



**CH2M HILL Plateau Remediation  
Company, Inc.  
Plateau Remediation Contract  
Hanford Site**

**Report from the Department of Energy  
Voluntary Protection Program  
Onsite Review  
January 10-19, 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  
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## 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, employees, and DOE. Requirements for 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 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 results of the evaluation of CH2M Hill Plateau Remediation Company, Inc. (CHPRC), conducted January 10-19, 2017, and provides the Associate Under Secretary for Environment, Health, Safety and Security with the necessary information to make the final decision regarding CHPRC's continued participation as a DOE-VPP Star site.

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**ABBREVIATIONS AND ACRONYMS**

AJHA	Automated Job Hazard Analysis
ALARA	As Low As Reasonably Achievable
AMW	ALARA Management Worksheet
AU	Office of Environment, Health, Safety and Security
AU-12	Office of Worker Safety and Health Assistance
BLS	Bureau of Labor Statistics
CFR	Code of Federal Regulations
CHA	Craft-Specific Job Hazard Analysis
CHPRC	CH2M Hill Plateau Remediation Company, Inc.
CRRS	Condition Reporting and Resolution System
D&D	Deactivation and Decommissioning
DART	Days Away, Restricted or Transferred
DOE	Department of Energy
ECRTS	Engineered Container Retrieval and Transport System
EJTA	Employee Job Task Analysis
ELM	Enterprise Learning Management
EMS	Environment Management System
ERDF	Environmental Restoration Disposal Facility
ESRB	Executive Safety Review Board
EZAC	Employee Zero Accident Councils
FWS	Field Work Supervisor
GHA	General Hazard Analysis
HAMMER	Volpentest Hazardous Materials Management and Emergency Response Training Center
HAMTC	Hanford Atomic Metal Trades Council
HAZCOM	Hazard Communication
HRB	Hazard Review Board
HSWET	Hanford Site Worker Eligibility Tool
IH	Industrial Hygiene
IHEA	Industrial Hygiene Exposure Assessment
IS	Industrial Safety
ISMS	Integrated Safety Management System
JHA	Job Hazard Analysis
MASF	Maintenance and Storage Facility
MSA	Mission Support Alliance, LLC
NAICS	North American Industry Classification System
NCO	Nuclear Chemical Operator
OSHA	Occupational Safety and Health Administration
PAPR	Powered Air Purifying Respirator
PFP	Plutonium Finishing Plant
POMC	Performance Objectives, Measures, and Commitments
PPE	Personal Protective Equipment
PTS	Project Technical Services
PZAC	President's Zero Accident Council
RL	Richland Operations Office
RPE	Respiratory Protection Equipment

RPET	Respiratory Protection Equipment Tracking
SGRP	Soil and Groundwater Remediation Project
SME	Subject Matter Expert
SO <sub>2</sub>	Sulphur Dioxide
STEM	Science, Technology, Engineering and Math
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TPA	Tri-Party Agreement
TRC	Total Recordable Case
VPP	Voluntary Protection Program

## EXECUTIVE SUMMARY

The Department of Energy (DOE) Voluntary Protection Program (VPP) Team from the Office of Environment, Health, Safety and Security (AU) recommends that CH2M Hill Plateau Remediation Company, Inc. (CHPRC), continue participating as a Star site in DOE-VPP. This report contains the results of the January 2017 assessment and supports the AU DOE-VPP Team's (Team) recommendation to the Associate Under Secretary for Environment, Health, Safety and Security.

CHPRC is the prime contractor for the safe, environmental cleanup of the Central Plateau at the Hanford Site. CHPRC is responsible for waste retrieval and fuels management, groundwater and vadose zone remediation, demolition of facilities and canyons, and closure of the Plutonium Finishing Plant (PFP). Along the Columbia River, CHPRC is remediating the 100-K Area, which includes removing and storing highly radioactive sludge from the K-West Basin. CHPRC initially applied to DOE-VPP as a transitional Star participant. After an onsite review in 2011, CHPRC entered DOE-VPP as a new applicant at the Merit level while it addressed several issues. In 2014, CHPRC had made significant improvements to its safety programs and was elevated to Star status. Continued participation in DOE-VPP requires an assessment every 3 years for Star participants. Accordingly, the Team conducted an onsite assessment from January 10-19, 2017.

CHPRC injury rates remain well below its Bureau of Labor Statistics' (BLS) comparison industry average although there has been an upward trend in both total recordable case (TRC) and days away, restricted or transferred (DART) case rates. Subcontractor injury rates also increased for 2016. The Team did not find any disincentives to reporting of injuries, illnesses, or safety concerns by workers.

Over the past 3 years, CHPRC has focused on its strategy on the end of the contract and setting up any following contractor for success in the cleanup mission. While CHPRC has suffered some setbacks regarding worker trust, it has responded to those setbacks by implementing improvements. CHPRC establishes realistic goals and expectations and provides the necessary resources to meet those goals and expectations. Managers are alert to employee issues and concerns and address them.

Employee Involvement is evident across the CHPRC projects. Multiple mechanisms create conduits for raising, addressing, and resolving safety issues. Employees engage and contribute to safety and process improvements by offering suggestions and ideas that are captured in safety logbooks, communications with supervisors, and interaction with the Hanford Atomic Metal Trades Council (HAMTC) safety representatives. Strong community outreach continues and the effort of employees to keep the messages fresh and exciting for participants is commendable.

CHPRC has improved the planning of work, including hazards analysis. The process successfully identifies and documents the hazard analyses. Hazard analysis tools lead to selection of proper controls that are integrated into work instructions. CHPRC has a robust industrial hygiene (IH) sampling program to identify and monitor workplace exposures and validate the hazards analysis.

CHPRC uses the hierarchy of controls by eliminating or reducing hazards through substitution, engineered controls, or personal protective equipment (PPE). Facility and work area

modifications and the use of mockups for high hazard work demonstrate CHPRC's commitment to using worker suggestions for continuous improvement of processes and work methods to eliminate or control hazards.

CHPRC continues to provide a training process that properly trains workers, supervisors, and managers. CHPRC works in conjunction with the other Hanford Site contractors to ensure the training process is responsive to its needs. CHPRC has invested significant resources to develop detailed mockups as training tools to ensure procedures are correct and the workers are well trained for unique project activities.

CHPRC has faced many challenges since beginning its mission to clean up the Hanford plateau. The scope of work contains some of the most hazardous work in the DOE complex. CHPRC has brought together the Hanford workforce and experienced professionals- performing similar work at hazardous sites around the world and has made steady, incremental improvements in its relationship with the workforce leading to improvements in both safety and health and project performance. CHPRC managers have learned to trust the workforce, include workers' views and opinions as they seek better solutions to problems, communicate honestly with workers, and build respect. Similarly, workers have learned to trust CHPRC managers, increased their willingness to raise issues and concerns without fear of reprisal, and increased their participation in safety improvement efforts. When conflicts between safety and schedules arise, workers and managers seek resolution through collaboration and communication. The Team also identified several opportunities to help CHPRC continue improving.

