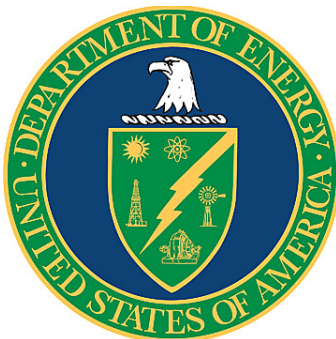




## **CH2M HILL BWXT West Valley, LLC West Valley Demonstration Project**

**Report from the Department of Energy  
Voluntary Protection Program  
Onsite Review  
April 18-27, 2017**



U.S. Department of Energy  
Office of Environment, Health, Safety and Security  
Office of Health and Safety  
Office of Worker Safety and Health Assistance  
Washington, DC 20585

## Foreword

The Department of Energy (DOE) recognizes that excellence can be encouraged and guided, but not standardized. On January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration's (OSHA) VPP. Since its creation by OSHA in 1982 and implementation by DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health.

DOE-VPP outlines areas where DOE contractors and subcontractors can surpass compliance with DOE Orders and OSHA standards. The program encourages a *stretch for excellence* through systematic approaches, which emphasize creative solutions through cooperative efforts by managers and employees. Requirements for the DOE-VPP participation are based on comprehensive management systems with employees actively involved in assessing, preventing, and controlling potential health and safety hazards at their sites. All contractors in the DOE complex, including production facilities, laboratories, and various subcontractors and support organizations may participate in DOE-VPP.

However, in keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, any participant may withdraw from the program at any time. DOE-VPP consists of three programs with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star program is the core of DOE-VPP. This program is aimed at outstanding protectors of employee safety and health. The Merit program is a steppingstone for participants that have good safety and health programs, but need time and DOE guidance to achieve true Star status. The Demonstration program, expected to be used rarely, allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Merit or Star program.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of employees at the site. The symbols of this recognition are certificates of approval and the right to use flags showing the program in which the site is participating. The participant may also choose to use the DOE-VPP logo on letterhead or on award items for employee incentive programs.

This report summarizes the results from the evaluation of CH2M HILL BWXT West Valley, LLC (CHBWV), conducted April 18-27, 2017, and provides the Acting Associate Under Secretary for Environment, Health, Safety and Security with the necessary information to make the final decision regarding CHBWV's continued participation as a DOE-VPP Star site.

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## ABBREVIATIONS AND ACRONYMS

ALARA	As Low As Reasonably Achievable
AOC	Ashford Office Complex
AU	Office of Environment, Health, Safety and Security
AU-12	Office of Worker Safety and Health Assistance
BLS	Bureau of Labor Statistics
BTZ	Beyond Target Zero
CBT	Computer-Based Training
CBTZ	Company-Level Beyond Target Zero
CFR	Code of Federal Regulations
CHBWW	CH2M HILL BWXT West Valley, LLC
CIH	Certified Industrial Hygienist
CPC	Chemical Process Cell
DART	Days Away, Restricted or Transferred
D&D	Decontamination and Decommissioning
DOE	Department of Energy
ECP	Employee Concerns Program
ESS	Event Summary Sheet
EM	Office of Environmental Management
FF	Fact Finding
GET	General Employee Training
HLW	High-Level Waste
HR	Human Resources
IAS	Integrated Assessments Schedule
IH	Industrial Hygiene
IR	Issue Report
ISMS	Integrated Safety Management System
IWP	Industrial Work Permit
JSA	Job Safety Analysis
LOTO	Lock-Out/Tag-Out
LPRC	Low Profile Rail Cart
MPPB	Main Plant Process Building
NAICS	North American Industry Classification System
NFG	National Fuel Gas
NFM	Nuclear Facility Manager
NFPA	National Fire Protection Association
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
PD	Program Description and Continuing Training Plan
PPE	Personal Protective Equipment
QWL	Qualified Watch List
RWP	Radiological Work Permit
SAC	Safety Assessment Center
SME	Subject Matter Expert
STS	Safety-Trained Supervisor
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TRC	Total Recordable Case
VE	Value Engineering

VPP	Voluntary Protection Program
WIP	Work Instruction Package
WVDP	West Valley Demonstration Project
WVDPO	West Valley Demonstration Project Office

## EXECUTIVE SUMMARY

The Department of Energy's (DOE) Voluntary Protection Program (VPP) Assessment Team (Team) from the Office of Environment, Health, Safety and Security (AU) recommends that CH2M HILL BWXT West Valley, LLC (CHBWV) continue participating in DOE-VPP as a Star site. This report documents the Team's observations, conclusions, and identifies several opportunities for improvement that CHBWV can consider in its pursuit of excellence in worker safety and health.

The Western New York Nuclear Service Center covers about 3,300 acres approximately 35 miles south of Buffalo, New York. The New York State Energy Research and Development Authority manages the site on behalf of the State of New York, which was the home of the Nation's only commercial nuclear fuel reprocessing facility. On June 29, 2011, DOE awarded CHBWV a 6-year contract to continue the cleanup of facilities at West Valley Demonstration Project (WVDP). The West Valley site initially entered DOE-VPP in 1999. Continued participation requires an onsite assessment by AU. The Office of Worker Safety and Health Assistance (AU-12), within AU, scheduled that triennial assessment for April 18-27, 2017, and this report documents the results of that assessment.

CHBWV employs approximately 210 people and 90 subcontractor individuals at the site. The International Association of Machinists, Local 2401, represents 90 CHBWV employees. Many of these workers have worked at the West Valley site for most of their careers, some for 30 or more years. Since the 2013 assessment, CHBWV completed the milestone to relocate the high-level canisters from the main plant process building (MPPB), completed decontamination of the vitrification facility, and has shifted its efforts to decontamination of the MPPB. Hazards encountered on a daily basis by CHBWV workers include both high- and low-level radioactive wastes and the full range of industrial hazards, associated with elevated work, heavy equipment, electrical equipment, excavation, noise, and potential exposure to hazardous materials and chemicals.

CHBWV has a low injury rate for the type of work it performs. The Team identified one case in 2016 that it believes is recordable because it involved medical treatment beyond first aid. Although adding this case to the calculation for total recordable case (TRC) rate does increase the 2016 TRC rate, that rate remains well below the comparable TRC rate for that type of work.

CHBWV managers are committed to completing the contract milestones on time or early and recognize excellent safety and health performance as a contributor to that goal. They are dealing with a variety of challenges to that goal in a manner that protects the safety and health of the workforce. They recognize the contributions workers make on a daily basis, but should continue to emphasize the value of a deliberate approach to work in which workers question work methods, site conditions, and assumptions. That approach includes following site policies and procedures for work planning for all work, especially work perceived as routine or low-risk.

CHBWV continues to maintain strong employee involvement. Employees are engaged in the continuous improvement of the safety culture and are committed to maintaining a safe work environment. Beyond Target Zero (BTZ) teams actively encourage worker input and track and resolve the employee-generated issues, but the BTZ teams are not as employee-owned as in previous reviews. CHBWV managers recognize the positive contributions of worker input in resolving project challenges. Employee participation in a variety of projects demonstrates

employee involvement, but CHBWV must be careful as it moves forward to continue encouraging employees' input and recommendations in each project while simultaneously encouraging additional worker participation on BTZ teams.

CHBWV has a work control process that requires analysis of all hazards associated with work. CHBWV uses that process in the complicated high-hazard work associated with decontamination and decommissioning (D&D), but does not consistently use it for low-hazard or routine work. CHBWV should focus resources on routine work to identify and analyze hazards so workers do not make incorrect assumptions about those hazards.

CHBWV continues to use the appropriate hierarchy of controls to limit employees' exposure to hazards and protect the environment. It has used mockups of operations and activities successfully to protect workers, reduce dose, and meet schedule deadlines. As work has progressed further into the decontamination and demolition phase, CHBWV has faced ongoing challenges with space reductions and operational logistics, including changing the MPPB radiation buffer zones to contamination areas, which has now begun. Workers have demonstrated extensive employee involvement in hazard prevention and control by regularly providing solutions to challenging problems presented by hazardous work.

