CH2M HILL B&W West Valley, LLC
West Valley Demonstration Project

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
October 21-24, 2013

U.S. Department of Energy
Office of Health, Safety and Security
Office of Health and Safety
Office of Worker Safety and Health Assistance
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Foreword

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided but not standardized. For this reason, 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 (OSHA) VPP. Since its creation by OSHA in 1982, and DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. The Office of Health, Safety and Security (HSS) assumed responsibility for DOE-VPP in October 2006. Assessments are now more performance based and are enhancing the viability of the program. HSS continues to expand complex-wide contractor participation and is coordinating DOE-VPP efforts with other Department functions and initiatives, such as Enforcement, Oversight, and the Integrated Safety Management System.

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, employees, and DOE.

Requirements for DOE-VPP participation are based on comprehensive management systems with employees actively involved in assessing, preventing, and controlling the potential health and safety hazards at their sites. DOE-VPP is designed to apply to all contractors in the DOE complex and encompasses production facilities, research and development operations, and various subcontractors and support organizations.

DOE contractors are not required to apply for participation in DOE-VPP. 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 truly 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 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 provided by DOE 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 HSS DOE-VPP team's findings from the evaluation of CH2M HILL B&W West Valley, LLC (CHBWV), activities at the West Valley Demonstration Project during the period of October 21-24, 2013, and provides the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding CHBWV's continued participation in DOE-VPP as a Star site.

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ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
ALARA	As Low As Reasonably Achievable
AOC	Ashford Office Complex
BLS	Bureau of Labor Statistics
BTZ	Beyond Target Zero
CAS	Contractor Assurance System
CBT	Computer-Based Training
CBTZ	Company Level Beyond Target Zero
CFR	Code of Federal Regulations
CHBWV	CH2M HILL B&W West Valley, LLC
CIH	Certified Industrial Hygienist
CSPF	Container Sorting and Packaging Facility
DART	Days Away, Restricted or Transferred
D&D	Decontamination and Decommissioning
DOE	Department of Energy
DSA	Documented Safety Analysis
EM	Office of Environmental Management
FD	Facility Disposition
GET	General Employee Training
GLO	Ground Level Offices
HCS	Hazard Control Specialist
HEPA	High Efficiency Particulate Air
HIM	Hazard Identification and Mitigation
HMG	Hazard Mitigation Guide
HS-12	Office of Worker Safety and Health Assistance
HSS	Office of Health, Safety and Security
IH	Industrial Hygiene
IR	Instrument Recall
ISMS	Integrated Safety Management System
IWP	Industrial Work Permit
JSA	Job Safety Analysis
LSA	Lag Storage Area
MSDS	Material Safety Data Sheet
NAICS	North American Industry Classification System
OSHA	Occupational Safety and Health Administration
PM	Preventive Maintenance
POMC	Performance Objectives, Milestones, and Commitments
PPE	Personal Protective Equipment
RWP	Radiation Work Permit
SHIP	Safety and Health Implementing Procedure
SME	Subject Matter Expert
SMP	Safety Management Program
SOP	Standard Operating Procedure
SOTW	Skill of the Worker
STS	Safety-Trained Supervisor
Team	Office of Health, Safety and Security DOE-VPP Team

TRC	Total Recordable Case
TRT	Technical Response Team
TRU	Transuranic
VPP	Voluntary Protection Program
Waste/NOS	Waste Operations and Nuclear Operations
WPA	Waste Package Area
WIP	Work Instruction Package
WVDP	West Valley Demonstration Project
WVDPO	West Valley Demonstration Project Office

EXECUTIVE SUMMARY

The Western New York Nuclear Service Center is comprised of 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 West Valley Demonstration Project (WVDP) was one of five sites that reported to the Department of Energy (DOE) 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 B&W West Valley, LLC (CHBWV), a 6-year contract to continue the cleanup of facilities at WVDP. CHBWV is comprised of four companies: (1) CH2M-HILL Constructors Inc.; (2) Babcox & Wilcox Technical Services Group (B&W); (3) Environmental Chemical Corporation; and (4) American DND. Major contract milestones include: (1) completion of high-level canister relocation; (2) process, ship, and dispose of all legacy waste offsite; and (3) demolition and removal of the main plant process building and the vitrification facility.

The West Valley site initially entered DOE Voluntary Protection Program (VPP) in 1999. The most recent contract transition to CHBWV began August 29, 2011. In March 2012, CHBWV requested to retain the DOE-VPP Star status under the *transition* process provided in the DOE-VPP program documents. The Office of Worker Safety and Health Assistance (HS-12), within the Office of Health, Safety and Security (HSS), conducted a review of that request, and based on the recommendation from the West Valley Demonstration Project Office, agreed that CHBWV would remain in DOE-VPP in a *transitional* status pending receipt of a modified application for recertification as a Star site. The nature and scope of the changes necessitated an onsite assessment by HSS. HSS scheduled that assessment for October 21-24, 2013. This report documents the result of that assessment.

CHBWV employs approximately 190 personnel and 88 subcontractor personnel at the site. The International Association of Machinists Local 2401 represents a large portion of the workforce. During this assessment, owing to the small footprint and small workforce, the HSS DOE-VPP Team (Team) had contact with a majority of personnel, either through work observations or interviews. Work activities observed covered the gamut of activities associated with decontamination and decommissioning.

CHBWV has an effective, experienced, and involved management team that thoroughly understands the hazards and challenges of the current mission. The new management team carefully managed the contract transition. They continue working to improve communication with the workers and build trust. Managers are capitalizing on their experience from other sites and the knowledge of the workforce to accomplish the mission in a safe, compliant, and efficient manner.

Employees at CHBWV are fully engaged in the continuous improvement of safety at the West Valley site and are committed to establishing a safe work environment. Workers participate in the safety program through multiple venues, and donate their time and efforts to support community endeavors, as well as reaching out to other VPP participants.

CHBWV maintains an effective worksite analysis process that analyzes all hazards prior to performing work. The addition of the hazard analysis tools, such as the *Hazard Mitigation*

Guide and the *Approved Low-risk Routine Work List*, have strengthened the worksite analysis process resulting in more comprehensive work document packages. CHBWV should continue its efforts to improve the quality of the Job Safety Analysis.

CHBWV continues to implement the appropriate hierarchy of controls to limit employees' exposure to hazards and protect the environment. CHBWV is investing in improved hazard controls for hazards associated with everyday activities outside the decontamination and demolition activities (white space hazards), as well as improved work methods. Beyond Target Zero teams are actively engaged in identifying legacy hazards and appropriate controls. Workers understand 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. Improvements in tracking requirements for testing systems, such as local ventilation exhaust systems, will improve the safety controls of the site.

The CHBWV health and safety training program is comprehensive and adequate for the West Valley site. Workers, supervisors, and managers have appropriate training requirements established. Training and qualifications records are current, and workers do not perform work activities for which training and qualification requirements have expired. Supervisors are engaged in managing and monitoring employee training inputs and have the ability to verify that training requirements are current before assigning work tasks. CHBWV provides numerous reminders, postings, required reading subjects, and lessons-learned safety topics to encourage safety awareness at the site.

CHBWV has successfully transitioned the workforce at the site from the previous contractor. Because conditions at the site at transition were different than described in the request for proposals for the new contract mission, CHBWV has faced some unanticipated challenges in accomplishing its scope of work, but has used both the experience of its managers at other sites, and the site workers' broad knowledge to find solutions to those challenges. The managers and union leaders are learning to work together cooperatively, and the lines of communication are open and functioning. The workers at the site have a deep sense of pride and ownership of the site and their work, and continue to work carefully and safely to clean up the site. Overall, CHBWV demonstrates pursuit of excellence in each of the DOE-VPP tenets. The Team recommends that CHBWV continue participating in DOE-VPP at the Star level.

