)**

WVDP-586, W1904751, and WVLL-2021-001 generally identify the planned use of water misting and fogging, which is standard industry practice to reduce the generation of dust, during MPPB demolition activities. These documents also identify the use of fixatives and dust suppressants to control the spread of contamination. EA was unable to evaluate the adequacy of the dust suppression controls identified in W1904751 because the instructions did not include sufficient specificity for proper implementation. (See **OFI-CHBWV-2**)

## **Radiological Source Characterization and Minimization Conclusions**

CHBWV has established and implemented an adequate process for characterizing the radiological contamination of WVDP facilities in preparation for demolition. Additionally, work planning documents appropriately discuss a sequenced approach to demolition and generally discuss methods for minimizing the possibility of radiological contamination from MPPB demolition activities. However, the draft work package for conducting demolition operations does not provide sufficient detail on the application of fixatives and dust suppression methods.

### **3.3 Dose Limit Compliance**

The objective of this portion of the assessment was to evaluate CHBWV dose assessment processes used to demonstrate compliance with the public dose limit from radiological releases to the environment resulting from demolition activities.

With EPA approval, CHBWV appropriately chose to use an environmental measurement approach to demonstrate compliance with NESHAP and DOE Order 458.1, section 4.e.(8). Design documents, operating records, and interviews demonstrate that CHBWV's Ambient Air Monitoring Network (AAMN) is adequate to: (1) ensure that airborne radiological monitoring and sampling are effectively performed, (2) identify airborne releases and trends, and (3) demonstrate compliance with the 10 mrem/year NESHAP dose limit. The AAMN appropriately consists of 16 low-volume sampling stations (one for each compass sector) and one high-volume sampler (which can measure lower concentrations) in the sector most often identified as having the potential for maximum estimated dose. Past system operating records demonstrate that these samplers are operated at a high level of reliability (~98%). Samples are obtained bi-weekly and are screened onsite using alpha/beta counting, and results are entered into a site Environmental Laboratory Information Management System that effectively computes and flags any anomalous results for further review and trending purposes. Each quarter, the collected bi-weekly samples are composited for isotopic analysis by a certified contract laboratory and used for NESHAP compliance reporting. The AAMN detection limits are conservatively below the minimum required NESHAP detection limits.

However, EA identified that CHBWV does not apply any correction factor to the onsite screening samples to take into account the self-absorption of alpha particles from dust loading on environmental air sample filters, which affects the alpha particles' ability to reach the detector and could result in some alpha activity being missed. Alpha self-absorption associated with dust loading of particulate air sample filters is a long-acknowledged concern identified by both DOE and the U.S. Nuclear Regulatory Commission. This concern would not impact the annual NESHAP reporting accuracy but diminishes the added benefit that the AAMN could provide to identify potential short-term alpha excursions. As a result of EA's concern, CHBWV initiated further evaluations. CHBWV acknowledged that attenuation of alpha particles could be a factor but concluded that the potential added benefit of applying a correction factor

would be redundant to another monitoring system already in place. EA concludes that the results of the CHBWV evaluation are reasonable.

### **Dose Limit Compliance Conclusions**

Doses to members of the public are effectively evaluated to demonstrate compliance with NESHAP and DOE requirements. The AAMN is properly designed to gather air sampling data. CHBWV's approach of collecting air samples for laboratory analysis is appropriate.

### **3.4 Onsite Environmental Monitoring**

The objective of this portion of the assessment was to evaluate whether onsite airborne radiological monitoring and meteorological monitoring have been planned and/or implemented to detect releases and control demolition activities.

As part of its workplace radiation control program, CHBWV plans to conduct comprehensive onsite air sampling and contamination surveys during demolition work to detect and react to any potential releases. In addition, continuous monitoring of real-time meteorological data will be used to restrict demolition operations as appropriate.

#### **Airborne Monitoring**

Draft and final TWDs demonstrate that CHBWV is in the process of developing onsite airborne radiological monitoring protocols to detect and characterize releases of radiological contamination during decommissioning and demolition activities. WVDP-602 adequately describes the approach, monitoring equipment, sampling locations around the MPPB, and sampling frequencies to manage potential radioactive contamination and airborne radioactivity during MPPB demolition. Workplace air monitoring equipment includes both continuous air monitors and fixed air samplers. RC-RPO-104 also provides guidelines for performing deposition monitoring around the demolition site using pre-staged deposition plates and other horizontal surfaces during demolition.