The CHBWV safety and health training program continues to provide workers, supervisors, and managers with the appropriate training requirements. The Training Group has established processes to ensure training and qualification records are current. CHBWV uses program descriptions to preanalyze and define workers' required training by work task to establish relevant training requirements. CHBWV provides numerous reminders, postings, required reading subjects, and lessons learned safety topics to encourage safety awareness at the site. CHBWV is addressing inconsistencies in General Employee Training (GET).

CHBWV is performing its cleanup mission at WVDP in a manner that protects the health and safety of the workforce. Although faced with several challenges to contract scope, cost, and schedule, managers are appropriately encouraging workers to perform their jobs safely without worrying about the project schedule. However, in some cases, CHBWV has trended toward relying more on worker awareness and skill rather than supplementing that awareness and skill with the systematic work control process defined in its integrated safety management system (ISMS), primarily for routine tasks perceived as low-hazard. In other cases, slow changes in site conditions, such as the spread of contamination into areas previously treated as radiological buffer zones, have created situations where historic work practices no longer provide adequate safety margins. CHBWV is pursuing improvements in its safety culture by implementing management processes that will further encourage workers to report safety concerns and ensure that managers and supervisors do not exert schedule pressure when responding to workers' questions. The Team identified several opportunities for improvement that will help CHBWV address the identified conditions and continue its improvement.

**TABLE 1**

**OPPORTUNITIES FOR IMPROVEMENT**

<b>Opportunity for Improvement</b>	<b>Page</b>
CHBWV managers should emphasize to the workforce the need to follow work-planning processes, despite a perceived delay of work, because those processes prevent events, exposures, rework, and subsequent investigations that do lead to long work delays.	<b>7</b>
CHBWV should continue encouraging employee input and recommendations in each project while simultaneously encouraging additional worker participation on BTZ teams.	<b>10</b>
CHBWV should consider adding new routine activities to WVDP-485 as it approves those activities to help workers and planners efficiently plan and perform work.	<b>13</b>
CHBWV should revise its JSAs to include the specific control so workers do not have to make interpretations on the hazard control.	<b>13</b>
CHBWV should review all its routine and skill-of-the-worker tasks, 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.	<b>14</b>



## I. INTRODUCTION

The Western New York Nuclear Service Center covers about 3,300 acres approximately 35 miles south of Buffalo, New York. The New York State Energy Research and Development Authority manages the site on behalf of the State of New York, which was the home of the Nation's only commercial nuclear fuel reprocessing facility. The WVDP was one of five sites that reported to DOE's Office of Environmental Management's (EM) Ohio Field Office. In May 2006, DOE transferred WVDP from the Ohio Field Office to EM's Office of Site Support and Small Projects. On June 29, 2011, DOE awarded CH2M HILL BWXT West Valley, LLC (CHBWV) an 8.6-year contract to continue the cleanup of facilities at WVDP. CHBWV consists of four companies: (1) CH2M HILL Constructors Inc.; (2) Babcox & Wilcox Technical Services Group (BWXT); (3) Environmental Chemical Corporation; and (4) American DND. The major contract milestones include: (1) complete the high-level canister relocation; (2) process, ship, and dispose of all legacy waste offsite; (3) demolish and remove the MPPB and the vitrification facility; and (4) complete all work in performance work statement, including balance of site facilities, surveillance and maintenance, and site operations.

The West Valley site initially entered DOE-VPP in 1999. The most recent contract transition to CHBWV began August 29, 2011. The last assessment in October 2013, performed by DOE's former Office of Health, Safety and Security, affirmed that CHBWV had successfully completed its transition and met the expectations for continued participation in DOE-VPP as a Star site. Continued participation requires an onsite assessment by AU. AU-12 scheduled that triennial assessment for April 18-27, 2017, and this report documents the results of that assessment.

CHBWV employs approximately 210 people and 90 subcontractor individuals at the site. The International Association of Machinists, Local 2401, represents 90 CHBWV employees. Many of these workers have worked at the West Valley site for most of their careers, some for 30 or more years. Since the 2013 assessment, CHBWV completed the milestone to relocate the high-level waste canisters from the MPPB and completed decontamination of the vitrification facility, and has shifted its efforts to decontamination of the MPPB. CHBWV expects to begin demolition of the vitrification facility and the MPPB in the coming months. The Team could not observe work in the MPPB because of the risk of contamination, so the Team relied on observation of work outside the MPPB and workers' reports of conditions inside the MPPB. Hazards encountered on a daily basis by CHBWV workers include both high- and low-level radioactive wastes and the full range of industrial hazards, including hazards associated with elevated work, heavy equipment, electrical equipment, excavation, noise, and potential exposure to hazardous materials and chemicals.

The Team determined during the 2013 assessment that CHBWV had successfully transitioned the workforce at the West Valley site from the previous contractor. Although conditions at the site at transition were not as expected for the new contract mission and CHBWV had faced some unanticipated challenges in accomplishing its scope of work, it had used both its experience at other DOE sites and the site workers' broad knowledge to find solutions to those challenges. The managers and union leaders were learning to work together cooperatively, and the lines of communication were open and functioning. The workers at the site had a deep sense of pride and ownership of the site and their work and continued to work carefully and safely to clean up the site. The design and structure of the work control process required that all hazards were

subjected to some form of hazard analysis, and CHBWV was working to improve the analyses used for low-hazard and routine tasks to ensure that appropriate controls were identified and communicated to the workers. The safety and health training program trained and qualified workers to deal with the hazards they faced on a daily basis.

## II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

<b>Injury Incidence/Lost Workdays Case Rate (CHBWV and staff augmentees)</b>					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2014	377,216	0	0	0	0
2015	350,870	0	0	0	0
2016	395,948	0	0	0	0
3-Year Total	1,124,034	0	0	0	0
Bureau of Labor Statistics (BLS-2015) composite for NAICS** Code 562, waste management and remediation services			4.5		3.0
<b>Injury Incidence/Lost Workdays Case Rate (CHBWV Subcontractors)</b>					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2014	174,368	0	0	0	0
2015	175,049	1	1.14	1	1.14
2016	208,695	0	0	0	0
3-Year Total	558,112	1	0.36	1	0.36
Bureau of Labor Statistics (BLS-2015) composite for NAICS** Code 562, waste management and remediation services			4.5		3.0

\* Days Away, Restricted or Transferred

\*\* North American Industry Classification System

**3-year TRC Incidence Rate, including subcontractors: 0.12**

**3-year DART Case Rate, including subcontractors: 0.12**

### Conclusion

CHBWV has a low injury rate for the type of work it performs. In 2017, CHBWV recorded two injuries, and a third injury is under investigation. The Team reviewed all 32 first-aid cases from 2013 to present. The Team agreed with the categorization of 31 of those cases, but one case in 2016 involved medical treatment beyond first aid. In that case, a worker was required to wear an immobilizing boot because of an event that happened in the workplace that significantly aggravated a preexisting condition. CHBWV should include this incident as a recordable injury for 2016. Recalculating the TRC for 2016, including this injury, results in a TRC rate of 0.50, which is still well below the comparison TRC rate of 4.5.

### III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture. The contractor must demonstrate senior level management commitment to exceeding occupational safety and health requirements and meeting the expectations of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. Elements of the management system include: (1) clearly communicated policies and goals; (2) clear definition and appropriate assignment of responsibility and authority; (3) adequate resources; (4) accountability for both managers and workers; and (5) managers must be visible, accessible, and credible to employees. Authority and responsibility for employee health and safety must be integrated with the management system of the organization and must involve employees at all levels of the organization.

In 2013, CHBWV had an experienced and involved management team that understood the hazards and challenges of its mission. The management team had carefully managed the contract transition and was working to improve communication and trust with the workers. CHBWV was capitalizing on managers' experience from other DOE sites and the knowledge of the workforce to accomplish the mission in a safe, compliant, and efficient manner. The Team identified opportunities for CHBWV to clarify its safety and health program structure, make its performance indicators more functional, and work with West Valley Demonstration Project Office (WVDPO) to ensure there were no perceived disincentives in the contract to reporting accidents, injuries, and illnesses.