TABLE 1

OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
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CHBWV should work with WVDPO to restructure the POMCs and remove any appearance of disincentives to reporting.	6
CHBWV should consider condensing the variety of policies related to safety into a single, comprehensive safety policy that clearly defines the interactions and expectations of each program.	6
CHBWV should consider another training class to refresh workers' knowledge of the JTrac system and seek feedback to improve the user interface.	9
CHBWV should consider ways to elicit both positive and negative perspectives from the workers after completion of work through postjob reviews.	10
CHBWV should consider capturing and documenting the analysis component of the hazard analysis that exists between the identification of the hazard and the determination of the resulting controls in all its hazard analysis documentation.	13
CHBWV should revise Procedure WVDP-485 to reinforce the expectation that if workers identify additional hazards beyond the original work activity scope, particularly for preanalyzed and approved activities, the worker should pause or stop work and consult with his or her supervisor and safety representative.	15
CHBWV should ensure that engineered controls' maintenance and inspection requirements are scheduled and tracked and that workers verify equipment compliance prior to use.	18
CHBWV should evaluate whether refresher training is necessary to ensure the safety technicians maintain adequate competency for operating all devices from year to year.	21
CHBWV should consider reinstating support for the STS program as a way of maintaining a cadre of personnel trained and ready to fill supervisory positions.	25

I. INTRODUCTION

The Western New York Nuclear Service Center is comprised of 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 West Valley Demonstration Project (WVDP) was one of five sites that reported to the Department of Energy (DOE) 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 B&W West Valley, LLC (CHBWV) a 6-year contract to continue the cleanup of facilities at WVDP. CHBWV is comprised of four companies: (1) CH2M HILL Constructors Inc.; (2) Babcox & Wilcox Technical Services Group (B&W); (3) Environmental Chemical Corporation (ECC); and (4) American DND. The major contract milestones include: (1) completion of high-level canister relocation; (2) process, ship, and dispose of all legacy waste offsite; and (3) demolition and removal of the main plant process building and the vitrification facility.

The West Valley site initially entered DOE Voluntary Protection Program (VPP) in 1999. The most recent contract transition to CHBWV began August 29, 2011. In March 2012, CHBWV requested to retain the DOE-VPP Star status under the transition process provided in the DOE-VPP program documents. The Office of Worker Safety and Health Assistance (HS-12), within the Office of Health, Safety and Security (HSS), conducted a review of that request and, based on the recommendation from the West Valley Demonstration Project Office (WVDPO), agreed that CHBWV would remain in DOE-VPP in a *transitional* status pending receipt of a modified application for recertification as a Star site. The nature and scope of changes necessitated an onsite assessment by HSS. HSS scheduled that assessment for October 21-24, 2013. This report documents the result of that assessment.

CHBWV employs approximately 190 personnel and 88 subcontractor personnel at the site. The International Association of Machinists Local 2401 represents a large portion of the workforce. Many of these workers have worked at the West Valley site for most of their careers, some for 30 or more years. During this assessment, owing to the small footprint and small workforce, the HSS DOE-VPP Team (Team) had contact with a majority of personnel, either through work observations or interviews. Work activities observed covered the gamut of activities associated with decontamination and decommissioning. 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 elevated work, heavy equipment, electrical equipment, excavation, noise, and potential exposure to hazardous materials and chemicals.

II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

Injury Incidence/Lost Workdays Case Rate (CHBWV)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2011 (From August 29)	143,197	0	0.00	0	0.00
2012	407,772	4	1.96	1	0.49
2013 (year-to-date)	310,530	0	0.00	0	0.00
3-Year Total	861,499	4	0.93	1	0.23
Bureau of Labor Statistics (BLS-2012) average for NAICS** Code # 562			5.4		3.4
Injury Incidence/Lost Workdays Case Rate (CHBWV Subcontractors)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2011 (From August 29)	54,168	0	0.00	0	0.00
2012	259,275	1	0.77	0	0.00
2013 (year-to-date)	136,330	0	0.00	0	0.00
3-Year Total	449,773	1	0.44	0	0.00
Bureau of Labor Statistics (BLS-2012) average for NAICS** Code # 562			5.4		3.4

* Days Away, Restricted or Transferred

** North American Industry Classification System

TRC Incidence Rate, including subcontractors: 0.76
DART Incidence Rate, including subcontractor: 0.15

CHBWV took over the contract for WVDP in the second half of 2011 and maintained a low TRC rate and DART case rate. In 2012, a rash of 5 injuries occurred, but the TRC rate remained below the comparable NAICS industry injury rate. CHBWV attributed the rise in injury rates to its efforts to encourage workers to report injuries (see Management Leadership). CHBWV investigated each injury and implemented appropriate corrective actions. CHBWV's efforts to promote safety, such as "white space" hazard prevention and the formation of Beyond Target Zero (BTZ) safety teams, have proven effective to identify and correct legacy hazards. As a result, CHBWV, as of this assessment, has remained free of recordable injuries in 2013 and demonstrates the performance expected of a DOE-VPP participant.

III. MANAGEMENT LEADERSHIP

Management leadership is a key element of achieving and sustaining an effective safety culture. The contractor must demonstrate senior-level management commitment to occupational safety and health, in general, and to meeting the requirements of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. As with any other management system, 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. Elements of that management system must 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 finally, (5) managers must be visible, accessible, and credible to employees.

The management team at CHBWV brings a wealth of experience from other decommissioning and cleanup projects in DOE. Because of that experience, they have a keen understanding of the hazards and challenges of cleaning up a highly contaminated nuclear fuel reprocessing plant. They are capitalizing on that experience and understanding to reduce the risks at the West Valley site efficiently. The General Manager strongly encourages managers' presence in the worksites.

CHBWV managers understand the hazards and challenges posed by the mission. For example, managers have identified the "Big 6" hazards on the site as elevated work, hoisting and rigging, heavy equipment, fire, radiological, and hazardous energy. CHBWV identifies these six top concerns on posters around the site, discusses them in safety meetings and prejob briefs, and monitors them on the performance dashboard. CHBWV updates and reviews that dashboard monthly. CHBWV uses two indicators for each of the "Big 6" hazards, tracking both issues and events. For tracking purposes, CHBWV defines issues as questions or concerns that are raised, internally or externally, and may lead to stepbacks, pauses, or work stoppage until the issue is addressed. These issues do not lead to accidents or injuries. CHBWV defines events as accidents, injuries, or occurrences related to that area. Similarly, CHBWV tracks DART cases, TRC, First-Aid cases, and observation cases related to safety. Observation cases are reported conditions or circumstances where workers could have injured themselves or others, but recognized the condition prior to an accident or injury.

CHBWV also encourages workers to report issues or conditions by the use of "Discovery Clocks." These postings around the plant site indicate the number of days since the last identified issue or condition. CHBWV encourages workers to keep the numbers on the postings low, as opposed to Event Clocks that show the number of days since the last injury or event. CHBWV displays the Discovery Clocks more prominently than the Event Clocks. The tracking of observation cases and the use of the Discovery Clocks is an excellent practice that CHBWV should share as a lesson learned with other DOE contractors and DOE-VPP participants.

In keeping with its desire to encourage reporting of conditions or issues, CHBWV regularly conducts factfinding investigations for issues or conditions that are below reportable thresholds. It has also established a Technical Response Team (TRT) that is available anytime to help correct conditions. CHBWV assigns specific personnel to the TRT on a rotating basis who are listed on the morning plan-of-the-day meeting. The TRT has the authority to take actions to help

workers, such as revising procedures and making decisions on work methods and practices. CHBWV demonstrated effective use of the TRT and factfinding for nonreportable events during this assessment when a subcontractor experienced an issue while lifting a Vertical Storage Cask liner into the vertical position using a righting fixture and a crane. When the liner's center of gravity moved past the tipping point, the liner moved rapidly, and caused the lifting cable to go slack and then taut again, causing a shock load to the cable and crane boom. The subcontractor immediately placed the crane into a safe condition, stopped work, and requested the TRT. The Team observed that the subsequent factfinding meeting was used to establish the sequence of events and identify process issues, but not to assign blame. The corrective actions included: tagging the crane out of service pending a complete inspection of the crane by a certified crane inspector, revising the lifting plan to include two cranes, and eliminating the righting fixture from the lifting plan. The event did not damage any equipment or injure any personnel, and CHBWV used the event as an opportunity to learn and improve. The work resumed 2 days later.

