Mission Support Alliance, LLC
Hanford Mission Support Contract

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
September 9-18, 2014

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FOREWORD

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided but not standardized. For this reason, on January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration (OSHA) VPP. Since its creation by OSHA in 1982 and DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. The Office of Environment, Health, Safety and Security (AU) is responsible for managing DOE-VPP. AU intends to expand contractor participation complex-wide and coordinate DOE-VPP efforts with other Department functions and initiatives, especially Integrated Safety Management (ISM).

DOE-VPP focuses on areas where DOE contractors and subcontractors using ISM 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, including production facilities, laboratories, subcontractors, and support organizations.

DOE contractors are not required to participate in DOE-VPP. In keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, participants may withdraw from the program at any time. DOE-VPP consists of three programs with designations 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, used rarely by the Department, allows DOE to obtain additional information 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 to participate in DOE-VPP, DOE recognizes that the applicant exceeds the basic requirements for systematic protection of employees at the site. As the symbols of such recognition, DOE provides certificates of approval and the right to use DOE-VPP flags for the program in which the site is participating. The participants may also choose to use the DOE-VPP logo on its letterheads and/or on award items for employee incentive programs.

This report summarizes the DOE-VPP evaluation of Mission Support Alliance, LLC (MSA)/Mission Support Contract (MSC), during the period of September 9-18, 2014, and provides the Associate Under Secretary for AU with the necessary information to make the final decision regarding MSA/MSC's continued participation in DOE-VPP.

Table of Contents

ABBREVIATIONS AND ACRONYMS

AJHA	Automated Job Hazard Analysis
AU	Office of Environment, Health, Safety and Security
BLS	Bureau of Labor Statistics
CAIRS	Computerized Accident/Incident Reporting System
CBT	Computer-Based Training
CFR	Code of Federal Regulations
CM	Corrective Maintenance
CSHA	Craft-Specific Hazard Analysis
DART	Days Away, Restricted or Transferred
DOE	Department of Energy
ESH&T	Environment, Safety, Health and Training
EZAC	Employee Zero Accident Council
FWS	Field Work Supervisor
GHA	General Industrial Hazard Analysis
HAMMER	Volpentest Hazardous Materials Management and Emergency Response Federal Training Center
HAMTC	Hanford Atomic Metal Trades Council
HFD	Hanford Fire Department
HGET	Hanford General Employee Training
HPMC	HPM Corporation
HSRPP	Hanford Site Respiratory Protection Program
HSS	Office of Health, Safety and Security
HSWET	Hanford Site Worker Eligibility Tool
IH	Industrial Hygiene
IHBHA	Industrial Hygiene Baseline Hazards Assessment
IIF	Issue Identification Form
IPIF	Integrated Process Improvement Forum
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
ITEM	Integrated Training Electronic Matrix
MSA	Mission Support Alliance, LLC
MSC	Mission Support Contract
MSDS	Material Safety Data Sheet
MSS	Mission Support Services
NAICS	North American Industry Classification System
NPE	Natural Phenomena Event
OSHA	Occupational Safety and Health Administration
OJT	On-the-Job Training
PAPR	Powered Air Purifying Respirator
PM	Preventative Maintenance
PNNL	Pacific Northwest National Laboratory
PPE	Personal Protective Equipment
PZAC	President's Zero Accident Council
RCT	Radiological Control Technician
RL	Richland Operations Office
SCWE	Safety Conscious Work Environment

SDS	Safety Data Sheet
SIP	Safety Improvement Plan
SME	Subject Matter Expert
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TRC	Total Recordable Case
VPP	Voluntary Protection Program
WRPS	Washington River Protection Solutions, LLC

EXECUTIVE SUMMARY

In May 2009, the Mission Support Contract was awarded to Mission Support Alliance, LLC, (MSA), which began operations on August 24, 2009. MSA has three separate Department of Energy (DOE) Voluntary Protection Program (VPP) participants: the Volpentest Hazardous Materials Management and Emergency Response (HAMMER) Federal Training Center, Safeguards and Security, and Mission Support Services (MSS). MSS includes all of the previous contractor's Hanford Site Operations organization, MSA administrative functions, and Lockheed Martin Information Technology subcontracted support. MSA completed transition of the DOE-VPP Star in September 2011. Per DOE-VPP requirements, the 3-year recertification review is due in 2014.

The Total Recordable Case and Days Away, Restricted, or Transferred case rates are trending slightly downward for the past 3 years. MSA is well below the comparison industry averages for both rates.