CHBWV is a relatively small organization, which allows managers to be more aware of workers' concerns. Since the last assessment, CHBWV has installed more temporary office space (trailers) at the site, which permits nearly all CHBWV employees to be located at the site, with the exception of procurement personnel. CHBWV expects all managers, including those not located at the site, to perform at least one management observation each month at the site. Based on Team observations of interactions between managers and workers, most managers are present in the workplace and familiar with workers. Workers appeared comfortable talking to managers, including raising questions or concerns.

The president/general manager, deputy general manager, and human resources (HR) manager meet bi-weekly with the union chief stewards, keeping lines of communication open, and allowing the union to raise any unresolved issues. Because of these regular meetings, the Team did not identify any safety concerns raised by union members that CHBWV was not already aware of and addressing.

The past 3 years have been stressful for CHBWV managers. Federal budgets, continuing resolutions, and associated uncertainties magnified the contract challenges identified in the 2013 assessment. The contract structure provides incentives for CHBWV to complete the four major milestones early and penalties if it completes a milestone late. In some cases, DOE has directed CHBWV to perform work that is beyond the scope of the contract. CHBWV wants to keep the customer satisfied, but this extra work often entails resources not originally anticipated in the initial contract and, in most cases, requires additional resources. CHBWV managers have been

frustrated attempting to obtain equitable consideration for additional resources when performing additional workscope.

Senior managers' frustration with the relationship between CHBWV and DOE WVDPO is causing frequent turnover among senior managers as they reach the end of their 3-year commitment. CH2M HILL, the parent company of CHBWV, has identified and persuaded smart and dedicated leaders to work on the project, but each change in senior leadership creates a new cycle of initial skepticism among workers that managers must work to overcome. If this cycle continues for the remaining period of the contract, CHBWV may find itself unable to persuade quality leaders to come to the project.

In 2016, WVDPO received and investigated an employee concern filed by a worker who did not feel comfortable raising a safety issue without fear of retaliation. CHBWV also requested a corporate safety culture assessment by CH2M HILL. Although the investigations did not reveal widespread concerns about raising safety issues or stopping work, they did identify that CHBWV needed to improve its safety culture. CHBWV managers identified four initiatives to address those results. Specifically, CHBWV is focusing on employee performance incentives, employee concerns, event recognition and investigation, and learning organization opportunities.

With regards to employee performance incentives, during the previous assessment, the Team noted that CHBWV was working with DOE to identify an allowable reimbursable budget for reward and recognition. Up to that point, CHBWV had been providing reward and recognition resources from nonreimbursable money provided by the parent companies. CHBWV successfully worked with DOE to provide \$25,000 annually for employee reward and recognition. CHBWV continues to receive additional money from the parent companies to supplement this budget.

CHBWV developed another unique approach to incentivizing employees for working safely. CHBWV implemented a "Safe Units" program that will allow employees to earn a share of the subsequent fee at the completion of the contract. Managers award safe units to employees proportional to the employee's contribution in achieving a milestone. Bargaining unit employees receive an equal number of prenegotiated safe units. Employees have already received one payment from fee and may potentially receive additional payments depending on the final determination of fee for the remaining milestones. Each unit has monetary equivalence that depends on the actual fee earned. Some workers remain skeptical of the final value of safe units, but continue collecting the safe units.

CHBWV has an employee concerns program (ECP) run by the HR manager. In the ECP manager's role, the HR manager reports directly to the president/general manager. Employees rarely use the program, with only six employee concerns submitted since 2011. Employees also believe the discipline process is fair and consistent.

Regarding event recognition and investigation, CHBWV had indicators that demonstrated weaknesses were developing in this area, but did not recognize these weaknesses. CHBWV tracks high-level issues, such as outside assessment findings, Enforcement Actions, Occurrence Reporting and Processing System events, and Price-Anderson Amendment Act-level issues, in an issues management system. Supervisors and safety committees track lower-level issues.

CHBWV also maintains a broad suite of indicators, but may miss opportunities to analyze those indicators in a way that would provide meaningful information to managers. The investigation of the previously discussed employee concern revealed that managers and supervisors were not using factfindings (FF) or other systematic investigations when employees identified issues and concerns. CHBWV could have self-identified this trend by comparing the number of events to the number of FFs, both of which were included on its dashboard of performance indicators. The lack of FF meetings, which are a component of CHBWV procedures, was an undesired condition that CHBWV is now working to reverse.

One action designed to reverse that trend is implementation of a new Event Summary Sheet (ESS). A supervisor or first level manager completes the form in response to any event, abnormal condition, or expressed employee concern. He or she then submits the form to the Nuclear Facility Manager (NFM). The NFM recommends the level of investigation and appropriate return-to-work conditions and sends the form immediately to three of the four vice-presidents for concurrence. The objective is to obtain rapid agreement with senior managers on an appropriate investigation and corrective actions that optimize the opportunity to learn from the event or issue. This process helps prevent supervisors and first line managers from focusing on immediate questions to a concerned individual about returning to work before investigating and resolving the issue, which the concerned individual may perceive as prioritizing the schedule over safety.

Finally, CHBWV is working to become a “learning organization” by emphasizing this theme at every opportunity. Managers received training on safety culture and what it meant to be a learning organization, including how managers and supervisors can unintentionally contradict the organization’s desire to learn from errors and issues. Many managers who were interviewed described how this training had changed the way they looked at themselves, and self-identified examples where they had dismissed an employee issue or not recognized an opportunity to respond to employee concerns.

CHBWV managers recognize they have a motivated and dedicated workforce that desires to perform work quickly. In some cases, however, they have not managed the potential for workers to perform tasks outside the scope of their assigned jobs, and this has led to events or undesired conditions. For example, during the assessment, workers were removing material and debris from storm drains. They placed the material (sand) on a pile of other dirt and gravel at the end of a parking lot. CHBWV was holding that material to add to other rubble slated for disposal by a subcontractor. The workers pushed the pile of sand further back over the bank, which they have done for several years and was considered skill-of-the craft for maintenance workers performing landscaping and lot cleanup. The action was beyond the scope of their authorized task. The workers were unaware that the New York State Department of Environmental Conservation (NYSDEC) had, 2 weeks earlier, requested that CHBWV employ best management practices and not place additional sand on the bank, expressing concerns for potential future impacts to nearby Quarry Creek. NYSDEC identified the material moved closer to the creek and notified DOE of the condition, resulting in an investigation.

In other cases, primarily routine or skill-of-the-craft work, workers are not following the CHBWV work planning and control processes for work they accept as low-risk to their health or safety. For example, a welding area in a former warehouse is equipped with a local exhaust

ventilation system to remove fumes and vapors from welding. Workers perform some welding on stainless steel, but there had been no analysis of the potential exposure to hexavalent chromium, a known carcinogen produced during welding with some stainless steel alloys. The industrial work permit (IWP) for this work was outdated, yet workers never questioned the IWP or need for controls. Similarly, a cutting fluid used with machine tools had a warning on the label to “use with adequate ventilation,” yet the workers had no reference to define “adequate” (see Worksite Analysis).

CHBWV is trying to shield workers as much as possible from schedule pressures, trying to assure them that working safely every day, avoiding accidents, injuries, and events will lead to the desired schedule performance. CHBWV exhibits the attributes of a safety conscious work environment where workers are willing and able to raise issues. Both of the previous cases described above demonstrate the desire of workers to perform tasks they perceive as within their skill and would probably perform outside the WVDP site without hesitation. However, they also demonstrate the risk that workers are assuming rather than exhibiting the questioning attitude necessary for an effective safety culture. The CHBWV intends for its work-planning processes to validate assumptions and reduce risks. CHBWV should encourage and challenge workers to develop a more questioning attitude about common tasks in addition to the D&D work in the MPPB. CHBWV managers should emphasize to the workforce the need to follow work planning processes, despite a perceived delay of work, because those processes prevent events, exposures, rework, and subsequent investigations that do lead to long work delays.

**Opportunity for Improvement:** CHBWV managers should emphasize to the workforce the need to follow work-planning processes, despite a perceived delay of work, because those processes prevent events, exposures, rework, and subsequent investigations that do lead to long work delays.

