CH2M ♦ WG Idaho, LLC
Idaho Cleanup Project

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
March 11-20, 2014

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 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. DOE's former Office of Health, Safety and Security (HSS) assumed responsibility for DOE-VPP in October 2006. In May 2014, the Office of Environment, Health, Safety and Security (AU) was established and has the responsibility to manage DOE-VPP. AU expects to expand contractor participation complex-wide and coordinate DOE-VPP efforts with other Department functions and initiatives and continue to utilize the components of the Integrated Safety Management.

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, laboratories, 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 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 from the evaluation of CH2M♦WG Idaho, LLC (CWI) at the Idaho Cleanup Project, during the period of March 11-20, 2014, and provides the Deputy Under Secretary for Management and Performance with the necessary information to make the final decision regarding CWI's continued participation in DOE-VPP.

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ABBREVIATIONS AND ACRONYMS

Anti-C	Anti-Contamination Clothing
ARP	Accelerated Retrieval Project
AU	Office of Environment, Health, Safety and Security
BEA	Battelle Energy Alliance, LLC
BLS	Bureau of Labor Statistics
CARB	Corrective Action Review Board
CEST	Company Employee Safety Team
COBRA	Changing Our Behavior Reduces Accidents
CFR	Code of Federal Regulations
CST	Caustic Storage Tank
CWI	CH2M♦WG Idaho, LLC
DART	Days Away, Restricted or Transferred
DCS	Digital Control System
D&D	Decontamination and Decomissioning
DD&D	Decontamination, Decommissioning and Demolition
DMR	Denitration Mineralization Reformer
DOE	Department of Energy
DPS	Drum Packaging Station
EBR II	Experimental Breeder Reactor II
EFCOG	Energy Facility Contractors Group
EM	Office of Environmental Management
EPHA	Emergency Planning Hazard Assessment
EST	Employee Safety Team
FHL	Facility Hazard List
GHA	General Hazard Analysis
HASS	Hazard Assessment and Sampling System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HPI	Human Performance Improvement
HPSC	Hazard Profile Screening Checklist
HSS	Office of Health, Safety and Security
ICARE	Issue Communication and Resolution Environment
ICP	Idaho Cleanup Project
ID	Idaho Operations Office
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISMS	Integrated Safety Management System
IWTU	Integrated Waste Treatment Unit
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
MFC	Materials and Fuels Complex
NAICS	North American Industry Classification System
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PM	Preventive Maintenance
PPE	Personal Protective Equipment
RCT	Radiological Control Technician

RWMC	Radioactive Waste Management Complex
SCWE	Safety Conscious Work Environment
SSDE	Soft-sided Drum Enclosure
SME	Subject Matter Expert
SMP	Safety Management Program
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TRC	Total Recordable Case
USW	United Steelworkers International
VOC	Volatile Organic Compound
VPP	Voluntary Protection Program
VPPPA	Voluntary Protection Programs Participants' Association
WBT	Web-based Training
WGT	Work Group Team

EXECUTIVE SUMMARY

CH2M♦WG Idaho, LLC (CWI), is the prime contractor for the Idaho Cleanup Project (ICP) at the Idaho Site. The scope of ICP includes the safe environmental cleanup of specific portions of the Idaho National Laboratory site, located 45 miles west of Idaho Falls, Idaho. The Department of Energy (DOE) Idaho Operations Office (ID) provides direction to, and oversight of, CWI. CWI initially entered the DOE Voluntary Protection Program (VPP) at the Star level in June 2007 and was recertified in 2010. With much of the decontamination and decommissioning (D&D) work complete, CWI's efforts now focus primarily on retrieval, repacking, and disposal of wastes from the Radioactive Waste Management Complex (RWMC) and the Idaho Nuclear Technology and Engineering Center (INTEC); managing spent nuclear fuels from a variety of sources; removal and processing of residual sodium from the Experimental Breeder Reactor II (EBR II); and closure of the EBR II containment. CWI completed construction of the Integrated Waste Treatment Unit (IWTU) in 2012 and is in the final stages of readiness review, acceptance, and startup.

Continued recognition in DOE-VPP requires a triennial onsite review by the Office of Environment, Health, Safety and Security's DOE-VPP Team (Team) to determine whether the applicant is continuing to perform at a level deserving DOE-VPP recognition. The Team evaluated CWI's safety programs against the provisions of DOE-VPP. Work observed included retrieval, sorting, and repackaging of targeted wastes at RWMC; construction operations supporting tank closure at INTEC; shop areas at INTEC; unloading and preparation of drums for waste packaging at RWMC; D&D activities at EBR II. Additionally, the Team observed Employee Safety Team (EST) meetings, prejob briefings, and a meeting of the Company Employee Safety Team.

CWI has maintained its high level of commitment to safety and health while efficiently completing its mission. The managers' willingness to be present in the work areas, listen to and implement workers' ideas, provide resources to encourage worker participation, and reach out to the community are significant strengths of the program. Senior managers lead by example and expect everyone in the organization to accomplish work safely, or stop work until issues are resolved.

Employee Involvement remains the cornerstone of the CWI safety program. CWI ESTs are the primary vehicle that encourages employee engagement and participation in safety. Across CWI, there is a strong sense of ownership towards safety, making it difficult to differentiate between hourly and salaried employees. Employees continue to use Changing Our Behavior Reduces Accidents (COBRA) as the CWI behavior-based safety program that employees can use to provide behavioral observations and feedback to each other. Community Outreach is well established and employees at all levels of the company participate in this effort.

CWI employs numerous tools to identify and analyze the hazards in the workplace and actively uses those tools to control the hazards. CWI successfully adopted the Energy Facility Contractors Group's Work Control Guidance recommendations in its latest work control revision. CWI should consider documenting the basis for the controls and capturing that basis to ensure workers and planners understand the limits of the controls. The workers continue to demonstrate a questioning attitude towards all work activities and are actively involved in recommending solutions for identified hazards.

CWI uses engineered controls throughout ICP with a large number of those controls resulting from employee-suggested improvements. The success of the controls has increased CWI's safety and production, while decreasing injuries and costs. Preventive maintenance, emergency planning, and occupational medicine are well-developed programs supporting CWI operations.

CWI continues to improve its safety training program. Discussions with employees indicate that most workers are satisfied with the scope and duration of training provided, and it is adequate for the positions and tasks assigned. In an effort to develop employee skills, CWI is providing continuing training for managers. The United Steelworkers International continues to provide the title 10, Code of Federal Regulations, part 851, *Worker Safety and Health Program,* and Hazardous Waste Operations training required for CWI workers. CWI should continue to monitor the Web-based training for employees to ensure the training is effective.

CWI continues to approach its participation in the DOE-VPP with enthusiasm and commitment, and establishes a very high standard for worker safety and health. There is a strong bond between workers and managers based on mutual respect and trust. CWI actively seeks and encourages employee involvement in every aspect of its mission. That involvement was particularly evident as it solved challenges associated with unexpected conditions at Materials and Fuels Complex and IWTU. The variety of participation opportunities, the incorporation of creative ideas, and the willingness to think outside the box are hallmarks of its efforts to improve safety. CWI willingly invests people, time, and money to generate worker interest and ownership to safely complete its mission. CWI demonstrates that a commitment to safety contributes to its ability to accomplish hazardous work on time and on budget. The Team strongly recommends that CWI continue to participate in DOE-VPP at the Star level.