MSA managers remain committed to the safety and health of their workers, but a significant trust gap exists between managers and the Hanford Atomic Metal Trades Council (HAMTC) workforce. MSA continues to support outreach efforts to the community and giving workers the opportunity to participate in other activities that support DOE-VPP. MSA continues to seek effective reward and recognition mechanisms to acknowledge worker contributions to safety improvements. MSA should adopt its strength in customer service as it finds ways to improve managers' relationship with the workforce. By following such a model and encouraging managers to follow an approach that treats the workforce as a customer, MSA will regain the trust and support of its workers, become more effective at accomplishing its fundamental mission, and establish workers' confidence that their experience and knowledge is a valued asset.

MSA has systems and processes to promote and encourage employee involvement. The Office of Environment, Health, Safety and Security DOE-VPP Team (Team) observed some employees taking advantage of these tools and opportunities to foster continuous improvement. MSA should review and address issues that affect worker trust and involvement and ensure workers feel valued for their contributions toward improvement.

MSA has a system that provides for the analysis of hazards and developing appropriate controls from that analysis. MSA has incorporated the elements of the DOE Work Control Guidance document; however, they need to continue to refine the implementation to ensure nonapplicable hazard controls are not included in the task-specific work packages. MSA has a system that provides for tracking and trending of injuries, but needs to focus on that trended information to achieve reductions in those injuries.

MSA uses the hierarchy of controls, such as substitution, administrative and engineered controls, and personal protective equipment throughout its work areas to reduce hazards and to protect workers. Work areas are generally free of clutter indicating workers place a high value on their work area and safety. MSA needs to establish a workable priority scheme for the preventive and corrective maintenance backlog to restore worker confidence that MSA is dedicating the resources to fix broken items and prevent workers from resorting to improvised repairs.

MSA continues to employ the training approach observed in the previous VPP review, and employees generally are satisfied with their training. HAMMER conducts most of the core

safety and health training for MSA employees. MSA should evaluate its training needs to ensure the training meets performance expectations, and take advantage of the slip simulator training at HAMMER.

Since completing the transition process in 2011, MSA has faced numerous challenges to the relationship between managers and the HAMTC workforce. In many cases, events and actions by managers, although well intentioned, have had the effect of significantly reducing the workers' trust. Workforce restructuring, budget reductions, and other cost-saving measures have produced an environment where many workers do not feel confident to use their "stop work" authority. Although they believe they would never perform work unsafely, they rely on their HAMTC safety representatives or union stewards to stop work for them. Some nonunion workers have also used this method to raise safety issues or address safety concerns. Although most managers believe they are available for workers to talk to them and genuinely want to ensure safety concerns are addressed, their actions have communicated a different message to workers. MSA finally realized the problem a few months prior to this assessment and is acting to regain workers' trust, but those actions, in addition to the opportunities for improvement identified in this report, need time to mature and convince workers those actions are not just short-term commitments made to satisfy the assessment team. Therefore, the Team recommends that MSA retain DOE-VPP Star status for MSS in a *conditional* status as it continues to pursue its improvement efforts, with a verification of the effectiveness of those actions by the Team in 12-18 months, after which the Team will make a final recommendation.

TABLE 1

OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
MSA managers need to find ways to spend significantly more time in the field to help counter rumors, ensure the correct basis for decisions is widely understood, and develop a relationship with the workforce based on mutual trust and respect.	7
MSA should train managers and supervisors to use the Corrective Action Management system as a means to document stop works and ensure the system does not create unnecessary administrative burden.	8
MSA should limit attendance at critiques or factfinding meetings to only those people necessary to establish the facts and timeline of an event.	8
MSA managers need to regain the full trust and confidence of the HAMTC safety representatives by actively seeking HAMTC safety representatives' opinions and ideas, continually creating opportunities for dialogue, and not waiting for the HAMTC safety representatives to come to the managers with issues.	9
MSA needs to establish a specific list of actions that it is taking to address the HAMTC concerns, share that list with HAMTC, and ensure it does not back away from those commitments in the coming months.	9
MSA needs to provide additional visibility and support for the EZAC process at the working level.	12
MSA should find methods to evaluate worker perceptions that minimize bias, that workers' trust will provide anonymity, and provide consistent and usable data.	12
MSA should evaluate the safety logbook effort and either support it, or develop another method to allow workers to effectively document their issues and concerns.	13
MSA needs to continue to evaluate the hazard analysis process to ensure that all hazards are analyzed and that the intent of the hazard analysis is effectively defined.	15
MSA should continue to emphasize the expectation that the addition of extraneous, nonapplicable hazards and their associated controls is not beneficial to the work package or the workers' use of the package.	15
MSA should ensure the proper maintenance and execution of the sampling evaluation schedule and the performance of all required sampling per their schedule.	17
MSA should consider developing and implementing focused reviews based on the trending data to reduce the recurrence of trending injuries.	17