EA noted that even though W1904751 is cited as the implementing document for controls stipulated in WVLL-2021-001, it does not contain sufficient written instructions or appropriate references to sections of other existing procedures. Specific implementation information presented in WVDP-602 and RC-RPO-104 is also not referenced in W1904751. Further, W1904751 contains less detailed information than higher-level documents (WVDP-602 and RC-RPO-104), and in some cases presents conflicting information. For example, W1904751, Appendix C, *Radiological Controls*, only mentions a requirement to conduct deposition monitoring, in contrast to RC-RPO-104, which provides more detail on the deposition monitoring methodology and frequency. Similarly, the same appendix states that the number and location of air sampling equipment will be determined by Radiological Engineering, in conflict with WVDP-602, which identifies the actual location of this sampling equipment. W1904751's current lack of specificity presents a risk to the effective and consistent implementation of identified hazard controls.

#### **Real-Time Meteorological Monitoring**

CHBWV has established effective processes to use onsite real-time meteorological monitoring data during MPPB demolition activities to ensure that conditions are within planned parameters. W1904751 appropriately requires suspending operations when winds are greater than 15 mph and ceasing operations and securing debris piles when winds are greater than 30 mph. Interviews with CHBWV personnel identified the practice of sharing meteorological data among the operational and environmental organizations.

## Environmental Monitoring Conclusions

MPPB planning documents and procedures adequately describe the environmental monitoring approach, equipment, sampling locations around the MPPB, and sampling frequencies to identify potential radiological releases during MPPB demolition. W1904751 appropriately requires suspension of operations and securing debris piles when pre-determined wind speeds are encountered. However, at the time of this assessment, W1904751 did not contain sufficient details or appropriate references to ensure effective and consistent implementation of controls related to surveys of pre-staged deposition plates and air sampling.

### 3.5 DOE Field Element Oversight

The objective of this portion of the assessment was to assess the effectiveness of DOE-WVDP in providing appropriate oversight of CHBWV performance in protecting the public and the environment from radiation during demolition activities.

DOE-WVDP's oversight program is defined in DOE-WVDP-010, *DOE-WVDP Assurance Oversight Program Description*, and is consistent with the requirements of DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, for evaluating CHBWV performance. The oversight program is implemented through a host of procedures.

DOE-WVDP maintains a three-year forward-looking schedule listing the annual, biennial, and triennial assessments required by applicable DOE orders. From this list, an annual oversight schedule is developed for the given year. The annual oversight schedule appropriately includes the required programmatic assessments, as well as specific oversight activities selected based on CHBWV's planned scope of work, or focus areas based on prior performance. A monthly oversight schedule is developed for all applicable functional areas, with assignments for onsite and on-call periods. DOE-WVDP oversight includes assessments, surveillances, reviews, and audits. Additional oversight activities include walkdowns for operational awareness and participation in scheduled meetings between DOE-WVDP and CHBWV counterparts. Walkdowns and field observations are appropriately conducted by every team within DOE-WVDP and are documented as daily oversight.

Based on the current work underway at WVDP, DOE-WVDP oversight focuses on demolition planning, including environmental radiation protection and monitoring. Through daily morning calls, frequent walkdowns, and collaboration with CHBWV staff on a near daily basis, DOE-WVDP collects oversight information on work progress. The CHBWV Safety Assessment Center reports on planned work every day, highlighting the hazards and safety controls, and provides a high-level summary of what happened the prior day, with the opportunity for sharing of lessons-learned, as appropriate. In addition to the Facility Representatives, the Federal Project Directors, managers, and various subject matter experts frequently call in to listen to the morning Safety Assessment Center calls.

DOE-WVDP holds multiple counterpart meetings with CHBWV on a weekly, monthly, or as needed basis. During interviews, all technical oversight personnel stated they had regular meetings with their CHBWV counterparts. DOE-WVDP management also has a regular weekly management meeting with CHBWV. In most cases, agendas are provided, and meeting minutes are created. EA reviewed 17 meeting agendas and/or minutes from various counterpart meetings related to environmental compliance or radiation protection. Based on this review, these regular meetings adequately serve to collect operations information, develop an understanding of technical issues, and share feedback on CHBWV performance.