CHBWV continues to control subcontractor project work; in an observed example for the construction of a new water treatment plant, the subcontractor’s technical representative was exercising better controls than CHBWV places on its own workers. In this case, the subcontractor’s technical representative was personally dedicated to ensuring the subcontractor performed the work correctly and used work control processes, permits, training, and other systems to keep the project on schedule and within budget. Many subcontractor employees are previous site employees who understand the expectations for performing work at a nuclear facility. The subcontractor’s technical representatives for major projects are normally present at the worksite, keep track of subcontractor qualifications for work onsite, and make sure subcontractors do not work beyond their authorized tasks.

## Conclusion

CHBWV managers are committed to completing the contract milestones on time or early and recognize excellent safety and health performance as a contributor to that goal. They are dealing with a variety of challenges to that goal in a manner that preserves the safety and health of the workforce. They recognize the contributions workers make on a daily basis, but should continue to emphasize the value of a deliberate approach to work in which workers question work methods, site conditions, and assumptions. That approach includes following site policies and

procedures for work planning for all work, especially work perceived as routine or low-risk. CHBWV continues to meet the Management Leadership expectations for continued participation in DOE-VPP.



#### IV. EMPLOYEE INVOLVEMENT

Employees at all levels must continue to be involved in structuring and operating the safety and health program and in decisionmaking that affects employee health and safety. Employee involvement is a major pillar of a strong safety culture. Employee participation is in addition to the right to notify managers of hazardous conditions and practices. Managers and employees must work together to establish an environment of trust where employees understand that their participation adds value, is crucial, and is welcome. Managers must be proactive in recognizing and rewarding workers for their participation and contributions. Employees and managers must communicate and collaborate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

In 2013, CHBWV employees were fully engaged in the continuous improvement of safety at the West Valley site and committed to establishing a safe work environment. Multiple venues existed for workers to participate in the safety and health program, and they were taking advantage of those opportunities. Employees also donated their time and efforts to support community endeavors and to reach out to other VPP participants in DOE.

Team interviews demonstrated that workers continue to be unafraid to report any injuries, accidents, or incidents. Workers indicated that CHBWV expects them to report injuries, accidents, or incidents and they did not fear retaliation or retribution for reporting.

A large percentage of the union workers at WVDP have more than 25 years of experience at the site. These experienced workers expressed their commitment to keeping each other safe as a way of life they developed over the years working at the WVDP site. They were clear about their expectation of ensuring their safety and the safety of their coworkers while performing work. The workers continue to believe that their experience at and knowledge of the site contribute to the safety of their work.

During the ISMS/VPP committee meeting attended by the Team, the union representative raised the concern that the use of off-road utility vehicles onsite has created a potential safety concern for the waste operations' forklift operators. The vehicles are small and quick and the forklift operators have had a growing concern that the utility vehicles are invisible to the operators when moving large waste containers across the site. The union representative stated that his people "could not live with themselves" if they accidentally collided with one of the utility vehicles and caused an injury. As a result, the ISMS/VPP committee immediately had six-foot high visibility flags attached to all the utility vehicles to increase their visibility to the heavy equipment operators.

Most workers and supervisors interviewed by the Team felt CHBWV encouraged them to stop or pause work if they encountered a safety issue, or an unknown situation and were comfortable doing so. CHBWV continues to use Procedure WVDP-553, *Step Back Program*, for safety pauses. The procedure assigns all employees the responsibility and authority to stop work when employees believe that a situation exists that: (1) places them, their coworker(s), subcontractors, or the public at risk or in danger; (2) could adversely affect the safe operation or cause damage to the facility; or (3) could result in a release of radiological or chemical effluents to the environment above regulatory limits or approval. The procedure provides a method to resolve

the issue. During its annual self-assessment, CHBWV identified some inconsistencies between the site stop work procedure and its contract, and formed a task team to revise the stop work procedure. These discrepancies did not diminish workers' understanding of the intent of the process, and they were both willing and able to stop or pause work.

CHBWV instituted the BTZ teams in 2011 as a mechanism to *effectively promote and integrate error/event prevention, detection, and correction initiatives in the work areas*. The BTZ teams involve the workforce in identifying and resolving solutions to issues within the work areas. The BTZ teams focus on prevention and elimination of hazards through early identification and corrective actions before they become a problem.

Currently, CHBWV has three working-level BTZ teams: Waste Operations, Facility Disposition, the Ashford Office Complex (AOC), and nine ad hoc committees. Each BTZ team has a chair, cochair, and a management champion. BTZ team membership consists of interested employees who volunteer to serve on the teams. A company-level BTZ team (CBTZ) brings in the three BTZ team chairs, champions, and ad hoc committee leadership on a monthly basis to discuss their efforts, accomplishments, and to address issues at the company level. BTZ-002, *Beyond Target Zero Safety Team*, provides guidance on the CBTZ team operation and function, establishes the charter for the CBTZ team, and defines the purpose of providing a forum where employees actively work together with managers to create a safe workplace. The Team observed the CBTZ team addressing all BTZ teams' concerns and ad hoc committee issues in a monthly timeframe. The CBTZ team was well represented and supported by senior managers.

The BTZ teams are actively encouraging worker input, and tracking and resolving employee-generated issues in a timely manner. However, because of union personnel reductions, exempt personnel lead some BTZ teams, such as the Waste Operations team. The Waste Operations BTZ team includes union workers on a rotational basis, ensuring all employees attend BTZ teams throughout the year. This approach is understandable given the reductions, but the BTZ teams are not as employee-owned as in previous assessments. The bulk of BTZ team issues identified are limited to area lighting and workspace deficiencies, such as cracked sidewalks and tripping hazards.

Based on the successes of the high-level waste (HLW) cask transfer milestone and the head-end filter changeout project (see Hazard Prevention and Control), the CHBWV managers recognize the positive contributions of worker input in efficiently resolving project challenges. Worker input has repeatedly helped CHBWV complete project/milestone tasks (see Hazard Prevention and Control). The positive effect of employee participation in a variety of projects does demonstrate active employee involvement, but CHBWV should continue encouraging employee input and recommendations for each project while simultaneously encouraging additional worker participation on BTZ teams.

**Opportunity for Improvement:** CHBWV should continue encouraging employee input and recommendations for each project while simultaneously encouraging additional worker participation on BTZ teams.

CHBWV implemented the ISMS committee nearly 6 years ago. However, in the past year CHBWV combined the ISMS and VPP steering committees. CHBWV expects the ISMS/VPP Committee to establish strategic initiatives to further the safety culture at WVDP, actively support the WVDP employees by responding to their health and safety needs and issues, solicit and encourage involvement in safety and health programs and awareness activities, help develop solutions for company-level safety concerns, support human performance improvement, and identify trends and issues.

The Team attended an ISMS/VPP Committee meeting during the review. The committee included a cross-section of employees and addressed the employee issues raised from the collection boxes located across the site. The collection boxes allow employees to raise concerns/issues anonymously to the committee for resolution. The committee provides responses to collection box issues in the ISMS monthly newsletter. The committee also reviews manager and worker recommendations for monthly safety recognition for employees' safe acts. The monthly safety award recipients receive a 1-month dedicated parking spot for their contributions. One monthly safety award recipient in the warehouse received recognition when CHBWV received two drums of sulfuric acid with a damaged bung hole that allowed the acid to bubble out when workers moved the drums. The workers immediately recognized the concern and stopped work, contacted safety personnel, and cordoned off the area.

In another example of the workers' culture of caring for each other, two employees described how they had been selected for the "on-the-spot award" recognition and donated that recognition to other workers who could better use that parking spot because of health concerns.

## **Conclusion**

CHBWV continues to maintain strong Employee Involvement. Employees are engaged in continuous improvement of safety culture and are committed to maintaining a safe work environment. The BTZ teams actively encourage worker input and track and resolve the employee-generated issues, but the BTZ teams are not as employee-owned as in previous reviews. CHBWV managers recognize the positive contributions of worker input in resolving project challenges. Employee participation in a variety of projects demonstrates employee involvement, but CHBWV must be careful as it moves forward to continue encouraging employee input and recommendations for each project, while simultaneously encouraging additional worker participation on BTZ teams. CHBWV meets the Employee Involvement expectations for continued participation in DOE-VPP.