MSA should evaluate controls for vehicle operation during reduced visibility conditions, as well as additional markings for obstructions.	20
MSA needs to walk down all work areas and inventory any PM or CM work that is affecting the work environment, prioritize the work, and ensure workers understand the priorities and schedule. Further, it needs to train managers and supervisors to recognize and eliminate, rather than tolerate, these workarounds.	22
MSA should consider including the slip simulator as part of initial employee training.	26
MSA should identify better performance indicators that determine effectiveness of training by observing workers' practices and measuring perceptions in response to training.	27

I. INTRODUCTION

In May 2009, the Mission Support Contract (MSC) was awarded to Mission Support Alliance, LLC, (MSA), which began operations on August 24, 2009. The MSC represents a unique contract concept developed by the Department of Energy (DOE) to consolidate infrastructure services across the Hanford Site in order to maximize efficiency of the ongoing environmental cleanup activities. As part of its transition, MSA combined several separate DOE Voluntary Protection Program (VPP) participants at the Hanford Site into a single program under Mission Support Services (MSS). Two other participants, the Volpentest Hazardous Materials Management and Emergency Response (HAMMER) Federal Training Center and the Safeguards and Security organization, while part of MSA, remained separate participants because of their significantly different missions. MSA completed transition of the DOE-VPP Star for MSS in September 2011. Per DOE-VPP requirements, the 3-year recertification review is due in 2014. The contract is a cost-plus-award-fee contract valued at approximately $3.059 billion over 10 years (a 5-year base period with options to extend it for another 5 years). MSA is currently in its fifth year; and in December 2013, DOE awarded a 3-year extension to MSA's contract through 2017 worth $950 million, leaving one more contract extension possible.

In August 2008, the former Office of Health, Safety and Security (HSS) issued guidance to contractors desiring to transition existing DOE-VPP Star status to the new contract. The guidance included written commitments from the new contractor management team and any affected bargaining units. The Hanford Atomic Metal Trades Council (HAMTC) and MSA made such commitments. To complete the transition, the contractor was required to submit a DOE-VPP application that clearly defined those areas that have changed from the previous contractor, and then undergo an onsite evaluation to determine if the new contractor continues to warrant recognition as a Star site.

DOE conducted an onsite assessment in September 2011 to determine if MSA met DOE-VPP requirements as specified in the DOE-VPP Manual and recommended MSA continue to participate in DOE-VPP as a Star participant. That assessment identified 16 opportunities for improvement. Five opportunities for improvement related to Management Leadership, one in Employee Involvement, four in Worksite Analysis, five in Hazard Prevention and Control, and one in Safety and Health Training. The primary focus of the Opportunities for Improvement was to improve manager and employee involvement and specific hazard controls processes.

Additional reviews performed since the 2011 VPP review included the Office of Enforcement and Oversight (Independent Oversight) within the former HSS' review of the preparedness of the DOE Richland Operations Office (RL) and the various Hanford Site contractors to deal with severe natural phenomena events (NPE) in April 2013. That review evaluated the processes for identifying emergency response capabilities and maintaining them in a state of readiness in case of an NPE. The report noted several positive observations, significantly that the Hanford contractors use a variety of methods to communicate information and protective action instructions to workers located at the site and in town. The report also identified that the Hanford Site has sufficient medical plans and procedures in place to treat injured or contaminated workers, as well as documented arrangements with offsite medical providers to accept and treat contaminated injured workers.

The Office of Environment, Health, Safety and Security (AU) DOE-VPP Team (Team) conducted this assessment from September 9-18, 2014. At that time, the portions of MSA covered by this assessment (MSS) consisted of approximately 1,500 workers, supervisors, and managers. Of those 1,500 personnel, the Team had contact with over 200 personnel through either work observations and walkdowns or formal interviews. Work activities observed by the Team included routine maintenance activities, high-voltage electrical work, facility operation, vehicle and heavy equipment maintenance, hoisting and rigging, and other tasks in support of Hanford Site operations.