A side effect of encouraging workers to report observations, issues, and injuries was that TRC and DART case rates both rose significantly in 2012. CHBWV had warned WVDPO that both indicators were going to rise because managers believed many workers were not reporting injuries. Although injury rates rose in 2012, there has been a notable decrease in 2013. In this case, the Team believes the reduction is due to improved work planning and practices, not due to decreased reporting by workers.

CHBWV has established a goal of zero for all these performance indicators. Zero may not be an effective target for issues in the Big 6 or for observation cases and contradicts the message of the Discovery Clocks. Issues and observations result when workers or managers proactively identify at-risk situations and bring that situation to the attention of the appropriate personnel. Realistically, CHBWV might be more effective by establishing a statistical baseline for these indicators, monitoring deviations from that baseline, and using those deviations as a basis for corrective action if necessary. CHBWV should revise its performance indicator targets for issues and observations to establish baselines and identify trends.

Opportunity for Improvement: CHBWV should revise its performance indicator targets for issues and observations to establish baselines and identify trends.

CHBWV had several plans for workforce restructuring, including plans to reduce certain job codes and eliminate backshift operations. Workers, particularly plant shift operators, were concerned that the response capability to alarms or conditions on backshift would be compromised without qualified operators available. Although there are no requirements related to the documented safety analysis (DSA) for operators on backshift, CHBWV has continued to maintain a small presence of plant shift operators in deference to workers' concerns.

Since the site is relatively small with a workforce that has worked together for many years, rumors spread very quickly and can often lead to unfounded concerns by workers. Recognizing this adverse potential, the General Manager follows up on all rumors he hears. In most cases, these rumors have no basis, but may contain some small nuggets of truth that indicate a practice or condition that requires action. The General Manager addresses these nuggets where appropriate in order to ensure an appropriate response from the management team.

CHBWV managers were consistent in their desire for all work to be accomplished safely. They repeatedly encouraged workers to step back, pause, or even stop work as often as they needed to in order to address questions, concerns, or prevent accidents and injuries. They valued input by workers as an integral part of work planning. Workers have responded to that message and are taking full advantage of the opportunity to contribute to mission success by using pauses, stepbacks, and work stoppage.

The CHBWV management team recognized at the outset that the site workforce would be skeptical of the new managers. The General Manager established his expectations that the new managers should not refer to their work experience at other DOE sites when making changes. Instead, it was his expectation that they consult the workers and work to address workers' concerns with longstanding problems before making other changes. Most managers followed this expectation. In one case, CHBWV brought in a supervisor from another site that did not follow this expectation and CHBWV subsequently removed him from the project. Additionally, the General Manager meets weekly with the Union President and Chief Steward to discuss safety issues and concerns. CHBWV normally expects managers to use coaching and mentoring to correct at-risk behaviors and practices, but there have been a few cases where CHBWV believed it finally had to use discipline to correct unsafe behaviors. In those few cases, CHBWV fully considered the negative effects that discipline might have on the individual workers, and only took that action after significant review and investigation. CHBWV recognizes from its surveys and self-assessments that some workers still distrust managers' motives, but that fraction is getting smaller as both managers and workers continue to build their teaming relationship and improve communication.

CHBWV faced several unexpected challenges when they took over the contract in August 2011. The bargaining agreement with the International Association of Machinists expired 15 days after the transition date. Over 270 drums of waste from liquid processing that were expected to be removed from the process building by the previous contractor remained in the building. Large volumes of wastes in boxes and drums were stored in buildings or exterior areas with no approved disposal path. The request for proposal did not identify those conditions, but CHBWV is addressing them in order to accomplish its contracted scope of work.

The structure of the CHBWV contract also presents challenges to CHBWV to provide incentives to the workforce. Per the contract, 80 percent of the available award fee is not available until the end of the contract, based on meeting established goals by milestone dates. CHBWV can lose up to $80,000 a day if it misses those milestone dates. This performance-based contract, if not managed carefully by both DOE and CHBWV, risks placing significant production pressures on the workforce as those milestone dates approach. To date, CHBWV has effectively shielded the workforce from that pressure.

CHBWV can earn the remaining 20 percent of the available award fee incrementally each 6 months, based on WVDPO's assessment of contractor performance. WVDPO establishes the Performance Objectives, Milestones, and Commitments (POMC) annually. While those POMCs are generally adequate, CHBWV and WVDPO may need to work cooperatively to revise two POMCs. First, WVDPO has established POMCs to reduce TRC and DART case rates below specific targets, and reduce the number of reportable occurrences. Second, WVDPO established a POMC to reduce the number of reportable occurrences. These criteria could discourage

CHBWV from reporting accidents, injuries, or occurrences. More effective POMCs could be identified that would incentivize CHBWV to take those actions that would lead to reduced TRC and DART case rates, as well as reduce occurrences. CHBWV should work with WVDPO to restructure the POMCs and remove any appearance of disincentives to reporting.

Opportunity for Improvement: CHBWV should work with WVDPO to restructure the POMCs and remove any appearance of disincentives to reporting.

Another challenge in the contract was that initially DOE did not provide any resources in the annual budget for worker reward and recognition. CHBWV has been working with DOE to establish a reimbursable budget for reward and recognition. In the interim, CHBWV has provided funding from nonreimbursable funds to celebrate achievements, both for groups and individuals. The CHBWV General Manager expressed his intent to continue using nonreimbursable funds in addition to the reimbursable funds as a means of promoting safety. All managers interviewed by the Team recognized the value of rewarding workers for doing the right thing, and were careful to avoid providing any incentives that might discourage reporting of accidents or injuries. Neither the Team nor the workers identified any disincentives to reporting accidents or injuries.

CHBWV is committed to creating an effective safety culture. It has performed surveys and assessments of nuclear safety culture, safety conscious work environment, integrated safety management, human performance improvement, and VPP. It has also issued a number of separate policies related to each of these concepts and approaches. These policies make identification of specific approaches for outside auditors very clear, but have had limited value to the workforce. Many workers interviewed by the Team did not fully understand how CHBWV implemented these policies on a daily basis to accomplish work safely. CHBWV should consider condensing the variety of policies related to safety into a single, comprehensive safety policy that clearly defines the interactions and expectations of each program.

Opportunity for Improvement: CHBWV should consider condensing the variety of policies related to safety into a single, comprehensive safety policy that clearly defines the interactions and expectations of each program.

CHBWV has an effective system to select and monitor subcontractor performance. Procedure WV-620, *Purchase Requisitions and Supplements,* provides the formal mechanism for establishing and transmitting safety program criteria to CHBWV vendors and subcontractors. All vendors and subcontractors complete an Integrated Safety Management Requirements List before performing work onsite. In addition, Procedure WV-19012, *West Valley Nuclear Services Safety, Health, and Security Rules for On-Site Services* (a) and (b), provide general and special safety, health and security rules for onsite services. Safety and Health Implementing Procedure (SHIP)-102, *Subcontractor Safety and Health Oversight Program*, identifies and establishes the safety program implemented by industrial safety and health for oversight and requisite interfaces between CHBWV and subcontractor personnel performing work at WVDP. CHBWV provides safety requirements, and subcontractors must adhere to the CHBWV safety plan. Each subcontractor has an assigned Subcontractor Technical Representative that is responsible for day-to-day monitoring of the subcontractor's work onsite. In addition, CHBWV managers were

frequently onsite to monitor subcontractor performance, particularly during major work evolutions. Throughout the transition process from the previous contractor, CHBWV has continued to perform annual evaluations that include all 5 tenets of DOE-VPP. The assessment is led by the Human Performance and Reliability Department, and integrates results and trends from other assessments conducted under the contractor assurance system. The report includes contributions from the BTZ committees (see Employee Involvement), and is used to establish performance targets for the coming year.