## V. WORKSITE ANALYSIS

Management of health and safety programs must begin with a thorough understanding of all hazards that might be encountered during the course of work and the ability to recognize and correct new hazards. Implementation of the first two core functions of ISMS, defining the scope of work and identifying and analyzing hazards, form the basis for a systematic approach to identifying and analyzing all hazards encountered during the course of work. The results of the analysis must be used in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that are encountered and include a system to ensure that new or newly recognized hazards are properly addressed. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of such hazards.

In 2013, CHBWV was maintaining a worksite analysis process that analyzed all hazards prior to performing work. The addition of the hazard analysis tools, such as hazard mitigation guide and the *Approved Low-risk Routine Work List*, had strengthened the worksite analysis process resulting in more comprehensive work document packages. However, the Team identified opportunities for CHBWV to improve the quality of job safety analyses (JSA).

Procedure WVDP-485, *Work Control*, defines roles, responsibilities, and the level of planning detail required in work packages at WVDP. The procedure describes a graded approach and includes a decision tree that guides planners to the required hazard analysis and planning for a work activity based on complexity, hazard analyses, and defined worker skills. Once the planner identifies the type of work package, various procedures guide the development of the required package. The decision tree is a useful visual aid that helps planners organize the various types of work packages according to their complexity and hazard levels.

CHBWV uses several methods to identify hazards and controls for work activities. WV-921, *Hazards Identification and Analysis*, and form WV-3909, *Activity Hazards Analysis*, help planners and subject matter experts (SME) identify potential hazards and integrate hazard controls into work instruction packages (WIP), standard operating procedures, JSAs, preventive maintenance procedures, instrument recalls, and subcontracts. The Team reviewed several WIPs that included IWPs and radiological work permits (RWP), required training, and prejob briefing instructions based on the analysis of the hazards. One WIP included detailed radiological controls, controls for elevated work, and pictures of piping sections to help the worker identify the correct line to determine if the pipe was empty, then draining, or removing the pipe. The associated As Low As Reasonably Achievable (ALARA) document included an analysis of radiological hazards and dose levels with recommended engineered controls, personal protective equipment (PPE), and time estimates to complete portions of the work. Work area and personal monitoring validates that radiation doses remain within the expectations of the radiological analysis. WIPs contain appropriate analyses to execute complex work.

Industrial hygiene (IH) analyzes various hazards. Since the last VPP assessment, CHBWV hired a full-time certified industrial hygienist (CIH) to assess the multitude of IH hazards. MPPB decontamination work currently requires the majority of the CIH's time. The CIH's highest priority is assessing worker exposure to asbestos from abatement work activities. Other priorities include assessing lead paint, silica, and particulate hazards produced during

decontamination work. The safety and health team have sampling equipment for 17 other hazards, and monitoring requirements keep the CIH and safety and health technicians in high demand for operations support.

CHBWV developed a list of 24 preapproved routine work activities in WVDP-485. WVDP-485 establishes criteria to approve and perform other activities as routine work. The work must be low risk with the hazards and controls documented in an IWP, JSA, an RWP, or other permits (ground disturbance permit, hot work permit, etc.). The work cannot exceed the ALARA trigger levels and cannot include temporary modifications or configuration changes. The Environmental, Safety, Health, and Quality Manager; the Balance of Site Facilities Manager; and the Work Control Manager approve all proposed routine work activities not listed in WVDP-485. Although approved, CHBWV has not added any of these new activities to the list in WVDP-485. This practice can introduce inefficiency in the planning process for repeat activities. CHBWV should consider adding new routine activities to WVDP-485 as it approves those activities to help workers and planners efficiently plan and perform work.

**Opportunity for Improvement:** CHBWV should consider adding new routine activities to WVDP-485 as it approves those activities to help workers and planners efficiently plan and perform work.

CHBWV uses a JSA or IWP to analyze hazards for routine work. The Team reviewed several JSAs that included a checklist of known hazards and an area to document additional hazards, along with preselected controls and an area to document additional or alternate controls. Many of the documented controls were general and required the workers' interpretation to identify what actual controls they used. For example, JSAs listed hearing protection for noise hazards, but did not specify the type of device and noise reduction rating. JSA identified gloves as controls for pinch points, but did not specify the glove type. JSAs identified foot protection, but did not specify the type of foot protection (e.g., foot protection beyond the sturdy footwear identified in GET). JSAs marked respirators as a control for silica dust, but did not include the respirator's manufacturer, make, or filter type. The JSA for changing batteries did not specify the acid splash hazard to eyes and the requirement for an eyewash station. Listing the specific controls, such as PPE or safety equipment in the JSA, ensures a match to the existing PPE inventory and that workers use the correct equipment. CHBWV should revise its JSAs to include the specific control so workers do not have to make interpretations on the hazard control.

**Opportunity for Improvement:** CHBWV should revise its JSAs to include the specific control so workers do not have to make interpretations on the hazard control.

The 2013 assessment found that JSAs or other hazard analyses did not document the hazard analysis that connected the hazard with the resulting control. The Team found similar conditions during the current assessment. For example, the Team observed a welding booth in the maintenance shop. The welding booth had an IWP and a Hot Work Permit that identified most of the hazards and controls, including a local exhaust ventilation system to remove welding fumes. Among other metals, the shop welds stainless steel, which may contain hexavalent chrome, a known carcinogen. The IWP for the welding booth did not include or reference any

analysis of these hazards that demonstrated the local exhaust was sufficient to protect the worker. The safety and health office believed these welding operations were air sampled in the past, but could not produce the results to determine exposure levels. Most of the welding operations are infrequent and of short duration. Existing sources of exposure assessment available from many sources, such as National Institute for Occupational Safety and Health or IH publications, can be of use in determining the need for, and frequency of sampling. Without the documented analysis, workers and planners cannot confirm that the conditions or assumptions of the original analysis remain valid.

The Team also identified several routine activities for which CHBWV had not performed or updated the associated hazard analysis. For example, a supervisor in the maintenance shop had a list of JSAs from 2011, many of which CHBWV had rescinded. The Team also observed a cutting fluid used on machine tools that includes a statement on the label saying “use with adequate ventilation.” Workers were unaware of any JSA that defined “adequate ventilation.”

These deficiencies in the various hazard analyses indicate CHBWV is not implementing its graded approach to hazard analysis for routine and skill-of-the-worker tasks. Specifically, managers, supervisors, and workers alike are not confirming hazard analyses exist for a task, or basing the selected controls on hazard analysis or documented sample results. CHBWV should review all of its routine and skill-of-the-worker tasks, 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.

**Opportunity for Improvement:** CHBWV should review all its routine and skill-of-the-worker tasks, 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.

When conditions arise or events occur, CHBWV has a process to conduct accident investigations and FF meetings, and to use the issues reporting (IR) program. Accident investigations and FF meetings follow the guidance in EIP-102, *Event Investigation Procedures*, while the IRs follow the guidance of WVDP-357, *WVDP Issues Reporting Program*. The majority of issues occurring at WVDP are IRs. In 2016, CHBWV recorded 51 IRs, 6 FFs, and 2 occurrence reports. CHBWV identified in 2016 that supervisors and managers were not conducting FF meetings or investigations (see Management Leadership). CHBWV revised its process to include recording events on an ESS. The NFM uses that information to determine the level of investigation. The Team reviewed several events and found a consistent approach to event evaluations and investigations. The Team attended an FF meeting on the movement of soil into a protected wetland. The meeting was well run as the team leader allowed the group to discuss the events and learn from the event in a positive and free discussion environment.

CHBWV trends many indicators for WVDP. Most of the indicators are required as part of the Contractor Assurance System report; other data are analyzed independently. For example, the administrator of the morning Safety Assessment Center (SAC) call that occurs as part of the plan-of-the-day conducts a semi-annual review of upset/changed conditions reported to the SAC. During the first 6 months of 2016, there were distinct trends involving motor vehicles and

destruction of electrical cords. An analysis of the five vehicle incidents/accidents found no common causes or common issues, and the analysis of the damaged electric cords prompted the installation of a dedicated outlet for an area heater in the vitrification facility.