**TABLE 1**  
**OPPORTUNITIES FOR IMPROVEMENT**

<b>Opportunity for Improvement</b>	<b>Page</b>
CHPRC should include measurable safety goals and expectations that reflect specific actions the employee can take to align with and support the organization's objectives in performance plans.	<b>10</b>
CHPRC should reemphasize the steps in the stop-work procedure with its employees and reinforce the methods available to resolve concerns.	<b>11</b>
CHPRC should identify and implement mechanisms to engage senior workers as teachers and mentors to new and transferred employees as a means of enhancing their integration into the workforce.	<b>11</b>
CHPRC should modify its safety inspection frequency for the PFP project to perform weekly safety and health inspections.	<b>16</b>
CHPRC should review the process to obtain accurate and timely information regarding injury and illness treatment and recordkeeping decisions to ensure the reliability of the processes.	<b>20</b>
CHPRC should work with MSA to implement improvements to the ELM system to produce routine, systematic delinquency reports to help evaluate and improve the training process.	<b>21</b>



## I. INTRODUCTION

CHPRC is a Washington State company formed by CH2M HILL Constructors, Inc. CHPRC is the prime contractor for the safe, environmental cleanup of the Central Plateau at the Hanford Site. CHPRC is responsible for waste retrieval and fuels management, groundwater and vadose zone remediation, demolition of facilities and canyons, and closure of PFP. Along the Columbia River, CHPRC is remediating the 100-K Area, which includes removing and storing highly radioactive sludge from the K-West Basin. In 2008, DOE awarded CHPRC the 10-year (5-year base period with an option to extend for an additional 5 years), \$4.5 billion Plateau Remediation Contract. The DOE Richland Operations Office (RL) provides day-to-day oversight and management of the Plateau Remediation Contract.

CHPRC initially applied to the DOE-VPP as a transitional Star participant. Under the provisions in DOE-VPP, DOE's former Office of Health, Safety and Security performed an onsite assessment in March 2011. The assessment determined that, although CHPRC had made significant progress toward achieving Star status for the company as a whole, changes to the program scope and structure under the new contract were more extensive than originally anticipated. CHPRC needed to deal with a variety of issues, such as worker distrust and fear of retaliation. CHPRC entered DOE-VPP as a new applicant at the Merit level while it addressed those issues.

By the next assessment, in 2014, CHPRC had made significant improvements in its safety programs. Despite many challenges and distractions related to collective bargaining negotiations and funding uncertainty, managers and workers had both sought improvements in management leadership and employee involvement. Some workers continued to be skeptical of managers, but managers were working to improve communication and trust. Improvements in work planning and control, increased manager visibility in the workplace, and continued efforts to involve workers and actively seek their opinions and ideas demonstrated the continuous improvement expected of a DOE-VPP participant; and CHPRC was elevated to Star status.

The Plateau Remediation Contract is a performance-based contract designed to focus on cleanup of the 100-K Area, the central portion of the Hanford Site, and the groundwater beneath the entire Hanford Site (River Corridor and Central Plateau). The scope includes: moving K-Basin sludge to the Central Plateau, treating and storing the sludge, and closure of the 100-K facilities and waste sites; placing K-East and K-West Reactors in Interim Safe Storage; treatment and disposition of low-level, mixed low-level, and transuranic wastes; retrieval of suspect, post-1970 transuranic waste; monitoring, characterizing, and remediating of groundwater and waste sites; shipment of special nuclear materials offsite; cleanout and demolition to slab-on-grade of PFP; cleanout and demolition of selected industrial and nuclear facilities; near-term shutdown activities of Fast Flux Test Facility; and long-term surveillance and maintenance of decommissioned facilities and waste sites. In 2016, RL added the remaining scope from the former Washington Closure Hanford, LLC contract to the CHPRC contract, which added the 618-10 Burial Ground remediation project, operation of the Environmental Restoration Disposal Facility (ERDF), and the Building 324 Contaminated Soil Remediation project.

The workforce consists of craft workers represented by HAMTC (approximately 700 workers), administrative employees, and professional support staff. Workers deal with the full spectrum of industrial, radiological, and chemical hazards associated with remediation and cleanup of nuclear

facilities and waste burial grounds.

A team from the Office of Worker Safety and Health Assistance (AU-12) (Team) conducted an onsite assessment from January 10-19, 2017. The review consisted of fieldwork observations and walkdowns in all project areas; interviews with workers, supervisors, and managers; and reviews of procedures, work packages, and other records. This report contains the results of that assessment and provides the Team's recommendation to the Associate Under Secretary for Environment, Health, Safety and Security.

**II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE**

<b>Injury Incidence/Lost Workdays Case Rate (CHPRC, including Staff Augmentees)</b>					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2014	2,467,519	9	0.73	1	0.08
2015	2,567,275	11	0.86	3	0.23
2016	2,843,763	10	0.70	5	0.35
3-Year Total	7,878,557	30	0.76	9	0.23
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 (CHPRC Subcontractors)</b>					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2014	387,396	1	0.52	0	0
2015	525,673	2	0.76	0	0
2016	638,963	6	1.87	3	0.94
3-Year Total	1,552,032	9	1.16	3	0.39
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: 0.83******3-year DART Case Rate, including subcontractors: 0.25*****Conclusion**

CHPRC and subcontractor injury rates remain well below its BLS comparison industry average. Subcontractor TRC and DART case rates increased for 2016. An October 2016 vehicle accident resulted in significant injuries to the driver (no seatbelt) and minor injuries to the passengers (who were wearing seatbelts). In another near-miss event, a worker accidentally cut into an energized 480V electrical line with a circular saw, but was uninjured. Because of these and other events, CHPRC and RL identified a need to focus on conduct of operations. CHPRC is preparing a common cause analysis and developing a corrective action plan, but that plan was not complete at the time of this assessment. The Team did not find any disincentives to reporting of injuries, illnesses, or safety concerns by workers. The CHPRC injury/illness and DART rates meet the expectations for continued participation in DOE-VPP.

### 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 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. 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 (5) managers must be visible, accessible and credible to employees. 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.

In 2013, CHPRC had significantly improved its Management Leadership. Managers were more visible in the workplace although many workers wanted to see more manager presence. Efforts to train and coach managers at all levels were effective. CHPRC had addressed the schedule pressures evident during the 2011 review, and managers consistently echoed the belief that stopping work when questions or concerns arose was essential to long-term success.

CHPRC management systems and processes that define roles, responsibilities, and authorities for safety and health remain in place. The CHPRC policy PRC-POL-SH-5053, *Safety, Health, Security, Quality, and Environmental Policy*, continues to apply to all CHPRC and its subcontractors. That document establishes the CHPRC policy as:

*CH2M HILL Plateau Remediation Company's philosophy is: "If we can't do it safely, we won't do it." Protection of people and the environment, while delivering quality products and services is a CH2M HILL Plateau Remediation Company core value. It is our vision to create a unified "One Culture. One Team." relationship that empowers managers, employees, and contractors to drive this philosophy and core value into all operations and achieve excellence in safety, health, security, quality, and environmental performance. This is accomplished through the use of the Integrated Safety Management System (ISMS), Environment Management System (EMS), Human Performance Improvement initiative, and by implementing the basic tenets of the Voluntary Protection Program (VPP).*

The CHPRC *Integrated Safety Management System (ISMS)/Environment Management System (EMS) Description*, PRC-MP-MS-003, describes how environment, safety, health, and quality are integrated into the work planning and execution for the Plateau Remediation Contract scope of work. In 2016, CHPRC completely revised the document following the guidance of DOE G 450.4-1C, *Integrated Safety Management System Guide*. CHPRC has a worker safety and health program, PRC-MP-SH-32219, *10 CFR 851, CHPRC Worker Safety and Health Program Description*, that adequately describes how CHPRC implements Title 10, Code of Federal Regulations, part 851 (10 CFR 851), *Worker Safety and Health Program*.