TABLE 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
CWI senior managers should ensure they fully inform middle managers and workers alike about critical decisions and reinforce that middle managers, as well as workers, can raise safety issues and stop work if they have concerns that the work cannot be completed safely.	4
CWI managers should continue to emphasize that VPP is an extension of Integrated System Management System (ISMS) and work to more effectively integrate the annual ISMS and VPP self-assessments.	5
CWI should consider documenting the bases for the controls and capturing those bases to ensure workers and planners understand the limits of the controls.	10
CWI should consider draining the leaky hot cell windows that are used infrequently and installing supplemental shielding if necessary to reduce the potential hazard and reduce maintenance, surveillance, and housekeeping costs.	16
CWI should continue to monitor the Web-based Training (WBT) to ensure the training is effective.	19

I. INTRODUCTION

CH2M♦WG Idaho, LLC (CWI), is the prime contractor for the Idaho Cleanup Project (ICP) at the Idaho National Laboratory (INL). The scope of ICP includes the safe environmental cleanup of specific portions of the INL site, located 45 miles west of Idaho Falls, Idaho. The original contract was a 7-year, $2.9 billion project funded through Department of Energy's (DOE) Office of Environmental Management (EM) that targeted legacy waste generated from munitions testing, Government-owned research and defense reactors, laboratory research, spent-fuel storage, and defense missions at other DOE sites. The DOE Idaho Operations Office (ID) provides direction to, and oversight of, CWI.

CWI initially entered the DOE Voluntary Protection Program (VPP) at the Star level in June 2007 and was recertified in 2010. In 2012, DOE extended the CWI contract through September 2015 with an estimated additional value of $730 million, citing CWI's ability to complete its environmental cleanup mission ahead of schedule and under budget, and accelerate work in the current contract allowing for outyear workscope to be completed earlier. With much of the decontamination and decomissioning (D&D) work complete, CWI's efforts now focus primarily on retrieval, repacking, and disposal of wastes from the Radioactive Waste Management Complex (RWMC), and the Idaho Nuclear Technology and Engineering Center (INTEC). CWI also manages spent nuclear fuels from a variety of sources. Remaining D&D work at the Materials and Fuels Complex (MFC) includes removal and processing of residual sodium from the Experimental Breeder Reactor II (EBR II) and closure of the EBR II containment. CWI completed construction of the Integrated Waste Treatment Unit (IWTU) in 2012 and is in the final stages of readiness review, acceptance, and startup.

CWI workers are represented by the United Steel Workers International (USW), Local 652, and the Idaho Building and Construction Trades Union. Additionally, CWI is supported by the Amalgamated Transit Union, the International Association of Fire Fighters, and the Security Operations Specialists Association.

Continued recognition in DOE-VPP requires a triennial onsite review by the Office of Environment, Health, Safety and Security's (AU) DOE-VPP Team (Team) to determine whether the applicant is continuing to perform at a level deserving DOE-VPP recognition. The Team evaluated CWI's safety programs against the provisions of DOE-VPP. During the site visit, the Team observed extensive work activities, evaluated relevant safety documents and procedures, and conducted interviews to assess the strength and effectiveness of CWI's health and safety programs.

The Team interviewed many employees, managers, and supervisors either formally or during observation of field activities. Hazards associated with work at CWI include, but are not limited to, the range of industrial hazards associated with construction or demolition work, and also extensive radiological contamination and residual process chemicals. Work observed included retrieval, sorting, and repackaging of targeted wastes at RWMC; construction operations supporting tank closure at INTEC; shop areas at INTEC; unloading and preparation of drums for waste packaging at RWMC; D&D activities at EBR II. Additionally, the Team observed Employee Safety Team (EST) meetings, prejob briefings, and a meeting of the Company Employee Safety Team (CEST).

II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

Injury Incidence/Lost Workdays Case Rate (CWI)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2011	3,328,781	15	0.90	8	0.48
2012	2,339,025	14	1.20	5	0.43
2013	2,090,073	8	0.77	2	0.19
3-Year Total	7,757,879	37	0.95	15	0.39
Bureau of Labor Statistics (BLS-2012) average for NAICS** #562 Waste management and remediation services			5.4		3.4
Injury Incidence/Lost Workdays Case Rate (CWI Subcontractors)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2011	453,951	7	3.08	0	0.00
2012	55,864	0	0.00	0	0.00
2013	24,888	0	0.00	0	0.00
3-Year Total	534,703	7	2.62	0	0.00
Bureau of Labor Statistics (BLS-2012) average for NAICS** #562 Waste management and remediation services			5.4		3.4

* Days Away, Restricted or Transferred
** North American Industry Classification System

TRC Incidence Rate, including subcontractors: 1.06
DART Case Rate, including construction and subcontractors: 0.36

Overall, the CWI injury rates are trending downward and are significantly below the comparison industry. A slight increase in the injury rate occurred in 2012 as CWI reduced its work hours as it completed IWTU construction. Subcontractor injuries also decreased as construction work diminished. A review of the injury/illness records and first-aid cases did not indicate improper reporting of injuries. CWI promotes the reporting of injuries, a safe work environment, and identifying and reducing behaviors that can lead to injuries. The Health and Wellness Roadmap pocket guide gives tips on nutrition, exercising, and stretching to improve health and help avoid the common injuries attributed to poor body positioning and flexibility. CWI accident and injury rates meet or exceed the expectations for continued participation in DOE-VPP at the Star level.

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

During the last DOE-VPP assessment, the Team determined that CWI managers had successfully maintained those aspects of the CWI safety program that were credited in 2007 for establishing a strong safety culture. CWI had built on those strengths, provided exceptional investment in the program, and made additional cultural improvements. These improvements produced large cost and schedule savings without sacrificing safety performance, and lead to a more rapid cleanup of the Idaho site. Managers' presence, active engagement of employees, and a willingness to listen and provide timely information regarding future workforce restructuring all contributed to a robust safety culture.

Since 2010, managers' visibility, accessibility, and credibility among the workforce has increased. CWI continues to commit time and money to improve safety. DOE rewarded that commitment and performance in 2012 when it extended ICP for 3 years (through September 2015) with an estimated value of $730 million. In its decision, DOE cited CWI's ability to complete its environmental cleanup mission ahead of schedule and under budget, and accelerate work in the current contract allowing for outyear workscope to be pulled forward and completed earlier. CWI accomplished this performance while reducing accidents and injuries by fostering an environment that encouraged employee ownership, participation, and innovation.

Workers contacted by the Team frequently commented on managers' presence at the worksites and their effective interpersonal relationships with workers. All managers recognized the importance of safety and the need to demonstrate their commitment through presence and actions. Most workers not only recognized the senior managers (company President and Vice-Presidents), but also demonstrated their comfort discussing issues and concerns with the senior managers. Conversations between senior managers and workers witnessed by the Team demonstrated a mutual respect between workers and managers.