Conclusion

CHBWV has an effective, experienced, and involved management team that thoroughly understands the hazards and challenges of its current mission. The management team carefully managed the contract transition and continues working to improve communication and trust with the workers. CHBWV is capitalizing on its experience from other DOE sites and the knowledge of the workforce to accomplish the mission in a safe, compliant, and efficient manner. CHBWV should continue working to clarify its safety and health program structure, make its performance indicators more functional, and work with WVDPO to ensure there are no perceived disincentives in the contract to reporting. CHBWV fully demonstrates the Management Leadership necessary for continued participation in DOE-VPP.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels must continue to be involved in the structure and operation of the safety and health program and in decisions that affect employee health and safety. Employee involvement is a major pillar of a strong safety culture. Employee participation is in addition to the individual right to notify appropriate 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 welcome. Managers must be proactive in recognizing, encouraging, facilitating, and rewarding workers for their participation and contributions. Both employees and managers must communicate effectively and collaboratively participate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

Workers are not afraid to report any injuries, accidents, or incidents. The Team had numerous discussions with workers about reporting accidents or injuries. All workgroups indicated that reporting injuries, accidents, or incidents are an expectation and that they did not have a fear of retaliation or retribution for reporting.

The Team observed several CHBWV prejob briefings where workers provided feedback on work methods and discussed concerns with their supervisors. For example, during a prejob briefing for staging a wastebox in a contaminated area, the interaction between the supervisor and the workers was outstanding. The workers would be dressed in full anti-contamination clothing and respiratory protection while performing the job, restricting their ability to communicate effectively. Discussions between the supervisor and workers focused on the sequence of tasks that workers wanted to follow in order to perform the task in the most efficient manner and reduce the time spent in contaminated areas. Since the workers had performed this task many times, they freely voiced their recommendations, and all support personnel and supervisors in attendance agreed with the workers' recommendations for the sequence of tasks.

Workers at WVDP have up to 30 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. They were adamant about their safety and the safety of their coworkers. The workers told the Team that their experience and knowledge helped them make the job safer because they knew "what to do" and "when to do it."

Most workers and supervisors interviewed by the Team felt comfortable and were encouraged to pause or stop work if they encountered a safety issue or an unknown situation. The Team did not encounter any workers that were uncomfortable about raising questions or issues. Procedure WVDP-553, *Step Back Program*, states:

> *"The purpose of this procedure is to ensure that all employees are given the responsibility and authority to stop work when employees believe that a situation exists that places them, their coworker(s), subcontractors, or the public at risk or in danger; could adversely affect the safe operation or cause damage to the facility; or result in a release of radiological or chemical effluents to the environment above regulatory requirements or approval; and provides a method to resolve the issue."*

Workers were clearly familiar with the purpose and intent of this procedure. The program permits a stepback where workers pause to allow clarification or to correct a deficiency in the work process. The worker has the ability to decide whether to pause or stop work and is involved in the decision to resume work once the question or issue is resolved. A few workers were less comfortable about challenging supervisors relating to their understanding of work expectations and requirements, but they reiterated that they would definitely halt work if an unsafe condition arose.

CHBWV instituted BTZ teams as mechanisms to involve the workforce in identifying and finding solutions to issues within their work areas. These teams focus on prevention and elimination of hazards through early identification and corrective actions before they become a problem. Currently CHBWV has four working level BTZ Teams: Ground Level Offices (GLO), Waste Operations and Nuclear Operations (Waste/NOS), Facility Disposition (FD), and the Ashford Office Complex (AOC). Each BTZ team has a chair, co-chair, and a management champion. BTZ membership consists of interested employees that volunteer to serve on the teams. A company level BTZ team (CBTZ) brings in the four BTZ chairs and champions 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 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.

Each BTZ team identifies its issues in its area of responsibility, which CHBWV refers to as gaps. The BTZ teams enter identified gaps into a computer-based tracking system, JTrac, which was developed locally for that purpose. Each BTZ team monitors the time since it last identified a gap using a Discovery Clock (see Management Leadership). Some workers expressed frustration with accessing and updating the JTrac system to manage gaps. When CHBWV introduced JTrac, it conducted an initial training class to train workers on its use. Based on worker feedback, CHBWV should consider another training class to refresh workers' knowledge of the JTrac system, and seek feedback to improve the user interface.

Opportunity for Improvement: CHBWV should consider another training class to refresh workers' knowledge of the JTrac system and seek feedback to improve the user interface.

In some cases, BTZ teams may not effectively raise issues to the CBTZ (self-filtering). For example, workers told the Team that in August 2013 personnel performed a lockout/tagout on a pump prior to maintenance. The lockout/tagout procedure removed a drain plug to verify the system was drained of residual water. Later, when the workers decoupled the union for the maintenance work, water leaked from the connection indicating that there was still water in the system. The workers that performed the lockout/tagout did not recognize that when no water drained from the system through the drain plug, there might be a blockage in the system. The maintenance workers are still concerned that the lockout/tagout procedure does not ensure personnel with appropriate system knowledge are involved in developing and establishing lockout/tagout boundaries. The FD BTZ discussed the lockout/tagout issue but did not raise it to the CBTZ. CHBWV scheduled a meeting to resolve the issue after the Team left the site. Other

than the delayed response to the lockout/tagout issue, employees expressed their belief that the BTZ system was generally effective.

CHBWV expects GLO, Waste/NOS, FD, and AOC BTZ teams to follow the structure and intent of the CBTZ charter but tailor their efforts to specific needs in their job scope. There is some variability in the charters of the area BTZ teams. For example, the AOC BTZ charter references BTZ-002 for further information relating to roles and responsibilities for BTZ positions. The GLO BTZ, on the other hand, is silent relating to roles and responsibilities of team members. Based on the Team's discussions, both BTZs are effective; however, the BTZ teams should consider comparing and evaluating the various BTZ teams' processes to determine if improvements to their organizational structure will improve their effectiveness. The Team attended 4 out of the 5 CHBWV BTZ meetings and all were consistently focusing on identifying issues and tracking them to completion. In addition to BTZ teams, CHBWV established ad hoc safety teams for specific functional areas. These include electrical safety, radiation protection, Personal Protective Equipment (PPE), respiratory protection, As Low As Reasonably Achievable (ALARA), and Human Performance Improvement teams.

Workers at CHBWV are involved in work planning and walkdowns. The Team interviewed several employees that performed walkdowns of planned work. In addition to planned work, employees indicated that they participate in safety walkdowns through their BTZ Teams. As an example, the GLO BTZ walkdown identified several shelves in workspaces that present hazards to office workers. One worker received a contusion on his head due to the location of the shelf unit. Further investigation revealed that other workspaces have the same problem. The GLO BTZ meeting discussed this issue and how best to eliminate the hazard.

The Team asked employees about the frequency of postjob reviews. The responses varied from: not at all or infrequent for low-risk/routine activities, to more often after a complex work activity. To improve work planning, CHBWV should encourage more postjob reviews, specifically related to low-risk/routine work. One way CHBWV might approach postjob reviews is to set aside 5-10 minutes at the end of the day to allow employees to discuss their perspectives on work for that day and allow the supervisors to document any important observations. CHBWV should consider ways to elicit both positive and negative perspectives from the workers after completion of work through postjob reviews.

Opportunity for Improvement: CHBWV should consider ways to elicit both positive and negative perspectives from the workers after completion of work through postjob reviews.

Workers are involved in community outreach efforts and company-wide activities. CHBWV is involved with the community and outreach efforts across the DOE complex. CHBWV assisted the Advanced Mixed Waste Treatment Plant at the Idaho site during its Phase 2 Integrated Safety Management System (ISMS) verification. Locally, CHBWV is mentoring both Bartlett Services and American DND. Employees at CHBWV support community groups, such as the Boy Scouts and Girl Scouts. A recent company effort to raise money for local food pantries raised over $2,500.

Conclusion

Employees at CHBWV are fully engaged in the continuous improvement of safety at the West Valley site and are committed to establishing a safe work environment. Multiple venues exist for workers to participate in the safety and health program, and they are taking advantage of those opportunities. Employees also donate their time and efforts to support community endeavors, as well as reach out to other VPP participants in DOE. CHBWV meets the expectations in the Employee Involvement tenet 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. There must be a systematic approach to identifying and analyzing all hazards encountered during the course of work, and 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.