All managers interviewed by the Team expressed an unwavering belief in the value of safety excellence. They believe that safety and health are essential to accomplishing the mission. The vice-president for Project Technical Services (PTS) expressed his message to workers that safety, health, quality, security, etc., are all tools for bargaining unit employees to "take work back from exempts," enabling the company and its subcontractors to use financial resources to

hire more craft people by reducing costs from investigations and lost time due to errors. This message was particularly relevant to subcontractor workers employed by small local companies. These companies often struggle to implement CHPRC safety and health expectations under small business, fixed-price contracts. Under these contracts, a small accident or injury can lead to days where subcontractors cannot work during an investigation. These investigations cause schedule delays, cost overruns, and reduced employment. CHPRC ensures subcontractors have the necessary safety and health support to perform work, so the message that workers must be deliberate and careful, stopping to ask questions, and prevent issues is pertinent. The PTS vice-president challenged CHPRC direct-hired workers with a similar message.

CHPRC managers are now more aware of shortfalls in project resources versus project goals, particularly if DOE does not provide necessary funding to accomplish agreed-upon project milestones associated with meeting Tri-Party Agreement (TPA) milestones. These milestones can present significant production pressures on both managers and workers. These milestones, often agreed to many years before, may not reflect current circumstances as cleanup progresses and the contractor identifies unexpected hazards or issues. In 2016, CHPRC and DOE worked with the Environmental Protection Agency and Washington State regulators to acknowledge that CHPRC could not safely achieve the TPA milestone for PFP. In the months leading up to that acknowledgement, CHPRC reassigned workers away from PFP. Workers perceived these reassignments as giving the appearance of meeting the TPA milestone while increasing pressure on remaining workers to accomplish production goals. This perception was a significant contributor to workers' developing distrust of CHPRC managers. Once CHPRC formally adjusted the PFP schedule and renegotiated the TPA milestone, it established realistic work schedules and labor levels; and the relationship between managers and workers improved. Workers now believe the project schedules, and CHPRC managers learned the importance of early and open communication with the workers and regulators.

CHPRC continues to use two management processes to review high hazard work. First, each project organization within the Plateau Remediation Contract uses a Hazard Review Board (HRB). The HRB reviews: (1) select work activities, particularly complex, high-hazard tasks; (2) safety measures implemented to support the work; and (3) personnel overseeing the work activities to ensure they understand the work activity, the identified hazards, and the respective controls for those hazards. The HRB consists of managers, supervisors, HAMTC safety representatives and workers within the project. CHPRC uses HRB as a management check to ensure the project is ready for field implementation with basic hazard identification and mitigation strategies integrated into work practices and methods. There are clearly defined criteria for when the HRB must review work. The second process is the Executive Safety Review Board (ESRB), chartered to oversee and monitor the programs and processes associated with Safety Management Programs, Quality Assurance Program, ISMS/EMS implementation activities and the Price-Anderson Amendments Act. ESRB membership consists of the President, Vice-President/Chief Operating Officer, each of the project area vice-presidents, and the senior manager for each business unit. The Team was unable to attend meetings of the HRB or the ESRB during this review, but managers confirmed the processes remain effective in helping them ensure project work is appropriately authorized and safely performed.

CHPRC continues to provide resources for employee recognition and rewards, including resources from fee where DOE does not provide funding. CHPRC splits these resources between project directors, on a per-employee basis, for use by managers, supervisors, and safety committees. In 2014, the Team recommended that CHPRC encourage managers to reward and

recognize workers for contributing to working safely and ensuring those rewards were meaningful to workers for reasons other than the cash value of the award. In response to the recommendation, CHPRC permitted its project vice-presidents significant latitude in implementing reward and recognition programs. As a result, the Team identified some good reward and recognition practices that CHPRC could adopt across the organization.

In one approach, the PTS organization conducts a quarterly challenge based on ideas from the Building Trades Safety Representative. The challenge usually involves some form of game that workers can “win” by addressing the quarterly emphasis. For example, in the last quarter of calendar year 2016, PTS held the “PTS Charity Poker Run and Safety Challenge.” Senior managers conducted field inspections over five consecutive weeks and provided feedback to the projects. At the beginning of the inspection, the manager dealt seven cards to the inspected shop or area. After the inspection, the manager took back one card for any safety deficiencies found. Players who corrected a safety deficiency before the manager identified it could draw one card back into their hand. The shop played their best poker hand with the remaining cards. PTS awarded prizes to the winning players. The highest hand received a tool chest, and the vice-president donated to the winner’s favorite charity. The second place won a jersey for their favorite sports team, and third place won a George Foreman® Grill. Workers reported being excited about winning the challenges and enjoyed the gaming aspect while at the same time working to ensure their areas had no safety issues.

A second approach, used by the vice-president for Environmental Programs and Strategic Planning, involved challenging workers to complete identified tasks throughout the year. The tasks included deliverables to meet project goals that included safety. Workers had tracking charts in their work area (office workers) where they could mark the date they accomplished their part of each goal. The vice-president promised that if 100 percent of the group (60-70 people) achieved the goals, he would take the entire group, along with their families, to Seattle for a Seattle Mariners game. In 2016, the group did not meet the challenge, so the vice-president was planning a local dinner and activity to recognize the effort. All the identified goals were fully within the capabilities of personnel to accomplish, and the goals did not discourage reporting of accidents or injuries. Specifically, the safety portion involved four activities conducted four times per year (4X4). Both of these examples are models that other projects can follow to reward and encourage involvement in safety improvements.

RL continues to establish annual Performance Objectives, Measures, and Commitments (POMC) tied directly to TRC and DART case rates, but combines those with a much broader suite of indicators that include both leading and lagging indicators. As a management tool, CHPRC uses many indicators as part of its contractor assurance system. Many of the leading indicators focus on identification of issues or problems that could lead to an accident, injury, or uncontrolled release of hazardous or radioactive material. By proactively assessing a variety of programs, identifying and correcting issues, and stressing self-identification of those issues, CHPRC preempts serious problems. CHPRC uses a percentage of internal versus external issue identification, compares severity of identified issues, and identifies actions within its contractor assurance system as a leading indicator of whether it is being sufficiently self-critical or relying on external assessments. DOE has tied much of the POMC to encouraging CHPRC to maintain a critical internal assessment function and helped ensure CHPRC does not lose its fee for self-reporting problems.

CHPRC continues to maintain a centralized staff of safety and health personnel that it assigns out to projects through a matrix organization. Project personnel can reach back to the central organization for additional support and technical expertise. Additionally, each project has a designated safety and health manager that reports directly to the project vice-president. That person has a solid line organizational assignment to the project vice-president, but is responsible for the day-to-day management of safety and health personnel assigned to the project. This organization helps the project vice-presidents retain responsibility for the safety and health performance of the project while ensuring safety and health personnel can perform their functions without fear of production pressures.

CHPRC began leadership training as part of its Safety Conscious Work Environment improvements in 2013. It continues providing those courses to managers and includes completion of those courses in the POMC.

CHPRC modified its communication efforts in 2013. Previously, CHPRC directed the communication program externally, trying to manage the company image and prevent the misinterpretation of events. Beginning in 2013, CHPRC decided to refocus its efforts to improve communication to the workers and spend less effort on the external message. CHPRC now spends approximately 70 percent of its communication efforts internally: maintaining newsletters, Web pages, and coaching managers. Previously, each project had a communications staff person assigned to assist the project team. In 2013 the communications specialists became an integral part of each project leadership team. The communication specialists review messages to employees and ensure managers' statements and actions do not conflict with the overall CHPRC message. The CHPRC communications staff developed a long-term communication plan and strategy that it continues to follow. Communication products include videos that focus on project performance, employees that support the projects, informational videos for all employees to understand how they contribute to the CHPRC mission, and community support activities. Communications staff assigned to projects meet directly with workers, listen for developing rumors or issues, and make recommendations to project vice-presidents on how to address rumors and ensure workers get accurate and timely information on project issues. Communications staff also help managers develop consistent messages and ensure clear transmission of those messages down through project organizations. The strategic approach to internal communications with dedicated resources and commitment to an open and honest message, even if it means bad news, is an excellent practice that CHPRC should share with other DOE and OSHA VPP participants.