CWI continues to have a robust set of policies and procedures that implements its worker safety and health program. Recently, CWI replaced its work planning and control standard with an updated management control procedure that integrates guidance from the Energy Facility Contractors Group (EFCOG) and URS', the CWI parent company, work control standard. The result is a streamlined work planning and control process that helps workers complete tasks safely (see Worksite Analysis). CWI's safety policy continues to be *performing work safely* and was echoed throughout the workforce.

In its Safety Conscious Work Environment (SCWE) survey in 2013, CWI identified a weaker relationship between workers and its middle managers. Workers trusted their direct supervisors and the senior management team, but in some cases did not share the same high degree of trust in middle managers. CWI attributed this difference to several factors, but believed the fundamental

cause to be a lack of training and coaching for middle managers in SCWE. In response, CWI is providing SCWE training to middle managers and supervisors. It expects this training to provide middle managers with the skills necessary to improve managers' communication and provide them with the tools they need to foster greater trust among the workforce.

In some cases, middle managers' response to resource changes and reassignments to support overall company goals may contribute to this difference in trust. The completion and operation of IWTU is a major milestone in the current contract. The construction project created significant problems for CWI because of cultural differences between the CWI workforce and the construction workforce, the ability of CWI to hold its parent company (URS) accountable for construction problems under the Intra-Company Work Execution Agreement (ICWEA), construction quality issues, and design issues identified during readiness and startup testing. With construction complete, startup and operation of the plant is one of CWI's remaining major milestones. When senior managers move resources to support that startup and operation, they may place middle managers in the situation of trying to accomplish their goals with fewer resources. This can lead to workers' perceptions that middle managers might be more interested in production rather than safety. To combat this perception, senior managers should ensure they fully inform middle managers and workers alike about these critical decisions and reinforce that middle managers, as well as workers, can raise safety issues and stop work if they have concerns that the work cannot be completed safely.

Opportunity for Improvement: CWI senior managers should ensure they fully inform middle managers and workers alike about critical decisions and reinforce that middle managers, as well as workers, can raise safety issues and stop work if they have concerns that the work cannot be completed safely..

Senior managers continue to support employee involvement in process improvements, including purchase of new equipment where that equipment will make work safer and more efficient. This support was evident throughout the projects. As in 2010, CWI actively sought worker feedback and incorporated worker ideas as CWI designed and built the new Accelerated Retrieval Project (ARP) enclosures. CWI incorporated many worker suggestions and ideas for waste management handling equipment in hot cells at INTEC that included cranes, shielding designs, work methods, and equipment design for processing sodium-bearing equipment. Workers and engineers worked closely together to design sodium treatment processes at both MFC and INTEC. In many cases, interactions between managers, workers, engineers, and safety professionals helped identify more efficient and safer work methods than originally expected, leading to safe work, as well as cost and schedule improvements.

Senior managers continue to foster a safe environment for workers to identify and address issues, especially when incidents occur. For example, recent events at CWI included an unanticipated water hammer event at MFC during sodium processing, buildup of carbon in the Denitration Mineralization Reformer (DMR) at IWTU, construction defects (including a purge gas dam in the process gas system) at IWTU, and an incorrect solution transfer at INTEC (see Worksite Analysis). In each case, CWI ensured that investigations, factfinding meetings, corrective actions, and other responses did not focus on blaming workers for errors and used events as learning opportunities. In each case, workers involved in the occurrence participated in corrective action development and helped identify error traps and effective solutions.

Senior managers recognize that with approximately 18 months left on the contract, there is a risk that experienced and skilled workers may leave to seek other opportunities. CWI is working

with DOE to identify the remaining work scope to stabilize the workforce as much as possible and reduce turnover and loss of skill sets. CWI has historically provided workers with training, counseling, and other opportunities to help them transition to other work if workforce restructuring becomes necessary, and those efforts will continue as the end of the contract nears. Senior managers were consistent in their belief that a change in contract might result in significant change to the senior management staff, but would probably have minimal effect on the workers.

A continuing strength of the CWI safety program is senior managers' willingness to provide resources for safety improvements and awareness. Multiple awareness and involvement campaigns exist throughout the project generated by ESTs. Senior managers not only provide the necessary funding for these campaigns, they actively participate and follow the campaign progress. This participation provides them with a greater understanding of the campaign's effectiveness and it helps them understand the campaign's costs and benefits. Managers also support and participate in the Changing Our Behavior Reduces Accidents (COBRA) observation program.

Finally, CWI effectively integrates its annual VPP assessment with other required self-assessments. In 2013, CWI established a crosswalk for performance expectations between the DOE-VPP expectations and SCWE attributes. Rather than performing two separate assessments to meet DOE requirements, CWI used this crosswalk to demonstrate that its annual VPP assessment effectively addressed the SCWE attributes. CWI has not been as effective in integrating its annual Integrated Safety Management System (ISMS) assessment and the annual VPP assessment. The annual ISMS assessment is a very detailed review of the variety of programs and processes to perform work safely. Many CWI personnel believed that VPP focused primarily on employee involvement and were surprised that the Team was asking questions they expected during an ISMS assessment, not a VPP assessment. CWI managers should continue to emphasize that VPP is an extension of ISMS and work to more effectively integrate the annual ISMS and VPP self-assessments.

Opportunity for Improvement: CWI managers should continue to emphasize that VPP is an extension of ISMS and work to more effectively integrate the annual ISMS and VPP self-assessments.

Conclusion

CWI has maintained its high level of commitment to safety and health while efficiently completing its mission. Managers' willingness to be present in the work areas, listen to and implement workers' ideas, provide resources to encourage worker participation, and reach out to the community are significant strengths of the program. Senior managers lead by example and expect everyone in the organization to accomplish work safely or stop work until issues are resolved. CWI continues to meet the expectations for excellence in Management Leadership and continued participation in DOE-VPP at the Star level.

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.

Employee Involvement remains the strength of the CWI safety program. Workers clearly demonstrate their participation and involvement in all aspects of safety and health programs at CWI. Employee participation on safety teams, willingness to complete COBRA observations, and use of step-back/stop-work authority were all testaments to the commitment to safety by employees. As stated in the 2010 review, worker-developed safety videos and the COBRA program continue to be a best practice for promoting employee involvement. The CWI human performance improvement (HPI) handbooks provide employees a guide to actively observe coworkers and identify error precursors. CWI encourages employees to incorporate HPI into work practices and provides them with training to promote situational awareness. Each employee receives an error precursor card to help recognize behaviors that can lead to errors and ultimately injuries. Observed workers seamlessly incorporated these tools into their normal behaviors. The CWI Health and Wellness Roadmap Program encourages workers to become involved in activities that benefit their health and engage in group health participation activities, such as walking 10,000 steps with coworkers.