The design, construction, and operation of the original facility as a fuel reprocessing plant was the subject of a United States Atomic Energy Commission-approved Final Safety Analysis Report. As a Category 3 Nuclear Facility, CHBWV submitted a revised DSA, WVNS-DSA-001, *Documented Safety Analysis for Waste Processing and Support Activities, Revision 17, Draft B,* compliant with title 10, Code of Federal Regulations, part 830, *Nuclear Safety Management*, subpart B, *Safety Basis Requirements* (10 CFR 830 (B)), to DOE. The DSA contains those high level controls relied upon by DOE for the safe operation of the facility and based on the current analysis, predominantly addresses proper handling of transuranic (TRU) waste and criticality prevention until the inventory can be reduced and removed from the site. CHBWV administratively requires 11 Safety Management Programs (SMP) described within the DSA for safe operation. The 11 SMPs include: the worker safety program, radiological protection program, nuclear criticality protection program, fire protection program, and the conduct of operations program. In addition, there are technical safety requirements that include specific administrative controls that provide specific controls for those SMPs and mitigators for site hazards.

Procedure WVDP-485, *Work Control*, implements the Integrated Safety Management criteria into an Integrated Work Control Process. The procedure outlines the work planning and control process for identifying, planning, scheduling, authorizing, performance, and closeout of work activities at the site. The procedure also establishes the required hazard analysis for all work. Attachment A of WVDP-485, *Decision Tree for Proper Work Authorization,* is a logic diagram for the selection of the appropriate work control document type required for the activity and indicates the type of hazard analysis for that activity. The Decision Tree process allows the work planner to review and use a preexisting hazard analysis rather than performing a new analysis, but the planner cannot bypass the hazard analysis. The Team's review of the Decision Tree confirms that CHBWV requires a hazard analysis for all types of work. The Decision Tree also includes the contractor site requirements, the associated implementing procedures, and required permits.

Procedure WV-921, *Hazard Identification and Analysis*, provides instructions for the Hazard Identification and Mitigation (HIM) process or hazard analysis including: (1) determining when various Hazard Control Specialists (HCS) shall be included in the work planning process; (2) identifying specific task activities where hazards exist; (3) identifying hazards applicable to the specific tasks; and (4) mitigating the hazards using a hierarchy of controls whenever elimination is not possible. WV-921 also recommends considering hazards and controls from

other safety program analyses (DSA, ALARA job review, industrial hygiene (IH) exposure assessment, etc.), and integrating those hazards and controls into the hazards analysis, whenever appropriate.

A planning team completes the Activity Hazard Analysis (AHA) during a walkdown and the work control planning process as the initial step of the HIM process. Attachment A to WV-921 is the *Hazard Mitigation Guide (HMG) for Integrated Work Control Process*. The team-based work planning approach uses HMG for consistent hazard identification and analysis that integrates company and regulatory requirements into work control documents. HCS' develop a well-defined hazard control set based on the AHA, the HMG, and additional or more detailed hazard analysis for critical or high hazardous work. The planning team incorporates only the applicable HMG items into the final work control documents, procedures, or permits. The Team's review of completed work packages confirmed the effective inclusion of identified hazards, the inclusion of the implementing procedures and regulations affecting the work task, and the recommended controls within the Work Instruction Packages (WIP).

The hazard analyses reviewed by the Team were comprehensive with details listed relating to training required for workers involved, hazard controls required, permits required for the work, and the procedures related to the work and controls. The Team's review of completed work packages confirmed the thoroughness of this hazard analysis approach compared to the previous process utilized at the site. The HMG process provided an analysis of the hazard conditions related to, but not limited to, radiological hazards, industrial hazards, excavation and subsurface penetration, fire safety, and chemical safety.

WV-921 also provides directions for developing Job Safety Analyses (JSA) using HMG. CHBWV recently improved the JSA process by reviewing previous standing JSAs and applying a more detailed approach to the hazards analysis and the recommended controls in the JSAs. Several of the new JSAs were reviewed and the Team considered the resulting controls effective. CHBWV should continue working to improve the JSA process to the new expectations demonstrated in the recently improved documents.

The Team noted that JSAs only documented identification of the hazard, not specific details or assumptions that led to the control selection. In most cases, the additional analysis may only be the citation of an Occupational Safety and Health Administration regulation or a manufacturer-recommended practice, but documenting that citation and any other assumptions ensures the recommended controls are appropriate. It also provides workers, supervisors, and subject matter experts (SME) with valuable information to determine if the analysis bounds subsequent changes to the activity or other similar activities. CHBWV should consider capturing and documenting the analysis component of the hazard analysis that exists between the identification of the hazard and the determination of the resulting controls.

Opportunity for Improvement: CHBWV should consider capturing and documenting the analysis component of the hazard analysis that exists between the identification of the hazard and the determination of the resulting controls in all its hazard analysis documentation.

Attachment A, Figure A-1, to Procedure WVDP-485 provides a *Tailoring and Graded Approach to Planning* matrix that establishes a graded approach for work planning and control based on

complexity of the activity, expected hazards, and other risks associated with the proposed activities. A risk-based matrix qualitatively ranks the hazards of a task or operation based on established metrics described in the procedure. Attachment A, Figure A-2, establishes the *Criteria for Work Control Activity/Document Screening Process*. The table lists examples of the factors/criteria for work planners to determine and select the appropriate type of work control document for a given work activity. The development, analysis, and inclusion of these figures (tables) in Attachment A-2 have been effective in improving the definition, analysis, and resulting controls for planned work packages compared to previous years.

For repetitive operations or maintenance activities, Procedure WVDP-485, identifies four types of work control documents: standard operating procedures (SOP); instrument recall (IR) (i.e., calibrations or functional tests of instruments); predictive and preventive maintenance (PM); and low-risk routine work. For SOPs, IRs and PMs, the hazard analysis is performed in accordance with Procedure WV-921, *Hazard Identification and Analysis*, and the hazards and hazard mitigations are required to be included directly in the SOP, IR, or PM, or in permits required by the SOP, IR or PM (e.g., Industrial Work Permit (IWP), Radiation Work Permit (RWP)).

For infrequently performed tasks, onetime only tasks (nonrepetitive tasks), or routine tasks performed under differing circumstances, WVDP-485 defines five types of work documents. For complex tasks (high-hazard or complex work), a WIP is used. High-hazard or complex work activities are tasks not totally within the training and qualifications of workers that require detailed work instructions and accompanying hazard analysis to be performed safely and correctly. The work performed has the potential to cause significant harm to personnel or damage to the environment. Procedure EP-5-002, *Administration of Work Instruction Packages,* provides direction and guidance to work planners for WIP development, with the associated hazard analysis performed per Procedure WV-921.

The Team reviewed a sample of randomly selected, completed WIPs that had well-defined workscopes and comprehensive hazard analysis and controls. In addition, most of the WIPs reviewed included effective written feedback in the lessons learned section from the workers and supervisors that performed the work. The overall quality of WIPs sampled and the feedback provided in completed packages from workers and supervisors demonstrate a significant improvement in the work control process for the site.

There are three types of work for skill of the worker (SOTW) tasks: minor work; troubleshooting/routine maintenance; and low-risk routine work. Minor work is work that is SOTW, which may present greater complexity and risk than low-risk routine work, but is not complex or high hazard. SOP-00-54, *Minor Work Request,* establishes the process for minor work. Examples of minor work include equipment and area decontamination, maintenance work, minor repairs, etc. SOP 00-11, *Troubleshooting and Maintenance of Electrical Equipment,* covers electrical troubleshooting and routine maintenance and provides bounding conditions under which it may be used. Procedure WV-921 defines the hazard analysis for minor work and troubleshooting/routine maintenance.

Low-risk routine work are tasks that are low-risk, simple, routine, frequently performed and within the definition of SOTW and may be performed without written work instruction under the

direction of a supervisor using the training and qualifications of the worker if covered by Attachment B, *Approved Low-risk Routine Work List.* Attachment B is a continuously developing list of preanalyzed and approved work activities authorized to be performed as low-risk routine work. CHBWV analyzes the hazards of the low-risk routine work listed in Attachment B, using IWP per SHIP-201, *Industrial Work Permits*, a JSA per SHIP-108, *Preventive & Predictive Maintenance and Recurring Task System*, and/or an RWP per RC-ADM-6, *Radiation Work Permits*, as applicable. These permits then communicate the controls resulting from those analyses to the worker. Examples of nonrepetitive tasks that are low-risk routine work include minor decontamination and some scaffold erection and removal.