During the 2014 assessment, the Team identified significant gaps in trust between CHPRC managers and workers. Since that time, CHPRC has worked to improve communications and build trust with the workforce. Those efforts have come to fruition, particularly in the 6-9 months prior to this assessment. Over the past 3 years, there have been changes in the CHPRC senior management structure and personnel. CHPRC appointed a new president in December 2016. That individual returns to the Hanford reservation, having formerly worked at many of the current CHPRC sites. The new president encourages all managers to be visible and accessible, but does not establishing any specific goals regarding percentage of time they must to spend with their workforce, as had previous presidents. During other DOE-VPP assessments at the Hanford Site, the Team heard a variety of rumors and reports that some CHPRC managers did not listen to workers, did not honor stop-work, and created a culture that discouraged workers from reporting safety issues. CHPRC was aware of these reports, and over the past 12 months reassigned some managers, appointed others, and made efforts to reach out to workers. In

particular, the HAMTC safety representatives reported that they have established good working relationships with newly assigned project vice-presidents and the chief operating officer. Although they report there is room for improvement, the HAMTC safety representatives believe the current CHPRC management team is responsive to their concerns.

CHPRC continues to use the Conduct of Operations Mentoring Program. The mentor program consists of four to six mentors with extensive operational history working at the Hanford Site. Each project has individually assigned mentors to assist workers and supervisors and report directly to that project's vice-president. The mentor's role is not an oversight function. They work with the project staff identifying improvements in the planning and execution activities, emphasizing effective conduct of operations. The mentor's strong communication with the project team and understanding of the issues facing the team provide the project vice-president with an invaluable link to the day-to-day activities and enables him/her to eliminate any barriers affecting the project's success.

CHPRC expects its subcontractors to meet the same safety and health expectations as its own workers. To improve the flowdown of safety and health requirements to subcontractors, CHPRC safety professionals worked with the buyer's technical representatives and contract specialists to inform subcontractors of safety and health requirements at the various stages of the contract. Additionally, CHPRC may meet with potential subcontractors to ensure they understand the expectations for health and safety. CHPRC meets quarterly with its subcontractors to review safety performance, address any issues, and ensure continued effectiveness of its safety programs.

## **Conclusion**

Over the past 3 years, CHPRC has focused on its strategy on the end of the contract and setting up any following contractor for success in the cleanup mission. While it has suffered some setbacks regarding worker trust, it has responded to those setbacks by implementing improvements. CHPRC effectively establishes realistic goals and expectations and provides the necessary resources to meet those goals and expectations. Managers are alert to employee issues and concerns and address them. CHPRC fully demonstrates the Management Leadership expected of a DOE-VPP participant.



#### 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 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 and participate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

In 2014, Employee Involvement was evident across most of the CHPRC projects. The President's Zero Accident Council (PZAC) and Employee Zero Accident Councils (EZAC) functioned as conduits for raising and addressing safety concerns. Most employees engaged and contributed to safety and process improvements by offering suggestions and ideas captured in safety logbooks, communications with supervisors, and interaction with HAMTC safety representatives. However, a segment of the worker population believed managers were not communicating company and project expectations. CHPRC was taking positive steps to reach out to that segment, build trust and encourage them to become part of the solution, and contribute to project success.

CHPRC provides multiple opportunities for employee involvement in the structure and operation of the safety and health program. Union safety representatives and EZAC members can participate in injury/illness investigations and analysis with safety and health professionals and management. This includes participating in critiques, identifying causal factors, and developing and implementing corrective action plans. In addition, CHPRC provides employees the opportunity to participate in safety and health inspections (PRC-PRO-SH-40499, *Safety and Health Inspections*), and engage in trending and communicating organizational safety and health data. Any employee can submit safety concerns via safety logbooks, the issues management program, union safety representatives, or the employee concerns program. Other involvement opportunities include tracking and disseminating information on the status of safety and health goals, performing safety outreach, delivering safety shares, maintaining EZAC and VPP Web sites, performing hazard analyses, job workability walkdowns, pre/post job briefs and feedback sessions, and participating in safety meetings and safety council activities.

Employees throughout CHPRC demonstrated awareness and support of the company's expectation to do work safely. In almost every case, the employees, approached by the Team, indicated a willingness to ask questions, identify issues, and work collaboratively to bring acceptable closure to issues related to their work. The PZAC, EZAC, and VPP staffs are major contributors to this awareness. PRC-MP-SH-40452, *CH2M HILL Plateau Remediation Company Voluntary Protection Program Plan*; PRC-CHRT-SH-9982, *President's Zero Accident Council*; and PRC-CHRT-SH-40512, *Employee Zero Accident Councils*, identifies employee roles and responsibilities for these forums and create a framework for employee involvement. Represented employees indicated that there has been significant improvement in their relationship with managers and managers' responsiveness over the past 6 months.

CHPRC holds nonrepresented employees accountable for their personal safety behavior through the annual review process using site form A-6004-617, *Performance Planning and*

*Review.* Employee performance plans identify performance goals, as well as job competencies and expectations. Some of the reviewed performance plans included safety performance goals that were outside of an individual employee's control; e.g., "safety performance statistics shall meet or exceed the "green" rating level (for nonmanagerial employees) and some performance goals were nonspecific; e.g., "ESH&Q programs will be implemented to promote enhanced safe work control" (for a program analyst). Further, the performance plan did not specify the actions necessary to satisfy the expectations. Performance plans did not identify how an employee could demonstrate how he/she "Watches out for others," "Learns from both successes and mistakes," and "Encourages safe work practices," yet managers evaluate employee performance to these criteria. Aligning performance plan goals and expectations with specific activities will better quantify the threshold for success. As discussed in Management Leadership, some organizations identified safety improvement actions linked to organizational goals. CHPRC could include those actions in performance plans; e.g., "Complete the organizational safety challenge in 2017" (for environmental programs and strategic planning staff), "Participate in a facility safety inspection each quarter" (for a project engineer), or "Monitor and present status of EZAC Goal #1 at monthly EZAC meetings" (for a program analyst). These performance criteria enhancements will increase employee involvement in safety activities throughout the projects.

**Opportunity for Improvement:** CHPRC should include measurable safety goals and expectations that reflect specific actions the employee can take to align with and support the organization's objectives in performance plans.

Employees identified multiple pathways to resolve issues including contacting their supervisor, using EZACs, using the Safety Ideas and Issues (logbook) process, involving their HAMTC safety representatives or submitting employee concerns. Employees referred to issues they identified and indicated they received support to bring the issues to resolution. In a few cases, employees had not received feedback on the status of items they put into the logbook. These items remained in the logbook for more than 60 days and were not elevated to the Condition Reporting and Resolution System (CRRS). The employees asked their HAMTC safety representative to investigate why there had been no action. Simultaneously, a new manager came into the organization and recognized the situation. Through efforts of both the HAMTC safety representative and the manager, the outstanding issues have been elevated to CRRS and the status communicated to the initiating employees.