Through observations and discussions with CWI employees, the pride, ownership, and commitment to a safe work environment is evident throughout the company. Interviews with employees indicated that they continue to promote ownership of their and their co-workers' safety at work, at home, and throughout the community. Employees across all working levels were willing and able to share their personal positive experiences about their involvement with various safety programs and community outreach opportunities. Examples of employee engagement include many programs developed and promoted by employees at all levels (safety awareness videos like the CWI-NSTERS, COBRA, "Star" Bucks rewards, Safety 24/7, and Always Safe, All the Time).

CWI ESTs remain the primary vehicle to encourage employee engagement and participation in safety. CWI encourages subcontractor employee participation in all its safety activities. The CEST provides a foundation where employees actively work together with managers to create a safe workplace. In addition to the CEST, there are subordinate ESTs in each of the major work areas. The chairs and vice-chairs of the subordinate ESTs are members of the CEST. CEST meetings are open to all employees. The CEST actively supports ESTs; solicits and encourages employee involvement; develops solutions for company-level concerns and issues; identifies trends; tracks CEST safety and health goals; provides a communication pathway between ESTs and managers; integrates VPP elements into company activities; and assigns, tracks, documents, and communicates actions or issues in a formal tracking log. Typically, each EST provides the CEST a summary of its activities during the past month. The Team observed a CEST meeting that was informative, well-presented, and included recognition of employees for contributing to the safety culture at CWI. According to CWI employees, recognition and awards are frequent at

EST and CEST meetings. Supervisors or EST management champions generally present employee awards. Some examples include plaques for supporting facility initiatives, safety posters, organizing speakers for ESTs, and contributing to facility safety.

As observed during the 2010 review, subordinate ESTs continue to organize and conduct facility inspections using checklists to document deficiencies. Subordinate ESTs include the D&D EST, Idaho Falls Facilities (IFF) EST, INTEC Area Project EST, and the RWMC EST. CWI selects a different facility inspection focus area monthly, based on trend analysis or lessons learned (i.e., tripping hazards, space heaters, extension cords, housekeeping). Each EST meeting begins with a *Safety Share* (topics encourage safety in the workplace) and an I-Stretch exercise presented by one of the EST members. Some of the topics presented at ESTs include safety during winter months, firearm safety, ladder safety, managing stress, the hazards associated with wearing lanyards and long scarves, and the flammability hazards of using automobile starter fluid. Each EST develops goals and objectives that they work towards completing during the year.

The EST at INTEC is subdivided into five INTEC Safety Groups (ISG) to focus on the particular project evolutions occurring in the facility: 24/7 (which includes shift workers, balance of plant, dual operations, scheduling and the engineers group); IWTU; maintenance; miscellaneous services; and waste management. In total, there are approximately 300 workers at INTEC with 5 different projects occupying a single site.

During the 2010 review, the Team observed a strong sense of ownership towards safety and a working relationship that made it difficult to differentiate between hourly and salaried employees. This strong sense of ownership continues today as CWI considers all personnel as CWI employees. Workers informed the Team that they are involved in the formal and informal reporting of hazards with no reported concern for reprisal or retaliation. The Team talked with several workers that initiated step-backs or stop-work and all confirmed that there was no fear of retribution. As observed in 2010, several workers confessed that there were more likely to be repercussions from *not* reporting a problem than reporting a problem, including from their peers. Past and continuing efforts have embedded *actively caring for coworkers* into the CWI safety culture.

COBRA is the CWI behavior-based safety program that employees can use to provide behavioral observations and feedback to each other. As observed in the 2010 review, it continues to provide CWI employees with the ability to interact with coworkers in a positive fashion and provide a communication vehicle to input safety concerns. COBRA participation includes cards that employees may submit for behavioral observations and/or safety concerns. There are computers dedicated for COBRA submittals located throughout CWI workspaces, or employees may submit anonymous COBRA observations electronically or via cards. CWI data shows a direct correlation between the total number of submittals and the total number of injuries. During 2013, there were approximately 87,000 COBRA submittals and 8 recordable cases compared to 2007 when there were 7,400 submittals and 38 recordable cases.

Employees at all levels of the company participate in a well-established community outreach program. Sparky the Dog, Spiderman, Superman, Wonder Woman, and Batman are icons that show up at events, such as Community Night Out, Community Celebrations, Professional Conferences, Classroom presentations, and School Assemblies. The concept of *Always Safe, All the Time* shares the safety 24/7 theme to the community. In addition to community outreach, CWI encourages workers to participate in mentoring efforts, and giving many workers the opportunity to participate in safety conferences. CWI mentoring efforts include CH2M Hill Twin Falls, Idaho; Simplot in Pocatello, Idaho; CH2M HILL B&W West Valley, LLC

(CHBWV), West Valley, New York; Monsanto, Soda Springs, Idaho; and URS-CH2M Oak Ridge, Tennessee. CWI regularly presents informative sessions at the Voluntary Protection Programs Participants' Association (VPPPA) National conferences. Additionally, CWI support to the Region X Chapter of VPPPA has been exemplary.

Conclusion

Employee Involvement remains the strength of the CWI safety program. CWI EST is the primary vehicle to encourage employee engagement and participation in safety. Across CWI there is a strong sense of ownership of safety and a working relationship that makes it difficult to differentiate between hourly and salaried employees. Employees continue to use COBRA as the CWI behavior-based safety program that employees can use to provide behavioral observations and feedback to each other. Community outreach is well established and participated in by employees at all levels of the company. CWI meets the Employee Involvement expectations for continued participation in DOE-VPP at the Star level.

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.

CWI employs multiple processes to identify and analyze hazards. These processes include industrial hygiene baseline surveys, facility hazard lists (FHL), hazard profile screening checklists (HPSC), job hazard analysis (JHA), and job safety analysis (JSA). CWI conducts industrial hygiene hazard baselines for its facilities and operations, and then records those results in the Battelle Energy Alliance, LLC (BEA) maintained hazard assessment and sampling system (HASS) database. Qualified safety professionals conduct the comprehensive baseline surveys and conduct personal monitoring on a regular basis. Work planners and procedure writers can easily reference industrial hygiene sampling results from the HASS database to establish, modify, or institute new controls for work tasks. Discussions with subject matter experts (SME) and workers demonstrated CWI continuously monitors for beryllium, lead, asbestos, chromium, and other hazardous materials. CWI updates the HASS database to reflect new sampling data or changed conditions.

CWI maintains its chemical inventory on the Dolphin system. The Dolphin system tracks all chemicals using barcodes applied when chemicals are accepted. CWI updates the chemical inventory annually using summer interns to perform top-to-bottom inventories of all chemicals at all CWI facilities.

CWI divides work control hazard analysis into two processes: work covered by operational activities (technical procedures); and work performed under maintenance, decontamination, decommissioning and demolition (DD&D), and construction work orders. MCP-3562, *Hazard Identification, Analysis, and Control of Operational Activities,* covers hazard analysis for technical procedures. MCP-101, *ICP Work Control Integrated Process,* covers hazard analysis for maintenance, DD&D and construction activities. These processes collectively provide an effective approach to work planning and control that ensures appropriate workers, supervisors, SMEs, and responsible managers work cooperatively to analyze hazards and develop hazard controls.