The use of a preanalyzed set of work activities is an excellent approach to ensure supervisors, planners, and workers properly analyze and review low hazard work. By establishing a preapproved list, SOTW work is better defined and analyzed in the work control process, and additional work activities can be added to the list if analyzed and determined to meet the low hazard criteria.

However, Procedure WVDP-485 also includes the statement that for low-risk, routine and nonroutine work, "*workers shall also refer to applicable MSDS sheets and technical manuals for additional guidance, safety precautions, and PPE."* This statement implies the worker may identify additional hazards associated with the task that are beyond his or her specific knowledge or skills, that were not identified and analyzed in the initial hazard analysis. Guidance, safety precautions, and PPE identified by the Material Safety Data Sheets (MSDS) or technical manuals should have been included in the initial analysis of the activity prior to adding the activity to the approved low-risk routine work listing in Procedure WV-921, Attachment B. Rather than leaving the hazard analysis to the worker, CHBWV should revise Procedure WVDP-485 to reinforce the expectation that if workers identify additional hazards beyond the original work activity scope, particularly for preanalyzed and approved activities, the worker should pause or stop work and consult with his or her supervisor and safety representative. Work should only resume after modifying the hazard analysis for the task to establish the appropriate controls.

Opportunity for Improvement: CHBWV should revise Procedure WVDP-485 to reinforce the expectation that if workers identify additional hazards beyond the original work activity scope, particularly for preanalyzed and approved activities, the worker should pause or stop work and consult with his or her supervisor and safety representative.

Procedure WV-121, *Integrated Assessment Program,* documents the policy to develop, implement, and maintain the integrated assessment program to comply with applicable DOE Directives, Regulations, Standards, and ISMS requirements. Section 6.5 describes the implementation and performance of the Performance Evaluation and Contractor Assurance System (CAS). The purpose of CAS is to evaluate the overall site performance and conduct an analysis of that performance monthly. The CAS performance metrics include evaluating the performance of the CHBWV ISMS through the evaluation of: trends, efficiencies, extent and severity of a specific problem, problems and cause relationships, and favorable trends. Recommendations based on these analyses are provided to the CHBWV General Manager regarding corrective actions that may need to be taken or areas where management assessments may need to focus.

The CHBWV safety department prepares and executes a schedule for quarterly self-assessments and program assessments as required by Procedure WV-121, *Integrated Assessment Program,* and SHIP-104, *Industrial Safety Assessment, Regulatory Review and Inspection Program,* to perform self-assessments on an annual basis.

As part of the VPP criteria, CHBWV is required to, and does, inspect and assess the hazards of the entire site each quarter. Form WV-3063, *WVDP Safety/IH Quarterly Inspection,* is used in the performance of the required quarterly site inspections. CHBWV identifies and documents deficiencies and tracks recommended corrective actions to closure. The Team reviewed the quarterly inspections for 2012 and 2013 to date. The assessments were performed using the required forms and any deficiencies were properly identified and immediately corrected or entered into the tracking system for closure.

Conclusion

CHBWV maintains an effective worksite analysis process that analyzes all hazards prior to performing work. The additions of the hazard analysis tools, such as HMG and the *Approved Low-risk Routine Work List,* have strengthened the worksite analysis process resulting in more comprehensive work document packages. CHBWV should continue its efforts to improve the quality of JSAs. CHBWV meets the expectations in Worksite Analysis for continued participation in DOE-VPP.

VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (by substitution or changing work methods) or addressed by the implementation of effective 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/procedures must also be followed by everyone in the workplace to prevent mishaps or control their frequency/severity.

Overall, the site identifies hazards and uses the hierarchy of controls (i.e., substitution, engineering, administrative, PPE) to limit exposures to workers and the environment. The Team observed that the site is continually eliminating hazards to facilitate deactivation of the plant. CHBWV uses a staging method in its work planning to help eliminate multiple hazards. For example, CHBWV used the staged method for decontamination and decommissioning (D&D) work in the main process building. The work plan first scheduled the removal of asbestos insulation from overhead pipes in a hallway so workers did not have to account for possibly damaging the asbestos as they completed other work in the hallway. Next, workers brought equipment into the same hallway to access the vessels containing raschig rings located on the floor beneath them. Radiological hazards are the main hazard of this work. Similarly, the use of steam heat within the building has presented a variety of hazards to workers performing piping system removal. The steam plant is scheduled for shutdown and demolition, which will remove hazards from anticorrosive chemicals used in the water, and will also eliminate the risks associated with workers potentially cutting a live steam pipe. Using the staged approach to work planning is an effective method to eliminate hazards and demonstrates a sound work planning approach.

CHBWV also uses engineered controls where practical. For example, there is a welding station in the electricians' shop for both carbon steel and stainless steel. The welder uses a welding mask that automatically darkens when the arc begins; and 3 years ago, the site installed an adjustable local exhaust hood that exhausts to the outside.

In two cases, CHBWV was not adequately maintaining engineered controls on equipment. In one case, the local exhaust hood previously discussed was overdue for flow testing since January 2013, but the welder continued to use the hood without identifying the issue or requesting that the hood be tested. The industrial hygienist recognized the lapse, tagged the exhaust hood out-of-service, and scheduled the equipment for testing. In a second case, an adjustable tongue guard on a grinder in the machine shop was set at greater than quarter inch, contrary to 29 CFR 1910, *Labor, Occupational Safety and Health Standards,* subpart O, *Machinery and Machine Guarding,* section 215, *Abrasive Wheel Machinery,* (b)(9) *Exposure Adjustment*. CHBWV should ensure that engineered controls' maintenance and inspection requirements are scheduled and tracked and that workers verify equipment compliance prior to use.

Opportunity for Improvement: CHBWV should ensure that engineered controls' maintenance and inspection requirements are scheduled and tracked and that workers verify equipment compliance prior to use.

CHBWV uses radiological controls throughout the site. Yellow and magenta chains and postings identify Contamination, Radiation, and Buffer Areas, warn personnel of radiological hazards, and prohibit entry into the posted area without proper training, approval, and appropriate PPE. RWPs accompany work packages and are specific to the work being performed.

The Lag Storage Area 4 (LSA 4) is a large warehouse that houses two sorting operations under separate tents. LSA 4 also stores empty and waste-filled barrels and boxes. The first of the two tents is the Container Sorting and Packaging Facility (CSPF). The original purpose of CSPF was to remove prohibited items in barrels filled with mixed, low-level radioactive waste with a strategic sorting procedure. Today, the same equipment and similar procedures help to sort asbestos containers prior to release for disposal. According to an operator, this tent is free of radioactive contamination. The entire tent is under continuous negative pressure even when sorting operations are not ongoing. Asbestos packages enter the sorting area through two garage door airlocks. Workers place asbestos packages in a holding area and the outside garage door is closed. The inside garage door remains closed until a worker opens the interior garage door and brings the package into the sorting area. Workers don PPE appropriate for asbestos work and enter through airlock doors. Two movable, exhaust ventilation systems are available to place over the package to control any potential fiber release. An operator stated that workers open most asbestos packages in the glovebox, also under negative pressure. Workers handle the asbestos in the glovebox and remove any prohibited items for asbestos landfills. The asbestos moves along the glovebox until it reaches a container under a hood, and leaves through an airlock passage originally designed for barrels.

The second tent in LSA 4 is the Waste Package Area (WPA). The WPA is similar in design to the CSPF since the CSPF processed low-level radioactive waste. The design of the WPA came from the Nevada Nuclear Security Site and provides protection to workers and the environment from radioactive waste. Much like the CSPF, workers bring radioactive material from the main plant through garage doors and place the waste in a holding area until the exterior garage doors are closed. Workers retrieve the material by opening a set of interior garage doors and bringing it into the processing area. Ventilation systems maintain a constant negative pressure inside the WPA. Workers are videotaped packaging and inventorying every item that goes into the TRU waste containers. Workers also repackage low-level radioactive waste in barrels by emptying the contents, removing prohibited items (i.e., ballasts, batteries, chemicals, and others), and repackage the low-level radioactive waste. This process eliminates mixed waste and the disposal issues associated with it. In an effort to reduce disposal costs, CHBWV also processes low-level radioactive waste from barrels to boxes to make better use of the available disposal volume.