Employees are also engaged in resolving issues. For instance, a new nuclear chemical operator (NCO) questioned discrepancies between sampling plans and proposed additional sampling to confirm conditions. CHPRC held multiple meetings that included workers, engineers, subject matter experts (SME), and managers to reconcile the identified concerns. Even though historical data indicated that CHPRC did not need additional samples, managers sanctioned the additional sampling to address worker's concerns. Another example occurred after a sulfur dioxide exposure occurred at the 200W Pump and Treat plant. Engineers, scientists, operators, and managers collaborated and identified a viable chemical substitution, as well as a change to the number of valves that would be open at any time to minimize the potential for recurrence of a similar exposure (see Hazard Prevention and Control). Employees' awareness of the issues management process and willingness to use that process are strengths of the system.

Safety inspections are another way employees can engage and improve the work within their organization. The Team reviewed safety inspection documents for several projects that reflected participation by multiple types and levels of employees. The related checklist was thorough,

covering key areas. The Team also observed a maintenance safety inspection during the assessment. The inspection included a supervisor, safety and health SME, HAMTC safety representative, millwright, electrician, and tool crib custodian. The inspection found several conditions that workers immediately corrected. In addition, the inspection team raised some questions that the supervisor noted needed action. The inspection team sent items from the inspection to the EZAC secretary for consolidation and entry into the CRRS tracking system.

All employees contacted by the Team acknowledged their right to stop work. In one discussion, employees indicated that everyone knows they have the right to stop work but, in reality, it is hard to decide whether to use it because of the perceived formality necessary to restart work. Some workers did not understand that Hanford Site-wide procedure DOE-0343, *Hanford Site Stop Work Procedure*, employs a step-based approach to addressing concerns, and return to work does not always require an independent analysis and external approval. CHPRC can improve employee confidence in the stop-work process by reinforcing the procedure content and routinely discussing ways workers can use the procedure to address potentially unsafe conditions (e.g., if an employee encounters a potential hazard not discussed in a prejob brief or if a worker has concerns about whether the job can be safely performed as described).

**Opportunity for Improvement:** CHPRC should reemphasize the steps in the stop-work procedure with its employees and reinforce the methods available to resolve concerns.

Recently hired and transferred employees indicated that their introduction into the new organization resulted in what they perceived as safety-related glitches. These disconnects involved the new employees asking senior workers questions about: (1) hazard identification in work control documents; and (2) unclear responsibilities in a procedure. Senior worker responses did not provide enough information for the new employee to proceed effectively. This caused apprehension about hazards and controls on one job and resulted in a stop-work on another. CHPRC should identify and implement mechanisms to engage senior workers as teachers and mentors to new and transferred employees. This effort will enhance new employee integration into the workforce, limit confusion, and avoid unnecessary work delays due to miscommunication.

**Opportunity for Improvement:** CHPRC should identify and implement mechanisms to engage senior workers as teachers and mentors to new and transferred employees as a means of enhancing their integration into the workforce.

There are many mechanisms for employees to obtain safety information related to both work and home. These include Safety Tailgates held weekly at each project and Think Target Zero messages that provide information to help reduce injuries, as well as posters and other media to reinforce the message. There is also a Safety Quarterly distributed to employees, client safety professionals, the CHPRC board of directors, and others. Employees across the company demonstrated they are aware of CHPRC's focus on safety and were satisfied with the level of information available to them.

Finally, CHPRC has a robust community outreach through its VPP that promotes employee involvement in safety programs. Two of the larger outreach activities are the "After School Matters" program and the company's contribution to the annual Hanford Health & Safety Exposition (Safety Expo). "After School Matters" emphasizes different aspects of work at the

Hanford Site and allows students to experience hands-on activities related to different jobs. The original “After School Matters” effort involved collaboration among the site’s contractors and unions; it has evolved so individual organizations within CHPRC continue the outreach with the goal of helping students understand how work and safety go hand in hand. The Safety Expo has been a mainstay in the community for many years. Efforts from CHPRC’s VPP Team and employee safety councils keep the educational component of the Expo fresh, most recently involving the company’s Science, Technology, Engineering and Math (STEM) professional to assist in tailoring the seminars and booths to reinforce that STEM principles are important at work, home, and play.

### **Conclusion**

Employee Involvement is evident across CHPRC projects. The PZAC, EZACs, and the other mechanisms described in this section are conduits for raising, addressing, and resolving safety issues. Employees engage in and contribute to safety and process improvements by offering suggestions and ideas captured in safety logbooks, communications with supervisors, and interaction with HAMTC safety representatives. Strong community outreach continues and the effort of employees to keep the messages fresh and exciting for participants is commendable. The Team heard of a few cases where communication and information exchange between new and seasoned employees was less than effective. Determining a way to better mentor newcomers by establishing more communication with the existing workforce will result in confident and competent newcomers and may decrease instances of rework due to miscommunication. CHPRC demonstrates the Employee Involvement expected of a DOE-VPP participant.

## 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 address new or newly recognized hazards. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of such hazards.

In 2014, CHPRC had established programs for analyzing hazards during the work planning process. Areas for improvement included worksite analysis procedural changes that document and institutionalize the hazards analysis and strengthening worker involvement in the hazard analysis process.

CHPRC has increased worker involvement in the work planning process. Each project within CHPRC has a work planning office that develops work packages using PRC-PRO-WKM-12115, *Work Management*. That procedure defines roles, responsibilities, and work control processes. Appendix A identifies minimum requirements for a planning team that include the fieldwork supervisor (FWS), workers, and other SMEs. The planning team develops the work instructions, and CHPRC prefers that the planning team and work team be the same personnel whenever possible. Appendix B identifies SME participation in work package development based on the workscope and hazards. The Team observed a work-planning meeting for the deactivation and removal of portions of a fire suppression system at PFP. The meeting included the FWS, craft performing the work, and other SMEs all of whom participated in discussions and offered valuable input. At two different prejob briefings for deactivation and decommissioning (D&D), workers contributed to the discussion and answered questions about hazards or work instructions.

CHPRC has a general hazard analysis (GHA) and several craft-specific job hazard analyses (CHA). Each document lists hazards that workers should be able to identify and control without further direction and does not require additional planning or analysis. The GHA is an analysis of the general hazards that apply to all CHPRC personnel. CHPRC includes these hazards and appropriate controls in the CHPRC module of Hanford General Employee Training. The GHA includes the workscope and hazards encountered during general activities, such as improper lifting, insects, sharp objects, and uneven surfaces. It also recommends controls to work safely and avoid injury. The CHA contains the workscope, hazards, and controls for a craft with an advisory statement that the CHA does not cover the environment in which the activities may occur. By using these hazard analyses, CHPRC has established criteria that supervisors and work planners use to efficiently plan and authorize work and ensure more complicated, higher hazard tasks receive more attention.

CHPRC identifies any task that is beyond the scope of the GHA and CHA as “beyond skill-based” work. PRC-PRO-WKM-079, *Job Hazard Analysis*, requires the planners, SMEs, and other members of the hazard analysis team identify and analyze unique hazards and integrate

the controls into the work package for beyond skill-based work. Appendix B identifies how to make the determination that work and associated hazards are skilled based or beyond skill base.

Since the last VPP assessment, CHPRC decided to shift emphasis from the automated job hazard analysis (AJHA) to the Job Hazard Analysis (JHA) checklist. Many planners complained that the AJHA was cumbersome and lengthy. The planning team can take the paper JHA checklist on field job walkdowns. The JHA checklist contains 19 activities that may require a hazard analysis; and in several work packages, planners added additional activities. The planning teams rely on IH and industrial safety (IS) assessments and As Low As Reasonably Achievable (ALARA) management worksheets for analysis that may lead to various work permits (i.e., radiological work permit, beryllium, asbestos, hot work, confined space, etc.). The JHA checklist contains control selections and the planner can add more information to each activity. SME analysis and controls, including cut-resistant gloves, glove type and thickness, and designs of portable ventilation hoods when cutting pipes with internal contamination were incorporated in the JHA checklist. Planning teams derived these controls from analysis and workers' experience with the hazards.