CWI revised its work control document, MCP-101, *ICP Integrated Work Control Process,* to incorporate EFCOG work planning and control guidance. This change includes the use of a general hazard analysis (GHA) that credits worker training in general safety and health requirements. General hazards are those hazards located within a facility or site area that are routinely encountered by personnel entering, passing through, or inhabiting a facility/site. Workers mitigate or control the general hazards based on site/facility safety orientation and training, signs and warnings, and general personal protective equipment (PPE). It is the individual's responsibility to remain cognizant of job conditions and to stop-work/step-back if a hazard emerges or they encounter a new or unexpected hazard.

For hazards not covered by the GHA, MCP-101, *ICP Integrated Work Control Process,* uses JHA, JHA walkdowns, HPSC, FHL (for work location), applicable lessons learned, applicable JSAs and previously completed JHAs. The JHA identifies and analyzes activity-specific hazards associated with the work activity and/or the worksite to define a specific control set based on the hazards identified. The FHL provides a list of identified hazards by physical location within the facilities. The FHL information is used for the planning of work documents and to inform personnel of facility-specific hazards identified within a facility based on walkdowns, baseline assessments, and facility modification.

Further, per the EFCOG guidance, MCP 101, *ICP Integrated Work Control Process,* explicitly states that planners/writers do not specify general hazards and controls when developing HPSC and JHA. The reliance on GHA and focus on including job-specific hazards in the JHA help highlight the unique controls associated with specific tasks and the work environment detailed in the work order.

In addition to adopting the EFCOG recommendations, CWI eliminated the electronic HPSC database index that it previously used to support the HPSC process. Based on planner input, the HPSC database was far too cumbersome and increased work package preparation time. CWI now maintains an HPSC index, reducing the number of pages from 176 to only 36. Work control and planner personnel were very supportive of the improvements and stated the resulting HPSC data was more efficient and resulted in a better quality product.

Despite the revisions, CWI does not consistently document or capture the basis for hazard mitigation controls in its hazard analysis process as identified in 2010. Capturing and documenting the rationale for control selection is essential in defining the assumptions made that ensure the recommended controls are effective. When properly documented, the limits of the controls are clear and if work or the identified hazards exceed those limits, workers will be aware of that and recognize the controls may no longer be effective. CWI should consider documenting the bases for the controls and capturing those bases to ensure workers and planners understand the limits of the controls.

Opportunity for Improvement: CWI should consider documenting the bases for the controls and capturing those bases to ensure workers and planners understand the limits of the controls.

CWI is developing a new process to treat bulk, elemental sodium recovered from the secondary sodium system in MFC-766 (EBR II). The treatment and disposal of elemental sodium has represented a significant challenge for CWI, and its efforts to overcome those challenges is indicative of the success of its worksite analysis process. The new system is titled MFC-766, Caustic Storage Tank (CST). CWI intends to use a repurposed 4,000 gallon, 316 stainless steel tank that was formerly used for caustic storage in MFC-799A. CWI will place the 4,000 gallon CST in building MFC-766 to perform the sodium treatment as part of the D&D scope for 2014. The process will treat approximately 65 gallons of elemental sodium inside the CST using liquid water. This treatment method will vent the water vapor/hydrogen/nitrogen gas mixture resulting from the process out of the tank through an off-gas line.

The challenges associated with the treatment of sodium are significant. Hazards identified and addressed in the new process include: the thermal limits of the storage vessels, pressure excursions due to sodium/water vapor explosions, pressure excursions due to reactions of water condensate and sodium frost inside the process vent, and over-pressurization due to gas

introduction/generation rates exceeding the design flow of the off-gas system. CWI recognized that sufficient sodium will be present during the process to breach the vessel (by pressure excursion) if too much sodium reacts at one time, and that there is the potential to transport enough sodium frost into the vent to cause water hammer reactions in the vent, if not analyzed and controlled properly throughout the treatment process.

CWI conducted an extensive analysis and established several controls to mitigate potential pressure excursions and not exceed vessel and vent design pressures by limiting the amounts of water within the vessel and within the vent, thereby limiting the potential reaction energy in each tank. Controls identified through the analysis included using a nozzle that produces a fine spray pattern rather than delivering the water in a stream or jet, purging the oxygen from the vessels with inert gas, maintaining a net positive pressure of inert gas within the vessel and within the off-gas system throughout the treatment process, and adding thermocouples to the tank vessel to improve the control of tank temperature, thereby reducing the potential formation of sodium frost and moisture during the process.

During this review, the Team attended a factfinding meeting organized to investigate the facts associated with the leakage of low-level, radiologically contaminated solution during a transfer at the INTEC facility. The solution collected in two valve boxes during a liquid transfer, rather than in the intended vessel. The plant shift manager led the factfinding meeting, and over 30 participants attended. The participants included operations personnel, workers, design engineers, DOE-ID representatives, and the USW safety representatives. The plant shift manager explicitly described the rules of behavior at the start of the meeting and explained the purpose of the meeting was to detail the facts of the event and not to place blame. The workers who performed the transfer actively participated in the discussion and were not intimidated.

Workers conducted the liquid solution transfer per the relevant procedure. The procedure stipulates stopping transfer after 15 minutes if no liquid is received, based on the length of the transfer line, pump capacity, and the diameter of the pipe. In addition, the valve boxes involved in this transfer are not equipped with leak detection monitoring. The workers involved in the activity demonstrated a good questioning attitude and promptly stopped work when receipt of transfer did not occur within the 15-minute period. After stopping the transfer, the workers immediately walked down the system and identified liquid contained in valve boxes C27 and C28. No fluid spilled from either of the valve boxes and CWI initiated a recovery plan to pump the fluids out of the valve boxes into more suitable containment.

The fact finding confirmed that workers conducted a prejob review and discussed all limits and precautions of the procedure. The workers performed a visual verification of the valve and verified the valve boxes were dry prior to starting work. However, discussions identified that the procedure did not require visual inspection or verification of any valve lineups associated with the Digital Control System (DCS). Valves associated with the DCS are not required to be visually inspected because of their physical location (deep below in the ground in highly contaminated areas, etc.). The DCS is an automated system that electronically actuates valves. The DCS uses a solenoid-actuated air valve to open or close the automated valves. However, two of the DCS valve actuators do not contain a feedback loop. Therefore, if one of these two valves is commanded open or closed, the DCS indicates the commanded position, but does not provide confirmation that the action has occurred. As part of this liquid transfer, one valve commanded open in the DCS did not open because the operating airline was locked out for maintenance approximately 2 weeks prior to the transfer, disabling automatic operation. The DCS did not show this status. CWI completed an engineering evaluation on these two valves that supported continued use of these valves without a feedback loop. While not the primary

reason for the liquid transfer failure, it was a contributing factor. CWI has determined the leak resulted from a plug failure in a leg of the transfer line that was demolished and is no longer used. CWI identified several actions as a result of the factfinding meeting. One such action is to determine how many valves within the DCS utilize the no feedback command response solenoids. CWI has completed this action and has determined that only the two valves discussed do not contain a feedback loop.