The readiness process for demolition of the MPPB is progressing, with a CHBWV line management self-

assessment under way. Both contractor and Federal readiness assessments are being planned in accordance with DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, and development of a plan of action and implementation plan is in process.

To control critical portions of the work scope, DOE-WVDP inserted a clause in the MPPB demolition contract to require submittal of key project deliverables for DOE-WVDP review and approval before initiation of work. In addition, any changes to W1904751 must be approved by DOE-WVDP. These provisions ensure that DOE-WVDP will have an opportunity to provide technical feedback on planned MPPB demolition activities.

Because the demolition is expected to take more than three years, DOE-WVDP is actively planning for staff attrition. To ensure that critical project knowledge is passed along and maintained, DOE-WVDP appropriately hired several new staff through new graduate programs. These new staff members are paired with seasoned DOE-WVDP subject matter experts to gain experience and project knowledge while being mentored.

Document reviews show that the DOE-WVDP staff maintains operational awareness and addresses questions and concerns with CHBWV management. DOE-WVDP's documentation for assessments of the occupational radiation protection program is comprehensive and critical, and it appropriately identifies significant issues for CHBWV resolution. Similarly, DOE-WVDP's formal assessments and surveillances of CHBWV activities relevant to environmental radiation protection are comprehensive and thorough, and the documented findings and observations resulted in timely identification, feedback, and correction of issues. For example, during the demolition of the VF, DOE-WVDP conducted a formal assessment of CHBWV's radiation protection program implementation that resulted in two findings. The first finding was related to radiological monitoring practices, and as a result of this finding, CHBWV immediately corrected the practice to comply with the requirements stated in its work instructions. The other finding was related to documentation, and at the time of the DOE-WVDP assessment, CHBWV had corrected this deficient practice.

### **DOE Field Element Oversight Conclusions**

DOE-WVDP has an effective oversight program that provides thorough evaluations of CHBWV's performance, particularly regarding the environmental radiation protection program for monitoring public dose resulting from demolition activities. The DOE-WVDP staff and management maintain cognizance of day-to-day deactivation activities and MPPB demolition planning, and they conduct routine meetings with CHBWV, spend appropriate time at the site observing work, reinforcing safety, and verifying that DOE expectations are met. The oversight program adequately includes assessments and surveillances of CHBWV and applies lessons learned for feedback and improvement. Assessments conducted by DOE-WVDP are comprehensive and critical, and they appropriately identify significant issues for CHBWV resolution.

## **4.0 BEST PRACTICES**

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

- CHBWV has innovatively combined the detailed wall/ceiling/floor-level and component-level radionuclide contaminant MPPB inventory with MPPB facility as-built structural diagrams. This information was used to develop detailed CAD drawings that were then used to develop a sequential

demolition plan, phased over a three-year period, that has the potential to minimize cross-contamination of facility areas, restrict the migration of contamination, and reduce the time and resources needed for demolition. This level of sequencing inherently limits the source term available for release during each sequenced step. The CAD drawings are planned to be used in daily worker briefings to ensure that all workers have appropriate situational awareness of each day's tasks.

## **5.0 FINDINGS**

There were no findings identified as part of this assessment.

## **6.0 DEFICIENCIES**

There were no deficiencies identified as part of this assessment.

## **7.0 OPPORTUNITIES FOR IMPROVEMENT**

The assessment team identified two OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports, they may also address other conditions observed during the assessment process. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

### **CHBWW**

**OFI-CHBWW-1:** Consider revising the draft work instruction package W1904751 to include additional details (e.g., instructions or appropriate references to existing procedures) that are necessary to ensure the effective and consistent implementation of controls that minimize potential radionuclide releases during demolition. Such additional detail could include, but is not limited to, dust suppression mechanisms (e.g., water misting and fogging, fixatives, and dust suppressants), deposition monitoring, and air sampling.

**OFI-CHBWW-2:** Consider revising the draft ALARA review report to strengthen the specificity regarding methods to keep exposures to workers and members of the public as low as reasonably achievable during demolition. Increasing the rigor of the ALARA review would help ensure that specific radiological controls are identified to be flowed down into the final work instruction package W1904751 for implementation.

## **8.0 FOLLOW-UP ITEMS**

EA will consider a follow-up assessment during the start of the demolition process to evaluate the implementation of the radiation protection program for both workers and the environment.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Remote Assessment: July – August 2021

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