CHPRC projects use the results of intensive analyses of facilities to provide the initial hazard analysis. The *Plutonium Finishing Plant Deactivation and Decommissioning Hazard Analysis*, HNF-15501, initially released in 2003, contains 336 pages of hazard analysis. This important baseline document identified nearly 300 hazards that workers may encounter during D&D activities. The hazard analysis evaluated industrial hazards, as well as hazards from nuclear criticality, chemicals, and explosives. This hazard analysis established important requirements for the PFP demolition plan and work instructions.

The planning teams use the ALARA management worksheet (AMW) for the analysis of radiological hazards. Based on the analysis of control effectiveness and prior experience, the AMW can specify controls that prevent or minimize release of contamination and reduce worker radiological exposure. CHPRC retains the AMW in the job control system as a reference document to help the planning team write the appropriate work instruction.

CHPRC uses PRC-CHRT-WKM-53060, *Hazards Review Board*, to review complex, high hazard work activities that are beyond skill based. The project manager chairs the HRB for the project. The board consists of members from the functional areas of the project and includes IH, IS, radiological protection, environmental protection, work planning, engineering, or other personnel determined by the HRB chair. The FWS presents the work documents to the HRB. The work planner and responsible manager are also present to represent the planning team. After presenting the work package, the HRB votes to reject or accept the work documents. During an interview, an FWS mentioned he met with the PFP HRB chairperson and had to present the entire work package prior to leading the fieldwork team. He had to demonstrate knowledge of the work, hazards, and actions he would take during emergencies. He was knowledgeable of the work package and presented a professional, caring sense of the work he and his team were performing.

Supervisors complete an employee job task analysis (EJTA) for each of their employees and review the EJTA annually per PRC-PRO-SH-52755, *Employee Job Task Analysis*, to identify physical job demands, medical qualifications for a respirator wearer, and potential exposure hazards for medical monitoring and qualifications. An IH/IS reviews the form and concurs with the data before it is released to Medical. The Team reviewed NCO and Insulator EJTA's and

found the potential exposure hazards identified were consistent with the hazards of the work packages assigned to them.

The CHPRC IH program includes the IH exposure assessment (IHEA), sampling plans, and work permits per PRC-PR-SH-17916, *Industrial Hygiene Exposure Assessments. The IHEA aids in the development of the JHA*. The IHEA includes an analysis of the workscope, activities, tasks, personnel, and hazardous agents and supports analysis in D&D work packages. In the PFP project to remove vacuum piping, the IHEA identified contamination within the piping to include plutonium nitrate and nitric acid solutions. Although the analysis from the IHEA demonstrated that a combustible atmosphere would not form within the piping, the planning team required connection of the building's E-4 ventilation system to the vacuum piping to keep it under negative pressure and remove the hazardous atmosphere. Hazardous agent analysis includes exposure frequency and duration, exposure potential, concentration, and major health effects. Industrial hygienists develop a hazardous agent priority number based on these characteristics that defines the sampling requirements. IH supports the sampling for beryllium, asbestos, carbon monoxide, flammable gas, nitric oxide, oxygen levels, volatile organic compounds, and others. CHPRC's IH baseline monitoring is robust and data is stored and readily retrieved from the IH database.

Workers use the safety logbooks to identify issues. During an interview, an NCO mentioned using the safety logbook in the shift office. The NCO documented an area that needed lighting improvement to prevent tripping after the project site underwent a rearrangement of office trailers. The safety office conducted a lighting survey, proposed a solution to increase lighting, and contacted the NCO to keep him apprised of the progress of the lighting project. The increased lighting eliminated the tripping hazard. Workers are comfortable identifying issues in the safety logbook because there is good feedback of issue status and resolution.

Each project determines the level of accident investigation per PRC-PRO-EM-058, *Event Initial Investigation and Critique Meeting Process*. PRC-PRO-EM-058 offers examples of thresholds for investigations and critique meetings. It also contains forms for the initial gathering of investigation information. The Team attended a critique meeting after workers broke a water sprinkler head on the fire suppression system at PFP. The meeting avoided accusatory language and focused on understanding the cause of the accident and preventing recurrence. The Team reviewed the root cause report on *Visible Indication of Paint Inside TL Powered Air Purifying Respirators (PAPRs) Blower Units*, CR-2016-2279. The report provided the history of solving issues on the PAPR unit and a bumper guard solution that prevented the full tightening of filter cartridges onto the threads of the PAPR. The report cites the lack of fully analyzing the changes to the PAPR since CHPRC assumed that the bumper guard would work with different cartridges without observations in the field. CHPRC provided communication to all CHPRC, Washington River Protection Solutions, LLC, and Mission Support Alliance, LLC (MSA), employees of the possible contamination breach and gave employees the opportunity to go to HPM Corporation, the site medical provider, for evaluation or bioassay and a letter for medical files. As previously discussed, RL and CHPRC both identified an increase in DOE Occurrence Reporting and Processing System occurrences, especially occurrences involving safety and health issues. CHPRC identified six attributes that in the conduct of work needed more attention. To improve those attributes, CHPRC developed a Conduct of Work Improvement Plan and chartered a Common Cause Analysis team as one of its actions. The two-page action plan is in the initial phase as reported to RL on December 28, 2016.

PRC-PRO-SH-40499, *Safety and Health Inspections*, establishes the requirements for inspecting facilities operated by CHPRC. Per the procedure, PTS inspects construction projects under its purview daily. The Building Trades Safety representative compiles all the safety inspections and evaluates the deficiencies by category, location, and issue. The Building Trades Safety representative presents this information at the monthly EZAC meeting using tables and pie charts to explain where issues are occurring and locations that may need assistance. The presentation is useful and a good practice that could be shared across CHPRC. At PFP, the safety and health manager developed a justification letter to release PFP from the required weekly inspections. The justification cites existing safety program requirements, such as general safe behaviors, worker qualifications, postings, work package requirements for hazard analysis and control, the use of permits, safety logbooks, and the daily and weekly observations and inspections associated with these programs, to conclude that PFP can conduct safety inspections quarterly. Although these elements exist in programs, the intent of safety inspections is to ensure personnel implement these elements and identify noncompliant or deteriorating conditions before they contribute to an accident or injury. Because of the constantly changing condition of the D&D work environment, the Team recommends that contractors performing D&D follow the construction site aspects of DOE-VPP guidance, including performing weekly inspections rather than monthly or quarterly. CHPRC should modify its safety inspection frequency for the PFP project to perform weekly safety and health inspections.

**Opportunity for Improvement:** CHPRC should modify its safety inspection frequency for the PFP project to perform weekly safety and health inspections.

## Conclusion

CHPRC has improved worker involvement in the planning of work, including an effective hazards analysis process. The JHA checklist captures the hazard analysis for work that is beyond the skill of the craft with input from workers, the FWS, and SMEs. Additional hazard analysis tools, like IHEA or AMW, provide the needed analysis to develop controls to include in work instructions. The IH sampling of hazards is robust and monitors the exposures to workers to validate the hazard analysis. Accident investigations seek to learn why the issue occurred and create lessons learned for future use. CHPRC should review its policy for conducting weekly safety inspections of D&D work to monitor the implementation of safety programs and practices in constantly changing work conditions. CHPRC meets the overall DOE-VPP expectations for Worksite Analysis.