CWI tracks and trends a variety of information throughout the year. Normal accident and injury rates are typically the most familiar to the workers. CWI tracks and trends 14 safety management programs (SMP) from its safety analysis report on a monthly basis. The 14 SMPs include industrial hygiene, industrial safety, criticality safety, fire protection, etc. CWI believes its safety and health program is effective if the 14 SMPs are trending well. CWI trends DOE's Occurrence Reporting and Processing System (ORPS) events and issues a report of those trends quarterly. The ORPS report also tracks and trends nonreportable ORPS events in order to enhance its trending data.

Each CWI project has a Corrective Action Review Board (CARB) that provides a quarterly report to the Performance Assurance group. The CARB quarterly report includes Issue Communication and Resolution Environment (ICARE), Noncompliance Tracking System (NTS), etc., for each project. This report ensures that all project leadership is tracking issues but also provides performance assurance information to trend potential issues across all the CWI projects.

According to the CEST charter, the CEST tracks and trends information associated with ESTs. The CEST discusses information associated with COBRA observations performed and updates to any associated COBRA corrective actions. The Industrial Safety and Health Director for CWI presents the company injury/illness data and if there are any previous actions assigned to the safety teams, their status is updated. The CEST receives a quarterly status report from individual ESTs on deficiencies, and tracking and trending of corrective actions. CWI tracks and trends HPI involvement across all company projects. For example, a review of CEST meeting minutes from January 2013 showed a graph of HPI repeated actions versus types of actions. The graph indicates that mental lapses and wrong actions occurred at twice the frequency of disregarding safety requirements or ignoring signs.

Conclusion

CWI uses numerous tools to identify and analyze hazards. CWI successfully adopted the EFCOG Work Control Guidance recommendations in its latest work control revision. CWI should consider documenting the bases for the controls and capturing those bases to ensure workers and planners understand the limits of the controls. The workers continue to demonstrate a questioning attitude towards all work activities and are actively involved in recommending solutions to identified hazards. CWI continues to meet the expectations as a DOE-VPP Star participant in the Worksite Analysis tenet.

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.

Work at ICP involves the potential for exposure to many types of industrial, chemical, and radiological environments and materials. Ensuring that worker exposure to these environments and materials is avoided, or at least minimized, requires following procedure PDD-1004, *Integrated Safety Management System*, which establishes the processes for planning and preforming work safely. CWI is continually searching for ways to minimize or eliminate hazards, thus reducing the use of PPE. CWI provides required PPE to protect workers from hazards that it cannot otherwise eliminate or avoid by substitution, engineered controls, or administrative controls. Personnel, procedures, training, work control processes, and facilities are available to ensure that required PPE is accessible and in proper operating condition.

The Team observed the application and improvement of engineered controls at RWMC in each version of the ARP enclosures. ARP involves the removal of buried drums that contain radiological material and solvents used in manufacturing processes that may leach from the burial ground into the aquifer. Removal of these wastes is part of a negotiated agreement between the Environmental Protection Agency, DOE, and the State of Idaho. Workers' suggestions provided the majority of hazard control improvements. For instance, worker suggestions over the past several years improved the drum packaging stations (DPS) to reduce PPE requirements from anti-contamination clothing (Anti-C) and respirators to laboratory coats and protective arm sleeves. The DPS consists of a conveyer belt that moves the hazardous waste in a tray from the retrieval area into a sorting glovebox. In the old system, after sorting for prohibited items, workers transferred the waste into a drum at the end of the glovebox. The transfer area was not enclosed and workers needed respirators and Anti-Cs to avoid potential contamination.

The current system encloses the waste transfer to the barrel in a soft-sided drum enclosure (SSDE), another worker improvement. Workers developed a bottom drop bag to load and transfer the hazardous waste out of the tray. Once filled, workers tie off the bag at the top, and a tie wrap is used at the bottom. A hoist raises and moves the bag into the SSDE, and lowers it into a plastic bag in the barrel. A sharpened washer attached to a rope at the top cuts the tie wrap at the bottom of the bag releasing the contents into the barrel. Workers then remove the bottom drop bag through the glovebox and dispose of it. Once the barrel is sealed, workers zip open the SSDE and move the barrel, contamination free. The elimination of respirators and Anti-Cs, and associated heat stress, allows operators to work comfortably and easily; an excellent example of hazard control development through worker involvement.

RWMC uses many engineered controls in ARP. To control airborne radiological contamination and volatile organic compound (VOC) levels in the retrieval area during operations, RWMC installed high efficiency particulate air (HEPA)-filtered ventilation systems with a flowrate potential of 20,000 cubic feet per minute (CFM). Each ARP may have several of these units, and operators can vary the flowrate of the units to maintain negative pressure in the ARP. As

material is unearthed, derived air concentrations (DAC) of radioactive material may increase, as well as VOC concentrations. Operators can increase the flowrate of the ventilation units and open service bay doors, thereby increasing room air exchanges and decreasing the concentrations to remain within operating parameters. In cases where equipment operators need to exit the retrieval area with elevated DAC levels, increasing the air exchanges can decrease DAC levels rapidly to allow equipment operators to leave. In earlier versions of ARP, fewer ventilation units were used and equipment operators sometimes had to wait lengthy times in their cabs until DAC levels were acceptable in the retrieval area. The investment in the ventilation units reduces the time a worker or facility is waiting, improves production, and minimizes potential worker contamination.

Other ARP improvements include: elevated lighting system by suspending it from the ceiling to improve vision and reduce glare; increased spacing in the dress out room for radiation control technicians, equipment operators, and D&D workers; placing air pump equipment for Continuous Air Monitors (CAM) in the service bay to reduce noise in the airlock and drum packaging station rooms; using prefilters on the expensive HEPA filters to extend their life and reduce exposure to workers replacing HEPA filters; and building a cooling system to chill airline supply air to help reduce heat stress.

Extensive use of engineered controls was also evident at INTEC. For example, the Waste Management organization uses hot cells in the former chemical process building for packaging and repackaging of waste. Operators and engineers have worked together to develop a variety of shielding devices for movement of waste containers into and out of the hot cell to minimize worker exposures. New sodium recovery processes have been developed that permit workers to handle sodium-bearing equipment in an inert atmosphere, and a new sodium distilling process is in development to recover and treat contaminated sodium parts. Operators in the Waste Management organization use the installed video cameras to remotely monitor and handle waste packages, and minimize exposure from the waste.

An ergonomist reviewed the tools used by operators at the INTEC spent fuel storage areas to reduce stresses to the body. The recommended improvements included neutral handle designs, reduced tool weight, and the use of hoists for lifting. Video cameras monitor the handling of fuel components to permit appropriate supervision while minimizing exposures to the fuel storage pool.

The D&D of EBR II at MFC uses many engineered controls. Sodium treatment processes used by BEA prior to turnover to CWI for D&D were not as effective as anticipated, and significant quantities of metallic sodium remained in the process piping. After a water hammer event in 2012 resulting from buildup of water pressure in contact with sodium, CWI revised its treatment and removal methods for sodium. They are developing a new process, using tanks removed from EBR II and a section of the EBR II building, to safely treat and clean piping removed from EBR II without exposing workers directly to the sodium hazards (see Worksite Analysis).