## **Conclusion**

CHBWV has a work control process that requires analysis of all hazards associated with work. CHBWV uses that process for the complex and high-hazard work associated with D&D, but does not consistently use it for low hazard or routine work to identify the correct controls. CHBWV should focus resources on routine work to identify and analyze hazards and ensure workers do not make incorrect assumptions about those hazards. CHBWV meets the overall DOE-VPP expectations for Worksite Analysis.

## VI. HAZARD PREVENTION AND CONTROL

The third and fourth core functions of ISMS, identify and implement controls and perform work in accordance with controls, ensure that once hazards have been identified and analyzed they are eliminated (by substitution or changing work methods) or addressed by the implementation of controls (engineered controls, administrative controls, or PPE). Equipment maintenance processes to ensure compliance with requirements and emergency preparedness must also be implemented where necessary. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. These rules and procedures must also be followed by everyone in the workplace to prevent, control the frequency of, and reduce the severity of mishaps.

In 2013, CHBWV was using the hierarchy of controls to limit employees' exposure to hazards and protect the environment. CHBWV was investing in improved hazard controls for "white space hazards" and improved work methods. BTZs were actively engaged in identifying legacy hazards and appropriate controls. Workers understood the philosophy that work must be done safely and compliantly the first time even if work must be delayed or stopped temporarily to establish the appropriate controls. The Team identified opportunities to improve tracking of testing requirements for systems, such as local ventilation exhaust systems.

The Team observed many examples of CHBWV's continued use of the hierarchy of controls. For example, after CHBWV brought mobile air compressors onsite to replace the degraded plant air system, CHBWV craft workers initiated an engineered control to reduce the noise hazard produced by the compressors. Workers fabricated insulated wooden boxes around the air inlets of the compressor enclosure that redirected the noise upward and muffled the sound, reducing the noise to below 85 decibels from over 105 decibels. In another example, SMEs and craft workers designed, fabricated, and installed a temporary circular shield to provide six to eight inches of supplemental steel shielding on the HLW overpack casks, reducing personnel radiation exposure during the cask lift lug installation, overpack weld inspection and installation of cask lid O-ring/gasket.

Similarly, using an administrative control and ALARA principles, workers recommended changing the procedural sequence for decontaminating radioactive wasteboxes. These procedural step changes kept worker exposures well below the ALARA exposure budget for this activity. CHBWV administratively controls radiation dose using an ALARA budget for all activities where workers will receive a radiation dose.

Consistent with OSHA's expectation to use stairs when workers must regularly access elevated work areas, CHBWV designed and fabricated work platforms for workers to access the top of HLW storage casks. This engineered control approach provided safer access to the elevated work area. Other hazard control examples include the use of grouting and fixatives to control contamination spread, the use of cameras on a large, shielded fork truck with otherwise obstructed forward visibility, and the substitution of a less hazardous paint for a more hazardous one.

The HLW project team used the value engineering (VE) meeting approach to discuss the structural challenges presented by the HLW project mission. VE is a systematic method to



improve the "value" of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost. Therefore, improving the function or reducing cost both increase value. The project team, including operators, engineers, SMEs, mechanics, subcontractors, and equipment vendors developed a strategy for moving the HLW canisters out of the process building to a long-term storage pad. Many modifications were required to the load-in facility, including subfloor grouting and the addition of steel plating to address floor-loading concerns. The project team also engineered and custom designed the TL 220 cask loader. This was necessary to accommodate the weight of the cask and canisters and the low clearances of the facility entrance. The project team also developed the low-profile rail cart (LPRC) and air handling carts for movement of the casks between each loading vehicle.

In addition to the special modifications to these facilities and the development of the unique loading vehicles, the workers, engineers, and SMEs worked together to optimize the HLW movement process. Each cask movement involved coordinating multiple actions, and initial CHBWV timeline studies estimated a maximum of four cask movements each month. Workers' ideas and suggestions allowed CHBWV to achieve up to three cask movements each week. As a result, CHBWV completed the milestone of HLW cask transport nearly a year ahead of the target date.

CHBWV has made extensive use of mockups to practice hazardous work in a nonhazardous environment. CHBWV used a mockup for the headend filter change-out. The filters had been in service for more than 25 years, and CHBWV expected potentially high radiation doses to workers removing the filters. The mockup simulated one-half of the filter change-out room and included the floor cutouts. The mockup "room" was elevated 12 feet off the ground to accommodate the below-room filters. The mockup used the warehouse overhead crane with an electromagnetic lifting attachment to "grab" the metal plates attached to the filter housings. The metal plates were added many years ago to the filter housing to allow for the use of the electromagnet to remove the filters. CHBWV contacted workers who had performed filter change-outs nearly 25 years ago to discuss past work methods. The headend filter change-out process greatly benefited from these lessons-learned discussions.

As part of the mockup project, workers made an entry into the actual facility filter room to validate the filter configuration and discovered that some of the filters did not include the installed metal plate on the filter housing. Metal "pull" wires had been added on to the filter housings in some cases and the pull wires attached to the filters had degraded to a point they could not be used. Consequently, engineers worked with the operators and mechanics to develop a new process to remove the affected filter housings. A WVDP mechanic suggested remotely drilling a hollow anchor attachment into the top of the filter housing. Workers could use that anchor to remove the filter housings without the electromagnet, and minimize worker exposure in the filter room. The filter removal mockups required over a month of tests and practice runs for the operation, demonstrating CHBWV's willingness to ignore schedule pressures in order to assure safe and successful work execution with minimal worker exposure.

In 2016, National Fuel Gas (NFG) identified a Class 1 leak on the gas service line to WVDP and threatened to shut off gas service if CHBWV did not repair the leak. NFG owns the service line, but because WVDP is a hazardous waste site, NFG would not perform the repairs. CHBWV uses a minimal amount of natural gas, but WVDPO wanted to maintain the gas service line for

future site plans. To accommodate WVDPO, multiple crafts worked together to install a temporary natural gas supply line that bypassed the leaking service line. To protect the temporary line, workers pulled the gas line through existing culverts using a cable-pulling winch. The cable-pulling winch, used by electricians to pull underground cables through conduit, includes built in strain meters to avoid overstressing and snapping the pulling fixtures.

Another example of worker involvement in an engineered control included the LPRC used to move the HLW casks between the Equipment Decontamination Room and Chemical Process Cell (CPC). Engineers designed the cart to fail in a neutral drive position on loss of power to allow the cart to be remotely towed from the CPC. Because the cart track was on a slight incline, workers were concerned it would roll downhill if the cart lost power and create a hazard to workers near the cart. Working with engineers and crafts, the operators developed a chock with a handle for emergency use that allowed workers to put the wheel chocks in place to stop a moving cart during a power failure while keeping the workers out of harm's way.

CHBWV uses multiple assessments to inspect the WVDP site. The safety and health professionals perform complete facility inspections quarterly. The inspection program uses a checklist to help guide the safety professional through the inspection. Other assessments of the West Valley site include the Integrated Assessments Schedule (IAS) and Management Workplace Visits. The IAS is part of the contractor assurance program and targets specific program areas, such as nuclear safety, respiratory protection, and the training program. Safety and health professionals complete those inspections quarterly using a checklist created specifically for that program. CHBWV tracks deficiencies through email, IRs, or the Open Item Track System depending on the severity of the issue.

While recognizing that WVDP has moved into a D&D phase with different housekeeping expectations, the Team found some examples of poor housekeeping and unsatisfactory radiological control practices. Rotting wooden pallets with exposed nails, old equipment, equipment components, plate material, piping, sheet metal, conduit, fittings, and other materials that will not be used for production or the D&D effort are scattered throughout the site. These materials, equipment, and rubbish can lead to rodent and insect infestations.