## VI. HAZARD PREVENTION AND CONTROL

The second and third 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, CHPRC had successfully eliminated or reduced hazards by substitution, engineering controls, or PPE. It had introduced improvements with new technologies and lessons learned, listened to and allowed workers to make improvements in controls to reduce hazards, and resolved medical restriction issues related to EJTA.

During this assessment, the Team observed many examples of CHPRC using the hierarchy of controls (elimination, substitution, and engineering controls). One significant example involved a detailed mockup in support of the Engineered Container Retrieval and Transport System (ECRTS). ECRTS is the system that will remove sludge from the K-Basin area and put it in containers for storage at T-Plant to wait a final disposition. Repairs or modifications will be exponentially more hazardous after CHPRC installs the system in the K-Basin. CHPRC minimized these issues by investing in a mockup of the K-Basin at the 400 Area Maintenance and Storage Facility (MASF) where it is building, testing, and operating the ECRTS before installing components in the actual basin. CHPRC avoided exposure to the radiological and nuclear hazards in the K-Basin during design and testing. Workers, SMEs, and engineers evaluated and developed procedures, identified potential system failure points, and trained workers using the actual components of ECRTS. Workers identified and helped resolve several issues using the mockup. Examples include procedure improvements and system modifications. One engineered improvement added a redundant pumping system to the cask transfer operation to remove excess sludge from an overweight container. CHPRC expects to accomplish the final sludge removal more effectively because of the identified improvements.

CHPRC used MASF to develop strategies and train D&D workers to cut and remove gloveboxes from the PFP facility. This effort helped CHPRC develop contamination controls for cutting contaminated parts and pipes. CHPRC is also using MASF to develop and demonstrate tools and equipment for the Building 324 contaminated soil remediation project. Using MASF to mockup, design, demonstrate, and train for work before putting equipment into contaminated environments is leading to significant project savings and performance improvements.

The Team also observed the following examples of hazard controls and processes improvements:

- Custom plastic glovebags made by CHPRC's plastic shop for different applications to control contamination spread. The Team noted the use of large glovebags over asbestos-covered air receivers;
- CHPRC reduced hazard exposure by adopting a D&D worker's suggestion for a routine activity. The worker routinely climbed up on water trucks to add soap as a wetting agent for

dust suppression. The worker suggested attaching the soap container to the end of a pole, permitting the worker to dump the material into the tank from ground level thus eliminating a fall hazard;

- At the Soil and Groundwater Remediation Project (SGRP), the 200W Pump and Treat facility changed its process in 2016 to eliminate the hazard of sulfur dioxide (SO<sub>2</sub>) emission. Prior to the change, CHPRC used sodium bisulfite in the water treatment process, creating a potential inhalation hazard from SO<sub>2</sub> emission. CHPRC substituted sodium thiosulfate for sodium bisulfite, eliminating the SO<sub>2</sub> byproduct;
- At SGRP, tarping ERDF cans has long been a problem on the Hanford Site and has resulted in shoulder injuries. CHRPC built tarping stations and tarping platforms to alleviate some of the risks associated with this activity. Employees helped redesign the tarping platforms to reduce the bending and body position ergonomic hazards;
- Employees recommended modifications of Building 6267 where CHPRC receives and stores environment and IH samples. The modifications made workstations adjustable, improving efficiency and reducing ergonomic hazards;
- The MASF team designed custom carts/dollies to allow easier movement of the large, awkward ECRTS equipment. Using worker suggestions, CHPRC designed and installed a rail system to move applicable ECRTS equipment into position within the Basin; and
- An employee suggested using magnetic light emitting diode (LED) light bars on the bottom of an all-terrain forklift to enhance worker awareness of the forklift position or movement. CHPRC created a short video to show workers the lights and share the idea with other Hanford contractors.

CHPRC uses respirators extensively to protect workers from radiological and chemical hazards. During the deactivation, decontamination, decommissioning, and demolition of PFP complex, CHPRC developed an automated method for collecting and managing respiratory protection equipment (RPE) issuance and control data. CHPRC previously collected and recorded this information manually on a CHPRC Respiratory Protection Equipment Issuance and Control logsheet and then entered it into a Microsoft™ Excel® spreadsheet. The manual data collection, entry, and reporting was time consuming and prone to errors. The new Respiratory Protection Equipment Tracking (RPET) system uses barcodes on the equipment and barcode cards issued to workers. After piloting the system at PFP, CHPRC deployed RPET at all CHPRC respiratory protection equipment issuance stations by September 2016. The system now automatically tracks the status of the RPE inventory through receipt, issuance, laundering, out-of-service, and availability. The system automatically transfers individual respirator use records to the Integrated Document Management System, the approved electronic record repository. The system incorporates RPE training records and prevents respirator issuance when a worker's respirator training is out of date. The new system improved production and increased CHPRC's confidence that it only issues respirators to qualified workers.

CHPRC performs periodic safety and health inspections using PRC-PRC-SH-40499, *Safety and Health Inspections*. The inspection program identifies existing and potential hazards, potential noncompliances from requirements, and unsafe acts or behaviors using checklists. The inspection program defines expectations for inspection frequency by workplace type. CHPRC inspects office areas quarterly, shops and storage areas monthly, field operations and D&D work weekly, and construction areas daily. CHPRC customizes the workplace inspection checklists

for the location and documents adverse safety and health conditions or deficiencies in a Condition Report to the facility/project manager. The manager tracks conditions or opportunities for improvement using the reporting criteria in PRC-PRO-QA-052, *Issues Management*, to closure in the CRRS.

Certified safety professionals are accessible throughout all CHPRC projects and workplaces. Numerous certified industrial hygienists, certified safety professionals, and certified health physicists are on staff and integrated into work control processes. Certified professionals interact daily with managers and workers, provide expert input into work activities, and serve as a resource to worker safety efforts, such as the EZAC and PZAC.

CHPRC maintains a comprehensive radiological control program to protect workers, the public, and the environment from the hazards associated with ionizing radiation. CHPRC-00073, *Radiological Control Manual*, documents the program to satisfy the requirements of 10 CFR 835, *Occupational Radiation Protection*. The program uses traditional radiological work permits and promotes ALARA practices. The Rad Worker program is mature and thorough and protects workers and the public. Due to schedule slippage, PFP is adding an additional shift, creating a need for additional radiation protection staff. CHPRC has temporarily mitigated this need by transferring health physics personnel from other CHPRC projects. CHPRC is actively seeking to procure additional staff to support the added shift work.

PRC-PRO-HR-033, *Employee Discipline*, documents the CHPRC disciplinary process. Workers interviewed indicated they understood the CHPRC disciplinary program and generally agreed that CHPRC applies discipline consistently and fairly.

PRC-PRO-SH-40410, *Hazard Communication Program*, documents responsibilities and program requirements for the CHPRC hazard communication (HAZCOM) program. The HAZCOM program is part of the overall chemical management program, PRC-PRO-SH-40516. Both programs are well documented and comprehensive. CHPRC updated its HAZCOM program to incorporate the globally harmonized system's requirements and is updating material safety data sheets to the new safety data sheet format as chemical manufactures provide them. Team interviews and workplace observations determined that workers and their supervisors are knowledgeable of the CHPRC HAZCOM program and hazards presented by chemicals.

CHPRC has limited emergency preparedness responsibilities because MSA provides emergency services to the entire Hanford Site. CHPRC has adequate staff, procedures, and equipment required to fulfill its support roles. CHPRC conducts periodic drills to ensure personnel understand and perform their emergency duties.