Mockups are another method used at CWI to develop an appropriate workflow and practice the workflow prior to performing work. Use of the mockup also limits worker exposure to hazards while the workflow process is developed. At IWTU, CWI built a mockup of the DMR since workers had to enter and perform hazardous work within the tight spaces of the DMR. A team of workers, managers, planners, safety, fire, industrial hygiene, and engineering identified the safest approach to enter the 15-inch diameter hole and work within the confined space. Using an ISMS approach, the planning team defined the workscope, identified hazards, developed controls, and then the workers practiced entering and working in the mockup. After each

evolution of work within the mockup, the planning team and workers discussed lessons learned and incorporated changes into the next iteration of the work package until they developed the best process for the actual work in the DMR.

The radiation protection managers are supported by radiological control technicians (RCT) to accomplish program requirements found in PRD-183, *Radiological Control Manual*, and implements requirements of title 10, Code of Federal Regulations, part 835 (10 CFR Part 835), *Occupational Radiation Protection.* The radiation protection managers use criteria and review approach documents (CRAD) monthly to review the program within a 3-year period. Also, the Radiation Protection Director conducts periodic Management Workplace Visits (MWV) at both projects and meets regularly with the managers and ID personnel.

In November 2012, the HSS Office of Independent Oversight completed an onsite review of the Idaho Site radiation protection program and stated that effective radiation controls are in use at the site. The report also identified some opportunities for improvement, including the ICP radiation protection program compliance matrices, to strengthen the RWMC hazard analysis for off-normal work and to enhance the radiological work permit content, and to assess the skyshine hazards at INTEC. Overall, Independent Oversight concluded that, based on work observed, CWI implemented an effective radiation protection program.

RWMC has radiological postings to warn workers of hazards, and RCTs monitor operations in ARP enclosures. The Team observed the RCTs monitoring radiation levels and constantly interacting with workers. As a policy at ARP, no additional personnel may enter the retrieval area when machines are digging up waste barrels. DAC and VOC levels may become elevated during excavation. A positive pressure air-conditioned ventilation system in the cab and an airline respirator supplied from bottled air on the machine protects the operator from airborne contamination.

The INTEC radiation protection manager replaced outdated radiological postings and inventoried the current postings within 2 years of assuming the position. The manager also developed the INTEC Radcon Toolbox, which is a quick reference pocket guide for RCTs to use in the field. It contains information about specific detectors and radiological materials found at INTEC. The manager also developed a safety improvement plan with several goals that include increasing the quality of the logbooks and improving the response to drills.

During a walkdown of waste management activities at INTEC, the Team observed that an oil-filled viewing window for the hot cell was leaking mineral oil. Upon further inquiry, CWI personnel informed the Team that the leaky windows had existed for several years. CWI monitored the windows monthly for oil level, and refilled the windows as necessary. Personnel had installed a variety of absorbent materials to absorb the oil, but absorbent materials could not contain the leak, and an area of the floor was marked with ropes to warn personnel of the slip hazard. A further review by CWI found that the facility safety basis did not credit the oil in the windows for its shielding value. The oil only improved visibility through the window, and workers rarely used the windows for the current activities. Allowing this condition to exist for several years is contrary to CWI's basic philosophy of reducing or eliminating hazards where practical. CWI should consider draining the leaky hot cell windows that are used infrequently and installing supplemental shielding, if necessary to reduce the potential hazard and reduce maintenance, surveillance, and housekeeping costs.

Opportunity for Improvement: CWI should consider draining the leaky hot cell windows that are used infrequently and installing supplemental shielding if necessary to reduce the potential hazard and reduce maintenance, surveillance, and housekeeping costs.

During this assessment, carbon monoxide (CO) levels measured in an RWMC retrieval area became elevated. The source was a machine used to move waste material, and it needed a new engine. A similar machine, undergoing an engine replacement, was not ready for use. The industrial hygienist discussed the situation with the project vice-president, and both agreed that the CO levels warranted the need to stop using the machine and have it undergo an overhaul. Even though this action temporarily hampered production, this decision demonstrates the overall concern for safety.

The ICP is well supported with industrial hygienists and safety and fire professionals who have many years of experience, certifications, and a deep knowledge of their project area. Several professionals have both the safety and industrial hygiene certifications and CWI encourages junior professionals to obtain certification.

Each project has its own maintenance crew that implements the preventive maintenance (PM) program. Each project manager tracks PM delinquency rates. At the time of this assessment, RWMC did not have any outstanding PMs. The PM delinquency rate for all CWI facilities was only 13 delinquencies for 3,270 PMs.

The INTEC engineering and maintenance staffs are examining all of their 1,800 PMs for redundancy, periodicity, and need. For example, rather than periodically removing and cleaning the strainers for a diesel fuel offloading pump, the staff decided to wait for the strainers to show signs of reduced flow. Operators can quickly recognize a clogged strainer (from flow readings and knowledge of equipment operation), and they can switch to the second pump to continue pumping. This strategy reduces maintenance work and fuel exposures from draining the pumps to service the strainers without affecting operations.

The review of the PMs is causing INTEC to rethink energy costs. They have installed thermometers set to 40 degrees Fahrenheit in vacant buildings and have reduced heating costs by $50K a week. INTEC's next target is to reduce electrical costs to run large fans in other vacant buildings. They plan on installing smaller fans to keep the air flowing, but at a lower cost. CWI is using PM to ensure the reliable operability of necessary systems and reduce energy consumption.

The hoist at RWMC DPS requires periodic inspections. The inspection procedure requires the partial disassembly of the hoist for physical inspection of brakes, sheaves, and electrical contacts. To gain access to the hoist, employees need to enter a radiologically contaminated area and a permit-required confined space. In addition to PPE of a Class B HAZMAT suit, scaffolding is necessary to access the hoist. CWI analyzed the inspection of the hoist in accordance with DOE Standard 1090-2011, *Hoisting and Rigging*, Section 4, *Hostile Work Environments,* and documented this analysis in Engineering Design File (EDF)-6089. The result of the analysis allowed CWI to perform specified visual inspections, coupled with discrete physical inspections, such as load testing the hoist, thus decreasing the employee's potential exposure to contamination.

Emergency Management maintains 10 Emergency Planning Hazard Assessments (EPHA) at INTEC, 3 EPHAs at RWMC, and 1 EPHA at MFC. EPHAs may change as CWI decommissions

and demolishes facilities or areas at the various sites, and changes to the EPHA are reported to Emergency Management using MCP-2412, *Reporting Changes of Hazards to Emergency Management*. According to the Emergency Management SME, a new hazard is inventoried once it is recognized, but discontinued hazards are removed during the triennial review period.

For 2013, 47 drills were completed; any needed improvements are tracked in either ICARE or by a work group team (WGT) until satisfactorily closed. The 2013 annual exercise involved an earthquake at RWMC. All evaluated sections were satisfactory, and CWI is tracking recommendations in the ICARE or WGT databases.