At the Low Level Waste 2 facility, a laboratory hood contains radiological water samples for analysis. A posting above the hood sash states "Caution Radioactive Material Dosimetry Required for Entry." A magenta and yellow striped tape covers the hood sill. The Team found a hose looping out of the hood, past the sill, and looping back in. Power supply wires for a magnetic mixer exited the front of the hood and laid on the sill. The sidewall of the hood has removable rubber grommets for wires to pass through, which keeps the wires off the inside of the hood countertop, but those grommets were not used. The tubing and electrical lines can move and carry contamination across the hood sill. Another example is debris had accumulated under an electrical panel box and an industrial, electrical power on/off switch. The space under those electrical items needs to be clear of combustible materials. At the welding booth, the last measurement of the airflow through industrial exhaust hood was completed in 2013. CHBWV began taking action to address some of these issues raised by the Team. Housekeeping was identified as a contributing cause to at least one recent recordable injury and a housekeeping improvement campaign was prescribed as a corrective action. CHBWV should correct the

deficiencies found during this assessment, reinvigorate the inspection of facilities, and dispose of unnecessary materials and equipment.

**Opportunity for Improvement:** CHBWV should correct the deficiencies found during this assessment, reinvigorate the inspection of facilities, and dispose of unnecessary materials and equipment.

CHBWV conducts annual site evacuation drills and other periodic drills. The Team observed the response during an onsite drill that involved a realistic scenario where a fork truck and an off-road utility vehicle had collided. The Team also attended the post-drill meeting that reviewed the drill's effectiveness and captured lessons learned and opportunities to improve. Drill actors, first responders, and support personnel provided meaningful input during the post-drill meeting. CHBWV also performs annual fire drills at the AOC. Nearby volunteer fire departments provide fire and medical response. Many of the volunteer firefighters, emergency response, and emergency medical technicians for the local jurisdictions work at WVDP. During the assessment, CHBWV conducted a briefing and a plant tour for local firefighters and emergency response personnel to familiarize them with the plant configuration and hazards.

CHBWV has struggled with adequate workspaces as the site continues to reduce its "footprint." Consequently, CHBWV has frequently displaced employees to new workspaces, which affects overall safety. Although this is characteristic of D&D worksites, it has presented some unique challenges for this site. Because CHBWV can tear down noncontaminated buildings quickly to take credit for footprint reduction, it demolished many administrative and support spaces early in this project. For instance, it razed the maintenance building and moved the maintenance shop to the site warehouse. This move eliminated the previous site meeting room, so CHBWV converted another part of the warehouse to a new, albeit smaller, site meeting room, reducing the warehouse area even more. As CHBWV reduced warehouse space, new problems, such as the lack of dual fire egress and cluttered workspaces (housekeeping), arose. However, CHBWV is addressing these problems. For example, after CHBWV self-identified the need for a second fire egress, it created an additional exit for the warehouse tool crib attendant and respirator-issue worker. The tool crib attendant indicated that housekeeping efforts are ongoing.

The Team confirmed that for the scope of work and size of the workforce (~300 employees) CHBWV has adequate numbers of certified professionals. The safety and health and radiological control departments are staffed with certified safety professionals, CIHs, and certified health physicists, respectively. Interviews with workers confirmed that professionals or safety technicians are involved with job walkdowns and regularly visit work areas.

Medical services include a full-time, onsite registered nurse who interacts with an outside occupational medicine subcontractor service provider - Healthworks. In accordance with the expectations of title 10 of the Code of Federal Regulations, part 851, *Worker Safety and Health Program* (10 CFR 851), the occupational medicine service provider(s) have toured the plant to become familiar with the workplace and to remain current on operations that workers are performing. This aids in diagnosing injuries/illnesses and in understanding what type of restrictions would be necessary should an employee be injured or become ill on the job.

CHBWV empaneled an electrical safety committee that meets regularly. The committee keeps minutes of meetings and CHBWV has appointed an electrical Authority Having Jurisdiction. CHBWV has made progress in implementing National Fire Protection Association (NFPA) 70E Standard for Electrical Safety in the Workplace® arc flash labelling requirements, but has only labeled newer equipment. Electrical PPE, conforming to NFPA 70E, is available and maintained. CHBWV has an adequate lock-out/tag-out (LOTO) program that subcontractors use when conducting work in the plant. During the 3 years prior to this assessment, there have not been any reportable occurrences from LOTO events.

A common electrical safety precaution during D&D work is removing and “air-gapping” all energy sources entering a building (electrical, water, steam, natural gas, etc.). This condition is referred to as “cold and dark” and eliminates the risk of workers encountering uncontrolled energy sources when cutting piping or conduit and drilling into walls and floors, etc. CHBWV has not established a cold and dark condition in the MPPB, but most workers agreed that cold and dark would increase the hazards they face. Lack of adequate lighting, small and twisting corridors, the need for respiratory protection and anticontamination clothing, and the ability to control building ventilation were the most commonly cited reasons by workers for maintaining electrical service in the MPPB and other buildings.

The MPPB is the site of most decontamination efforts. Changing ventilation paths, legacy contamination, poor historical radiological control practices, a leaking roof, and heavy industrial activity are causing contamination to migrate out of identified contamination areas into the radiological buffer area. CHBWV has begun treating the radiological buffer area in the MPPB as a contamination area, refusing to allow unauthorized personnel to enter the area, citing concerns about potential for contamination. However, the limits on personnel entry are not posted, not formalized, and are dependent on individual and “tribal” knowledge, and not in accordance with CHBWV radiological controls. The conditions have deteriorated to the point where CHBWV should repost the entire MPPB as a contamination area. CHBWV was tracking two shoe contaminations in the radiological buffer area in the past few months in the Noncompliance Tracking System. At the end of this assessment, CHBWV announced to workers that it would begin the process of posting the MPPB as a contamination area, and posted the area on May 22, 2017.

The hoisting and rigging program is mature, active, and ensures hoisting and rigging activities and equipment are safe. Besides regular assessments, the hoisting and rigging committee demonstrated continuous improvement by identifying the need for equipment operator refresher and ongoing training on the new lifting missions that will occur as the plant transitions from gantry cranes (operations) to mobile cranes (D&D).

## **Conclusion**

CHBWV continues to use the appropriate hierarchy of controls to limit employees’ exposure to hazards and protect the environment. It has used operations and specific activity mockups successfully to protect workers, reduce dose, and meet schedule deadlines. As work has progressed further into the decontamination and demolition phase, CHBWV has faced ongoing challenges with space reductions, operational logistics, and contamination spread during demolition. Workers have demonstrated extensive employee involvement in hazard prevention

and control by regularly providing solutions to challenging problems presented by hazardous work. CHBWV meets the expectations in the Hazard Prevention and Control tenet for a DOE-VPP participant.

## VII. SAFETY AND HEALTH TRAINING

Managers, supervisors, and employees must know and understand the policies, rules, and procedures that prevent or reduce exposure to hazards. Training for health and safety must ensure that responsibilities are understood, and that personnel recognize hazards they may encounter and are capable of acting in accordance with managers' expectations and approved procedures.

In 2013, CHBWV had a comprehensive health and safety training program. Workers, supervisors, and managers had appropriate training requirements. Training and qualifications records were current, and workers did not perform activities for which training and qualification requirements had expired. Supervisors were engaged in managing and monitoring employee training inputs and could verify that training requirements were current before assigning work tasks. CHBWV provided numerous reminders, postings, required reading subjects, and lessons-learned safety topics to encourage safety awareness at the site.

CHBWV continues to use Procedure, WVDP-126, *Performance Based Training Program Manual*, to implement the training requirements for the site. WVDP-126 uses a "systematic approach based upon five distinct phases (analysis, design, development, implementation, and evaluation) in a graded fashion so that the trainee gains the knowledge and skills to perform his/her jobs in a reliable, safe, and quality-minded manner." Managers, supervisors, and employees may undergo written examinations, oral boards, or demonstrations of proficiency to validate the effectiveness of their training.

WVDP-126 requires a new employee/transferred employee's supervisor to complete form WVDP-1392, *WVDP Health and Safety Training Profile*. The profile form has two parts. Part I identifies the health and safety training required for the job function, such as GET, silica training, and electrical safety. Part II contains the job qualification and training requirements, such as radiation worker, asbestos worker, medical requirements, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. Upon completion, the supervisor forwards the form to the training and medical departments for scheduling required training and medical exams.

For union workers, the training department worked in conjunction with the project managers to develop the Program Description and Continuing Training Plan (PD). The PD is a preanalyzed set of training requirements for union workers based on their job function classification (i.e., maintenance, D&D, etc.). The PD identifies the preselected training requirements for workers in those job classifications, so supervisors do not have to develop new training plans for every new employee. CHBWV reviews the PDs routinely to ensure they are correct. This process ensures CHBWV identifies proper and consistent training for the craft workers.