The WPA processing area includes a movable, high-volume exhaust hood, and a ground level exhaust hood. Workers place the movable hood over barrels as they are opened or over materials that pose an airborne hazard. When workers need to cut materials, they place the materials near the ground level exhaust hood to control the dust hazard. This approach was designed based on

workers' input. The original design involved a downflow-ventilated sorting table that was ergonomically challenging for workers and did not effectively capture the rogue alpha particles associated with TRU waste handling. The workers indicated they thought the original sorting process was ineffective and worked to develop the current design with their supervisors and safety teams. Two portable High Efficiency Particulate Air (HEPA) vacuums are available to control dust hazards. Since the tent has windows surrounding the process, observers oversee the work processes and interject comments on the process as needed.

CHBWV provides workers in WPA with appropriate PPE to protect them from radioactive contamination. For low-level radiation operations, workers wear white hoods (made of synthetic material) and an air line supplied with breathing air, two anticontamination suits, gloves, and boots. For high-level radiation operations, CHBWV utilizes a unique approach. Workers first don a cooling harness on their torso that is supplied with compressed air (not breathing air). Then workers don the two anticontamination suits and a full-face, supplied-air respirator. The worker wears a belt with a junction box that supplies breathing air for the respirator. The junction box also contains a HEPA filter for emergency use if the breathing air is interrupted and the worker needs to evacuate WPA. Next, the worker dons a vinyl bubble suit and a clear plastic bubble hood. Gloves and boots are dressed next, and two short hoses are inserted through the vinyl suit port connecting to the cooling harness and junction box. A cut in both anticontamination suits allows the air hoses' access to the cooling harness. Both cuts are taped shut to the hose to prevent contamination, and the vinyl port is taped shut around both hoses. A cut in the vinyl suit over the HEPA filter is taped shut, but can be opened quickly with one quick pull, exposing the filter to air. At this point, the worker is encapsulated and the two hoses are dangling out of the vinyl suit port with quick disconnects. As the worker enters the interlock chamber, two hoses taped together are connected to the quick disconnects to supply breathing air for the respirator and compressed air for the cooling harness. The vinyl suit inflates around the worker providing maximum protection against airborne contamination.

The vinyl suit and bubble hood add heat stress as the worker dresses and performs work. SHIP-209, *Heat and Cold Stress,* dated May 24, 2012, identifies appropriate administrative and engineered controls, including physiological monitoring, proper selection of PPE, and application of correction factors to work/rest regimes based on PPE. Recently, CHBWV built a dressing area with clear plastic sheets and a surplus portable air conditioner. Workers wait there until WPA is ready for entry, keeping the workers cool in the summer. The Team also noted workers wear similar high contamination protection for D&D work in the plant.

LSA 4 has a concrete berm around the entire concrete floor of the facility to keep liquids from leaving the facility. The berm is approximately one foot inward from the edge of the floor. Since the area from the edge of the floor to the curb is a *clean* area, many electrical conduits run along with other equipment, but not on the floor in this area. During rainy weather, water flows along the ground from outside to inside LSA 4. The entire facility does not flood because the berm keeps the water out, but the electrical conduits become submerged creating a potential electrical hazard. The chief electrical engineer and electrical supervisor inspected the conduit and determined that the conduit is rigid, grounded, and acceptable for exterior use. Workers have cleared drains and piping around LSA 4, but over time, land around the building has built up. Contract Modification 27B is in negotiation between CHBWV and WVDPO and includes

lowering the grading around the facility, installing additional drains and piping, and installing a new roof. The work is expected to occur in the spring of 2014.

The Team had the opportunity to observe the demolition of the environmental laboratory, office building 1 (OB1). CHBWV mentors or has a protégé relationship with American DND. CHBWV works with the subcontractor to develop its business and work practices and standards acumen so they can grow and eventually work on larger projects. Prior to demolition, CHBWV surveyed the laboratory for radioactive and other hazardous materials, and removed them prior to demolition. American DND, a small subcontractor, used a large excavating machine, outfitted with pinchers, to grip and pull apart the laboratory. Similar material was placed into large wastebins for recycle or disposal. A remote-controlled firehose on a vehicle watered the laboratory to suppress dust emissions and remained at a distance to avoid exposures.

CHBWV is investing significantly in "white space" hazards, meaning those hazards associated with everyday activities outside the D&D activities. The BTZs and managers are addressing walking and working surfaces, lighting, traffic, and general office safety. For example, there is a paved ramp that employees can descend from the south lot, but during this assessment, CHBWV closed the ramp just before the first snowfall to eliminate the slipping hazard on the ramp. The site built a wooden walkway of steps and platforms braced with handrails on both sides of the walkway so employees can safely enter the site from the south parking lot. The north lot now holds the shielding construction for the vertical storage canisters and all the vehicles for the subcontract construction workers, causing more employees to park in the south lot. The walkway reduces the chance of slipping because of its rough flooring and handrails. Also, bins of snow melting chemicals are stationed at the walkway and throughout the parking lot so it can be spread easily on slippery days. The walkway is a positive enhancement since it eliminates the slipping hazard.

The West Valley site implements DOE Order 151.1C, *Comprehensive Emergency Management System.* CHBWV bases its emergency management program on the WVDP *Emergency Planning Hazards Assessment*, Revision 22, dated June 24, 2013. The document identifies and assesses potential accidents associated with WVDP and the consequence management for each accident. The document is current for the hazards on the site. Additionally, Procedure WVDP-022, *WVDP Emergency Plan*, dated February 7, 2013, addresses DOE requirements and includes five letters of agreement and two memoranda of understanding. The significant agreements are with West Valley Fire District 1 for fire support and basic life support, Bertrands Chaffee Hospital for advanced life support, and Mercy Flight for helicopter transport and treatment at Erie County Medical Center in Buffalo, New York. Procedure EMP 101, *Emergency Management Implementing Procedures, General Instructions*, dated August 16, 2012, discusses how to shelter or evacuate. Procedure EMP 102, *Emergency Management Implementing Procedures, Emergency Field Teams*, dated January 30, 2012, discusses the role of response teams. Procedure EMP 103, *Emergency Management Implementing Procedures, Emergency Operations Management*, dated June 25, 2013, discusses the emergency operations center. The plans contained in these critical documents were tested with a triennial, comprehensive field exercise on May 16, 2013. The scenario included an event that occurred onsite that required a Mercy Flight, and as the helicopter approached the site, it experienced engine trouble and crashed into a radioactive material storage area causing a mass causality event. Of the 16 objectives evaluated, 12 were satisfactory or better, while 4 were unsatisfactory

and need improvement. A corrective action plan for deficient items identified in the CHBWV After Action Report is tracked in the Open Items Tracking System until completed.

The occupational health nurse runs an effective medical surveillance program. The nurse works closely with the training coordinator and supervisors to determine an employee's annual occupational medical examination needs based on regulatory requirements or the potential for exposure to hazards. The training database identifies when employees are due for medical exams and necessary training requirements. Annual medical exams are added or deleted as the employee changes jobs. Most of the medical exams are conducted in October, so the nurse begins collecting biological samples (blood or urine) and setting up screening exams, like chest x-rays for asbestos workers, 30 days in advance of the medical exam. When the nurse receives the results of the samples and screening exams, the occupational medicine doctor comes to the site to review the results with the employee and complete a physical exam. This year, the doctor examined 108 employees at the site, saving individual visits to the doctor's office in town. Subcontractors participate in this occupational medicine surveillance program.