In September 2011, the National Nuclear Security Administration conducted a no-notice exercise. The scenario involved the touchdown of a tornado at RWMC. Personnel took appropriate actions, and the Emergency Action manager directed personnel to report to the Emergency Control Center. Workers at the damaged facility took appropriate protective actions and CWI made appropriate notifications. In July 2012, an Independent Oversight review of a severe natural phenomena event at INL identified two opportunities for improvement for CWI: (1) increase the effectiveness of pager tests; and (2) improve the reliability and availability of backup power sources. CWI is addressing these opportunities for improvement and tracking these recommendations until completed.

CWI contracts with the BEA occupational medicine program for its medical support. BEA has a medical clinic at the Central Facilities Area, and another clinic is located at the Willow Creek building. BEA has a staff of 2 doctors, 2 physician assistants, 10 nurses, x-ray technicians trained also in phlebotomy, managers and administration personnel, an employee assistance program person, and a wellness expert. The Fire Department provides ambulance support and may position ambulances throughout INL to respond to medical emergencies. BEA provides first-aid medical support and advanced cardiac life support. Since the medics are located next to the Fire Station, medics respond with fire personnel to the emergency scene and transport patients to the Eastern Idaho Regional Medical Center.

CWI supervisors fill out an electronic form that identifies the employee's job tasks, locations, and expected medical examinations. The supervisor forwards the form to the industrial hygienist who reviews the electronic form and forwards it to the medical staff. The BEA doctor receives the electronic form and examines workers at either clinic for physicals. Injured workers can report to either clinic for treatment, or they may self-treat minor injuries at the worksite. MCP-49, *Occupational Injury/Illness Reporting and Follow-up*, defines minor injuries that can be treated by a qualified first-aid provider at the worksite, and the minor injuries are reported to the illness/injury coordinator via form 231.06, *Minor Injury Evaluation Form*. The BEA medical director meets with the CWI Safety and Health director several times a month to discuss medical cases, and there is a respectful relationship between the offices.

Conclusion

CWI effectively uses the preferred hierarchy of controls for hazards throughout ICP and encourages workers to be involved in control development. CWI's success in implementing hazard controls has simultaneously improved safety and production while reducing overall costs. PM, emergency planning, and occupational medicine are well-developed programs that support safe CWI operations. CWI meets the Hazard Prevention and Control expectations for continued participation in DOE-VPP at the Star level.

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 they are capable of acting in accordance with management expectations and approved procedures.

In 2010, the Team found workers were satisfied with the type and quantities of training received and were actively engaged in the training processes. Likewise, managers and supervisors were knowledgeable of the work, the hazards, and the controls. The training programs in 2010 continued to satisfy the expectations for a DOE-VPP Star participant.

CWI continues to improve its safety training program. CWI started *block and blend training* in 2006, and the training manager explained to the Team how they continue to refine and improve this concept. Improvements include accelerated learning techniques and the use of Web-based training for most requalifications. Block training consolidates training delivery, makes training efficient, and supports the operational scheduling at the facilities. Blending reduces redundancies by combining similar learning objectives into existing deliveries. According to the training manager, requalification and refresher settings benefit from blending similar training objectives into a single delivery. As an example, the CWI safety training block traditionally took about 155 hours to complete. Today, actual classroom training is approximately 120 hours of classroom instruction.

Discussions with employees indicate that most workers are satisfied with the scope and duration of training provided, and it is adequate for the positions and tasks assigned. In addition to training on core requirements, CWI continues to provide employees with the ICP Safety Tool Box Handbook. It describes the relationship of ISMS; 10 CFR Part 851, *Worker Safety and Health Program;* and VPP. It contains the safety policy and describes employees' responsibilities. It communicates the company's expectations and provides the necessary tools to make the employee successful. The Team attended refresher training on the toolbox and found it effective and informative. During employee interviews, the Team noted that employees used the toolbox when they could not readily express detailed information about the subject in question. For example, during one interview the employee pulled out his toolbox booklet at the beginning of the interview. When asked why, the employee said that it helped remind him of program details. Most employees were very knowledgeable about the safety training and its impact on their daily tasks.

CWI continues to provide employees with a comprehensive and extensive training program. As noted in 2010, each position requires courses to qualify the employee for his/her particular position. One of the newer training programs initiated by CWI is continuing training for managers. The Team observed a pilot training session for this year's training. The class size was relatively small and included first line and middle managers. EST chairs were also included in the managers training as they have found that this not only provides the EST chairs with leadership skills, but also provides an opportunity for EST chairs to learn alongside their managers. The subject matter was relevant with interactive participation by students and instructors that used open-ended questions to elicit responses to scenario discussion.

As observed in 2010, USW continues to provide all the 10 CFR Part 851 and Hazardous Waste Operations and Emergency Response (HAZWOPER) training for CWI workers. Workers interviewed in 2014 expressed satisfaction with the quality and content of the USW training.

CWI also participates in the voluntary DOE Training Reciprocity program through the DOE National Training Center.

During a discussion with several RCTs about the refresher training for radiation technicians, the subject of Web-based Training (WBT) arose. The RCTs indicated that they preferred classroom training, but realize that WBT is a cost-effective alternative for refresher training. They are concerned that they cannot accomplish their WBT at their project while supporting a heavy workload for their project. The training department, radiation control management, and operations agreed to provide the technicians 10 hours to complete their refresher training over a 3-month period. The training department researched other CWI projects and found similar situations. Because of this discussion, the training department committed to ensure every refresher module for technicians will include the expectations and commitment to provide the time for technicians to complete their refresher training. CWI should continue to monitor the WBT to ensure the training is effective.

Opportunity for Improvement: CWI should continue to monitor the WBT to ensure the training is effective.

Conclusion

CWI continues to improve its safety training program by refining and improving upon the *block and blend* training concepts. Discussions with employees indicate that most workers are satisfied with the scope and duration of training provided and it is adequate for the positions and tasks assigned. In an effort to develop employee skills, CWI is providing continuing training for managers. USW continues to provide all the 10 CFR Part 851 and HAZWOPER training for CWI workers. In an effort to ensure effective WBT, CWI should continue to monitor WBT. CWI meets the expectation of a DOE-VPP Star participant.

VIII. CONCLUSIONS

CWI continues to approach its participation in the DOE-VPP with enthusiasm and commitment, and establishes a very high standard for worker safety and health. There is a strong bond between workers and managers based on mutual respect and trust. CWI actively seeks and encourages employee involvement in every aspect of its mission. That involvement was particularly evident as it solved challenges associated with unexpected conditions at MFC and IWTU. The variety of participation opportunities, the incorporation of creative ideas, and the willingness to think outside the box are hallmarks of CWI's efforts to improve safety. CWI willingly invests people, time, and money to generate worker interest and ownership to safely complete its mission. CWI demonstrates that a commitment to safety contributes to its ability to accomplish hazardous work on time and on budget. The Team strongly recommends that CWI continue participation in DOE-VPP at the Star level.

Appendix A: Onsite VPP Assessment Team Roster

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