The Training Manager receives employee feedback on training, tracks completion percentages for training and retraining, and monitors employee engagement in classrooms. Based on these data, he has concluded employees are receiving adequate training commensurate with their job function. Employees interviewed by the Team validated that conclusion.

CHBWV managers and supervisors ensure employees receive proper training and that employee job descriptions are current. The Training Manager ensures the programmatic training is current. SMEs provide expert resources to the training department on a variety of subjects, provide on-the-job-training, and assist in developing standards, examinations, and training materials. SMEs also provide classroom instruction in their subject area when needed.

The program manual requires that all new WVDP employees complete GET and take a 25-question examination with a required score of 80 percent to pass. The Training Group provides a required reading “Annual Refresher” that reinforces the GET material and site requirements. GET recertification is on a biennial basis and is a test-only option. CHBWV gives students three opportunities to pass the test. If the worker fails all three attempts, they must retake the entire GET computer-based training (CBT). Employees take GET in a classroom or individually in a CBT environment depending on the number of people that require training. GET training information includes site and basic safety requirements, conduct of operations, equal employment opportunity, access, contacts, emergency response, ISMS, and VPP. Employees who do not complete/maintain their biennial GET training are denied card reader access to the site and may be required to surrender their badges to security at the gatehouse.

The Team reviewed the GET CBT training and the 2016/17 Annual Briefing Training. The Team review of the Annual Briefing material found no concerns with the content; however, the Team’s review of the GET CBT training identified several inconsistencies between the training contents and site policies and practices. For example, the CBT training specified that no audio or video recording equipment was permitted onsite, nor were personal computers (or tablets) permitted onsite or in the site parking lot. This restriction originated many years ago when the site was processing nuclear fuel and did not account for the current use of personal cell phones with video capability used by nearly all workers onsite. Nor did this restriction address the fact that support contractors or vendors may work onsite with nongovernment computers/tablets in their support activities for the company. However, the Team received proper direction upon arrival onsite from the site security personnel consistent with current practices. CHBWV directed the Team not to take any photos or video while onsite or connect laptops to the site network without proper authorization.

Additionally, the CBT GET training referred to a discontinued electrical inspection group that inspected corded power tools daily. The program prohibited use of any corded power tool without a current inspection sticker. CHBWV has not used this process for many years, yet the CBT training represents it as a requirement. According to the training manager, CHBWV uses SME reviews to update the GET training annually, but the SMEs did not identify these discrepancies. Experienced crafts who have been onsite for more than 25 years probably would have recognized these issues, but they are only required to retest every 2 years and do not review the full GET. The Training Group should consider using experienced crafts to assist in the annual review of GET training to ensure course content is correct. The site training manager took immediate corrective action to revise GET training information reflecting the current expectations for site access and controls.

The Training department maintains the WVDP Qualified Watch List (QWL) that provides the status of training qualifications of the workers and that all supervisors can access electronically.

CHBWV expects supervisors to refer to the QWL prior to assigning employees to work to confirm they have completed the required training to perform assigned work.

The Training department also maintains a database of training requirements and provides reminders electronically to individuals and their supervisors 30 days prior to expiration of training. The Team identified a potential for recordkeeping errors related to asbestos worker qualifications. Because New York State provides asbestos certification directly to the worker, asbestos workers must provide the training department a copy of their New York State asbestos certification. Some workers have forgotten to provide that information, so CHBWV administratively requires asbestos workers to present their New York State certification card to their supervisors daily before performing asbestos work.

In an effort to ensure workers complete annual training, the training group implemented a block training schedule to capture 100 percent of all selected employees for GET, Radiation Worker II, Criticality Safety, Respiratory Protection, and Conduct of Operations. Block training increases efficiency and improves management of the training program, and allows individuals to ask questions and share lessons learned from similar work assignments. In 2017, the training group added presentations from SMEs to discuss hoisting and rigging and criticality safety lessons learned as part of the 2017 block training. CHBWV schedules block training the first week of January each year, which also reinforces safety expectations after the holidays.

During this assessment, Senior Managers and managers completed a 1-day *Safety Culture for DOE & DOE Contractor Senior Leaders*, TLP-200, provided through the National Training Center with cooperation from EM, the Office of Science, and the National Nuclear Security Administration. The course provides a 1-day immersive experience in principles and attributes of nuclear safety culture and safety conscious work environment. It also provides participants with a variety of scenarios and tools to evaluate their own styles and work toward “a positive shift in culture by fostering a work environment that promotes trust, a questioning attitude, and receptiveness to raising issues.” After an initial slow start, participants in the class fully engaged with the instructors, actively participating in discussions, and contributing to the course objectives.

CHBWV publishes *Mentoring Moments* to reinforce employee awareness of hazards both at home and in the workplace. *Mentoring Moments* are small handouts provided around the site and at the entrance to the AOC that discuss safety topics, recent lessons-learned, and other safety topics applicable to CHBWV employees. Employees pick up the handouts at their leisure. CHBWV produced and distributed 24 *Mentoring Moments* in 2016. Topics described included walking and working around heavy equipment, safety conscious work environment, PPE use, and nuclear safety culture. The *Mentoring Moments* related to walking and working around heavy equipment was in direct response to the HLW cask transfer project that involved increased heavy equipment activities across the site.

CHBWV informs employees about recent changes or new information through a required reading program. Employees are required to read and sign that they have accomplished the required reading and understand the information. For example, CHBWV has had a recurring issue with the lenses of the respirator masks used by the company, routinely experiencing cracking issues. While the company negotiated with the respirator vendor to resolve the issue,



the training group released a lessons-learned required reading that described the ongoing issues, the potential concerns for workers, and the precautions to address the issue in the interim.

CHBWV continues to support employee accreditation in the Safety-Trained Supervisor (STS) program from the Board of Certified Safety Professionals. However, workers participating in the STS program are required to achieve accreditation on personal time; the company then reimburses them upon completion. The CHBWV training group does not actively track employee involvement in the STS program because certification occurs independent of the training department. The training group estimates approximately 60 employees are STS certified.

CHBWV provides a pocket-sized CHBWV Safety Toolbox Handbook. The Handbook contains emergency information, the CHBWV BTZ Safety Culture message, information on VPP, an explanation of 10 CFR 851, *Worker Safety and Health Program*, ISMS, CHBWV's Safety Framework, and Environmental Management System description. The Team observed the Handbooks were widely available to the workers and the contents of the Handbook were up to date.

## **Conclusion**

The CHBWV safety and health training program continues to provide workers, supervisors, and managers with the appropriate training. The Training Group has established processes to ensure training and qualification records are current. CHBWV uses program descriptions to preanalyze and define workers' required training by work task to establish appropriate training requirements. CHBWV provides numerous reminders, postings, required reading subjects, and lessons-learned safety topics to encourage safety awareness at the site. CHBWV is addressing inconsistencies in GET training. CHBWV meets the Safety and Health Training expectations for continued participation in DOE-VPP.

## VIII. CONCLUSIONS

CHBWV is safely performing its cleanup mission at WVDP in a manner that protects the health and safety of the workforce. Although faced with several challenges to contract scope, cost, and schedule, managers are appropriately encouraging workers to perform their jobs safely without worrying about the project schedule. However, in some cases, CHBWV has trended toward relying more on worker awareness and skill rather than supplementing that awareness and skill with the systematic work control process defined in its ISMS, primarily for routine tasks perceived as low hazard. And in other cases, slow changes in site conditions, such as the spread of contamination into areas previously treated as radiological buffer zones, have created situations where historic work practices no longer provide adequate safety margins. Nonetheless, CHBWV is pursuing improvements in its safety culture and issues management processes that will further encourage workers to report safety concerns and ensure managers and supervisors minimize the appearance of schedule pressures. The Team identified several opportunities for improvement that will help CHBWV address the identified conditions and continue its improvement. The Team recommends that CHBWV continue participating as a Star site in DOE-VPP.

## Appendix A: Onsite VPP Assessment Team Roster

### Management

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