By contract with DOE, a site-wide contractor provides occupational medicine program services required by 10 CFR 851. Because of the organizational/company boundaries that exist between CHPRC and the occupational medicine service provider, the CHPRC case manager expressed a concern to the Team that there are occasions when information necessary to determine injury and illness recordability is difficult to obtain. The Team did not conduct a complete injury and illness recordkeeping review to evaluate the adequacy of medical treatment information flow across company boundaries, and assessments of injury and illness recordkeeping by RL have not identified any issues. To address the case manager's concern and ensure CHPRC does not rely on informal communication to fulfill its recordkeeping responsibilities, CHPRC should review the process to obtain accurate and timely information regarding injury and illness treatment and recordkeeping decisions to ensure the reliability of the processes.

**Opportunity for Improvement:** CHPRC should review the process to obtain accurate and timely information regarding injury and illness treatment and recordkeeping decisions to ensure the reliability of the processes.

### **Conclusion**

CHPRC demonstrated the use of the hierarchy of controls by eliminating or reducing hazards through substitution, engineered controls, or PPE. Facility and work area modifications and the use of mockups for high hazard work demonstrate CHPRC's commitment to using worker suggestions for continuous improvement of processes and work methods. CHPRC meets the Hazard Prevention and Control 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, personnel recognize hazards they may encounter, and are capable of acting in accordance with managers' expectations and approved procedures.

The 2014 assessment found CHPRC continued to maintain a training program that ensured trained and qualified workers could perform their job functions safely. A Safety Conscious Work Environment survey led CHPRC to enhance frontline supervision skills by developing a Leadership Impact Initiative. The initiative focused on core leadership principles and skill development. In addition, CHPRC provided quarterly fieldwork supervisor training to frontline supervisors to augment their development as managers.

Administrative procedure PRC-PRO-TQ-40164, *Personnel Training and Qualification*, continues to guide the CHPRC training process to ensure employees can work effectively and safely. The procedure addresses and defines responsibilities of managers, the Training Manager, training specialists, schedulers, employees, students, and instructors.

CHPRC continues to use the Enterprise Learning Management (ELM) system owned and managed by MSA. The ELM tracks employees' training, schedules training, and rolls up training metrics for the training organization to manage and evaluate. ELM produces a daily Website report that shows projected training for the next 60- and 90-day periods. Each manager can review their section of the report to determine when training is required or identify training delinquencies within their workgroup. This capability permits managers and supervisors to adjust job assignments and scheduling to allow workers to complete their training requirements.

Team interviews identified that the ELM system is not capable of efficiently producing training delinquency reports for its users. Training staff can produce delinquency reports, but it is a multistep process requiring additional data "manipulation" to achieve useful results, so the training staff only produces the reports when requested. However, training delinquency reports are a useful tool for any training program to evaluate overall program effectiveness, identify if individual projects incur higher "no-shows" for assigned training, and identify training that may no longer be essential for workers on certain projects. CHPRC should work with MSA to implement improvements to the ELM system to produce routine, systematic delinquency reports to help evaluate and improve the training process.

**Opportunity for Improvement:** CHPRC should work with MSA to implement improvements to the ELM system to produce routine, systematic delinquency reports to help evaluate and improve the training process.

CHPRC coordinates with MSA for course development and presentation at the Volpentest Hazardous Materials Management and Emergency Response Training Center (HAMMER) and works with MSA to meet the CHPRC's training needs.

As a part of the training coordination effort, CHPRC and other site contractors participate on a training committee established by MSA. This committee evaluates improvement suggestions and integrates those improvements to meet the needs of site contractors. Team interviews identified several examples of this process. For example, CHPRC requested MSA/HAMMER to

develop a Conduct of Operations Simulator training course to improve workers' ability to identify conduct of operations and safety deficiencies in a hands-on training environment. At the time of the review, the curriculum for the training was complete and HAMMER was in the process of training the trainers for course implementation. In addition, based on the site-wide committee recommendation, HAMMER developed the "Do Work Safely" course designed for workers hired onto the Hanford Site with no previous experience working on DOE sites. History has demonstrated that workers from the private sector may not understand the DOE expectations related to conduct of operations, safety, and health. The course reinforces those expectations and DOE-mandated safety and health programs to those workers.

CHPRC develops an EJTA for each new employee or for employees assigned to a new job. The EJTA defines physical and medical examination requirements, any medical baseline testing and the employee's training requirements. After the employee satisfies the physical requirements, he or she meets with their supervisor to discuss training requirements. Every new employee receives CHPRC General Employee Training and ISMS training. Some workers also receive training on beryllium, radiological hazards, ladder safety, and heat stress if their job classification requires it. First line supervisors and managers use the Hanford Site Worker Eligibility Tool (HSWET) daily to validate qualifications and training prior to assigning work to an employee. Examples of employee training and qualifications recorded in HSWET include respirator training qualifications, physicals, hazardous waste operations and emergency response training, beryllium worker training, and radiological worker training.

CHPRC continues to use the Leadership Impact Initiative with a focus on leadership development across the management team. CHPRC modeled this training on best practices used in other CH2M HILL projects and offers it to first line supervisors and managers at all levels. The training occurs at quarterly executive manager retreats, quarterly all-manager meetings and addresses team development and training skills and other supervisory training tools. CHPRC expanded the Leadership Impact Initiative beyond management and supervision to include key project individual contributors and craft personnel.

In addition to the Leadership Impact Initiative, CHPRC conducts FWS training on a quarterly basis. The focus of the class is to reinforce worker accountability. The subjects addressed included: company vision, standards, requirements and ways to communicate goals, objectives, and priorities.

Team interviews identified significant CHPRC investment in the use of mockups to ensure workers can perform their duties safely and efficiently on new processes developed for unique activities. Examples include mockups for the removal of gloveboxes from PFP (completed) and the detailed mockup in support of the ECRTS program (see Hazard Prevention and Control).

## **Conclusion**

CHPRC continues to provide a training process that properly trains workers, supervisors, and managers. CHPRC works in conjunction with MSA/HAMMER and the other Hanford Site contractors to ensure the MSA-maintained training process is responsive to its needs. CHPRC should work with MSA to generate periodic training delinquency reports as a tool to help evaluate the training program. CHPRC has invested in developing detailed mockups to ensure procedures are correct and the workers are well trained for unique project activities. CHPRC continues to meet the DOE-VPP expectations for Safety and Health Training.

## VIII. CONCLUSIONS

CHPRC has faced many challenges since beginning its mission to clean up the Hanford plateau. Its scope of work contains some of the most hazardous work in the DOE complex. To accomplish that task, CHPRC brought together the Hanford workforce with experienced professionals performing similar work at hazardous sites around the world. That combination initially caused significant stress for workers and led to strained relations. Since then, CHPRC has worked to create incremental improvements in its relationship with the workforce, leading to incremental improvements in both safety and health and project performance. CHPRC managers have learned to trust the workforce, include their views and opinions as it seeks better solutions to problems, communicate honestly with workers, and build respect. Similarly, workers have learned to trust CHPRC managers, increased their willingness to raise issues and concerns without fear of reprisal, and increased their participation in safety improvement efforts. Processes for work planning and control have matured into systems that address the hazards posed by work, incorporate necessary controls into work plans, and allow workers to efficiently and safely complete work. When conflicts between safety and schedule arise, workers and managers seek resolution through collaboration and communication. The Team recommends that CHPRC continue participation as a Star site in DOE-VPP.

**Appendix A: Onsite VPP Assessment Team Roster****Management**

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