Overall, CHBWV maintains an effective IH program. The certified industrial hygienist (CIH), three safety technicians, and a safety engineer conduct the IH program. The CIH only works 2 days a week at the site but is available for consultation on the other days. The safety technicians perform the majority of the sampling and monitoring for the site and forward the results to the CIH for approval when necessary. The IH technicians collect compliance air samples, for example, for work involving asbestos and lead. Technicians record air sampling data, such as pump calibration and sample times in a database. The CIH reviews and signs air sampling results and sends copies to the employee and the employee's onsite medical record. Legacy air sampling results, completed under previous site contractors, are used by the CIH to answer data requests.

The CIH and the Training Coordinator developed a training and qualification program that the safety technicians must complete in order to be qualified to use the multitude of sampling devices (approximately 20) used in support of the IH program. The training for all devices includes a brief lesson plan and a documented "hands on" practical exam. However, there is no scheduled refresher training provided after the practical exams have been completed. Given the large number of devices that technicians use throughout the year, ensuring the technicians retain competency with all the devices without some refresher training, represents a potential weakness to the program. CHBWV should evaluate whether refresher training is necessary to ensure the safety technicians maintain adequate competency for operating all devices from year to year.

Opportunity for Improvement: CHBWV should evaluate whether refresher training is necessary to ensure the safety technicians maintain adequate competency for operating all devices from year to year.

Conclusion

CHBWV continues to implement the appropriate hierarchy of controls to limit employees' exposure to hazards and protect the environment. CHBWV is investing in improved hazard controls for "white space hazards," as well as improved work methods. BZTs are actively engaged in identifying legacy hazards and appropriate controls. Workers understand 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. Improvements in tracking requirements for testing systems, such as local ventilation exhaust systems, will improve the safety controls of the site. Overall, the CHBWV is improving the site's controls and reducing legacy hazards. CHBWV meets the Hazard Prevention and Control tenet expectations for continued participation in DOE-VPP.

VII. SAFETY AND HEALTH TRAINING

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

Procedure WVDP-126, *Performance Based Training Program Manual*, states that "…technical competence in job performance is established, monitored, and maintained. A systematic approach based upon five distinct phases (analysis, design, development, implementation, and evaluation) is used in a graded fashion such that the trainee gains the knowledge and skills to perform their jobs in a reliable, safe, and quality-minded manner." The training program requires operations supervisors to be trained in plant design, control and operating limitations, and nuclear science theories as applicable to their job function. Managers receive training in leadership skills, fiscal management, and integrated facility and interdepartmental operations as applicable to their position. Managers, supervisors, and employees may undergo written examinations, oral boards, or demonstrations of proficiency to validate the effectiveness of the training. The Training Manager believes the performance-based training is effective and that the employees are receiving adequate training commensurate with their job function. The Training Manager bases his assessment of the program on employee feedback, completion percentages and retraining, and employee engagement in the classroom setting. Employees interviewed by the Team indicated that the training is adequate and meets their needs. In 2013, according to the Training Coordinator, classroom and computer-based training (CBT) were split at about 50 percent each. CHBWV also maintains a Training Implementation Matrix that defines and describes selection, training, qualification, and certification for employees at DOE nuclear facilities.

CHBWV managers ensure employees receive proper training and that employee job descriptions are current. The Training Manager maintains the training facilities, equipment, and procedures and 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 receive General Employee Training (GET) and take a 25-question examination. According to the training department, in 2013, 70-80 new employees completed GET. Recertification of GET is on a biennial basis and students must pass the examination. According to the training specialist and manager, employees take GET in a classroom or individually in a CBT environment depending on the number of people that require training. In 2013, 78 employees completed GET through CBT and 86 completed GET in a classroom. Some of the areas' GET training covers include site and basic safety requirements, conduct of operations, equal employment opportunity, access, contacts, emergency response, ISMS, and VPP. Employees who do not complete their biennial GET training are required to surrender their badges to security at the gatehouse.

Procedure WVDP-126 requires new CHBWV or subcontractor employees to work with their supervisor to complete form WVDP-1392, *WVDP Health and Safety Training Profile,* which establishes a list of training requirements based upon job function. The supervisor and the employee sit down and go through a listing of training codes assigned to that particular job function. This form has two parts. Part I identifies the health and safety training required for the job function such as GET, silica training, electrical safety, heat and cold stress. 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 (HAZWOPER) training. The supervisor forwards the form to the training and medical departments for scheduling required training and medical exams.

The Training department maintains the WVDP Health and Safety Job Competency Requirements List that all supervisors can access electronically. Supervisors use this list to validate current training requirements are met prior to assigning employees to work. Additionally, the Training department provides reminders electronically to individuals 30 days prior to expiration of training requirements. If an individual does not have computer access, the supervisor receives the reminder. To date, there are 4 delinquent training records out of a workforce of 268 CHBWV and staff augment employees, or a 1.5 percent delinquency rate.

In addition to job-specific training, specialized training may be required for unique job tasks. For example, landscaping and maintenance workers received specialized training to remove trees. An outside expert provided training on the correct way to cut down trees safely. The Team interviewed employees that took the course and the employees said that they would highly recommend the course. They benefitted from the safety techniques and lessons they learned in the course.

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 AOC for employees to pick up at their leisure that discuss safety articles, recent lessons-learned, and other safety topics applicable to CHBWV employees. For example, there are articles on the "Kill Zone" around heavy equipment, pneumatic versus hard rubber forklift tires, insect bites or stings, and vehicle maneuvering safety to name a few. CHBWV also provides lessons-learned information from other DOE and industry sites to workgroups during prejob meetings. As an example, one of the *Mentoring Moments* is a lessons learned from an event where an operator lost his footing while attempting to exit the cab of a front-end loader. CHBWV also publishes safety letters posted at conspicuous locations (entrances, bathrooms, etc.) around the site that include topics, such as the installation of carbon monoxide detectors.

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. To ensure employees actually read and comprehend this information, CHBWV includes test questions related to the required reading during the employee's biennial requalification examinations.

The Team interviewed several workers that are Safety-Trained Supervisors (STS). These workers indicated that they were maintaining their qualifications as an STS without support from CHBWV. The previous contractor provided resources to individuals to acquire and maintain

STS certifications, but the workers indicated that CHBWV has not continued that support. CHBWV should consider reinstating support for the STS program as a way of maintaining a cadre of personnel trained and ready to fill supervisory positions.

Opportunity for Improvement: CHBWV should consider reinstating support for the STS program as a way of maintaining a cadre of personnel trained and ready to fill supervisory positions.

CHBWV provides a small wire-bound handbook called the *CHBWV Safety Toolbox* that fits into a shirt pocket. This small handbook contains emergency information, the CHBWV BTZ Safety Culture, information on VPP, an explanation of 10 CFR 851, *Worker Safety and Health Program*, ISMS, CHBWV's Safety Framework, and Environmental Management System description. During employee interviews, many employees had their handbooks readily available and showed them to the Team. The Team reviewed the contents of the handbook and found the information useful and informative.

Conclusion

The CHBWV health and safety training program is comprehensive and adequate for the West Valley site. Workers, supervisors, and managers have appropriate training requirements established. Training and qualifications records are current, and workers do not perform activities for which training and qualification requirements have expired. Supervisors are engaged in managing and monitoring employee training inputs and have the ability to verify that training requirements are current before assigning work tasks. CHBWV provides numerous reminders, postings, required reading subjects, and lessons learned safety topics to encourage safety awareness at the site. CHBWV meets the Safety and Health Training expectations for continued participation in DOE-VPP.

VIII. CONCLUSIONS

CHBWV has 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 has faced some unanticipated challenges in accomplishing its scope of work, it has 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 are learning to work together cooperatively, and the lines of communication are open and functioning. The workers at the site have a deep sense of pride and ownership of the site and their work and continue to work carefully and safely to clean up the site. The design and structure of the work control process requires that all hazards are subjected to some form of hazard analysis, and CHBWV is working to improve the analyses used for lower hazard routine tasks to ensure the appropriate controls are clearly identified to the workers. The safety and health training program trains and qualifies workers to deal with the hazards they face on a daily basis. Overall, CHBWV demonstrates pursuit of excellence in each of the DOE-VPP tenets. Therefore, the Team recommends that CHBWV continue to participate in DOE-VPP at the Star level.

Appendix A

Onsite VPP Audit Team Roster

Management

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