II. INJURY INCIDENCE / LOST WORKDAYS CASE RATE

Table 2.1 Injury Incidence/Lost Workdays Case Rate (MSS and Teaming Partners)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Rate	Days Away, Restricted or Transferred (DART) Cases	DART Case Rate
2011	4,415,512	21	0.95	14	0.63
2012	3,541,244	10	0.56	4	0.23
2013	3,132,749	14	0.89	11	0.70
3-Year Total	11,089,505	45	0.81	29	0.52
Bureau of Labor Statistics (BLS 2012) average for NAICS* Code 561 (Administrative and support and waste management and remediation services)			2.6		1.5

Table 2.2 Injury Incidence / Lost Workdays Case Rate (Subcontractors)					
Calendar Year	Hours Worked	TRC	TRC Rate	DART Cases	DART Case Rate
2011	98,573	1	2.03	1	2.03
2012	52,895	0	0	0	0
20112013	33,648	0	0	0	0
3-Year Total	185,116	1	1.08	1	1.08
Bureau of Labor Statistics (BLS 2012) average for NAICS* Code 561 (Administrative and support and waste management and remediation services)			2.6		1.5

* *North American Industry Classification System*

TRC Incidence Rate, including subcontractors: 0.82
DART Rate, including subcontractors: 0.53

Conclusion

The TRC and DART rates are trending slightly downward for the past 3 years. MSA is well below the industry average even with the stress caused by the layoffs from the DOE budget decrease of the past 2 years. MSA has 11 recordable cases as of this assessment for 2014. Injury data in MSA's annual VPP reports differed from data in the Computerized Accident/Incident Reporting System (CAIRS). DOE-RL identified several medical cases in 2013 that MSA had not categorized as reportable injuries. MSA changed its hardcopy of the injury file, but did not update CAIRS or the database that it uses to calculate TRC and DART rates for the annual VPP report. MSA also included injury cases from HAMMER with the MSS data. MSA has corrected

the data and it now reflects only MSS data. TRC and DART rates for MSA 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, and implementing the guiding principles of Integrated Safety Management (ISM). The contractor must demonstrate senior-level management commitment to ISM and occupational safety and health, in general, and to meeting the expectations 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.

In 2011, the Team identified that MSA managers were clearly committed to establishing a safe and healthy work environment, ensuring workers were intimately and substantially involved in the safety and health process, and providing adequate resources. They recognized and valued the contribution of the workers in accomplishing the mission of safe, compliant customer service. MSA had implemented changes after the transition from the previous contractor that addressed previously identified trust and communication issues. At that time, the Team expected MSA would be able to make the next improvement in safety culture by addressing some latent issues with the investigation and disciplinary process and ensuring the proper application of Human Performance Improvement techniques.

Since the 2011 assessment, MSA continues to maintain a comprehensive set of internal policies and procedures that comprise the MSA Worker Safety and Health program. These policies and procedures form a comprehensive Integrated Safety Management System (ISMS) described in MSC-MP-003, Rev. 6, *Integrated Environment, Safety, and Health Management System Description.* That document describes how MSA management systems implement the guiding principles and core functions of ISM. MSA assesses and updates that program annually.

In addition to its own policies and procedures, MSA maintains the site-wide safety standards programs. These programs establish a consistent set of standards across all the Hanford contractors for a variety of safety programs to include stop work, lockout/tagout, electrical safety, digging and trenching, hoisting and rigging, respiratory protection, and beryllium. These programs ensure workers understand essential safety programs when they move from one contractor to another under workforce restructuring and site-wide seniority processes. Although MSA manages the site-wide standards, DOE-RL approves and issues the documents.

MSA managers remain committed to safe, effective performance of work as an essential element of customer service. Because MSA is a service provider to the other Hanford contractors, customer satisfaction is a major goal of all MSA managers. However, after the 2011 assessment, MSA faced several challenges, including significant budget reductions over the intervening years and protracted negotiations over the collective bargaining agreement. Budget reductions led to reorganizations, workforce restructuring, and both voluntary and involuntary reductions of force. In its desire to keep its customers (DOE and the other Hanford contractors) satisfied, MSA managers made choices and decisions without the benefit of employee involvement and did not

adequately consider the effect of those decisions on workforce morale and trust. Consequently, the 2014 Team identified significant gaps of trust within the workforce.

Although resources have been limited, MSA continues to maintain a cadre of qualified and experienced safety and health professionals. MSA deploys these personnel from a central safety and health organization to the other functional organizations within MSA. In this model, the safety and health professionals are dedicated to the groups they support, but retain the capability to request additional subject matter expertise from the safety and health organization. Workers believe this model effectively ensures appropriate subject matter experts (SME) are readily available to provide timely support to those groups.

All managers interviewed by the Team identified their open-door policy, and that employees could freely come to them to express concerns or suggestions. Some managers clearly made significant efforts to reach out to their workers, listen to their concerns, and help remove obstacles to safe, efficient work. The workforce spoke very highly of those managers. The vice-president for Environment, Safety, Health and Training (ESH&T) began meeting with the HAMTC chief stewards a few weeks prior to this assessment. The Team observed the second such meeting and was impressed with the level of dialogue. Craft personnel were generally complimentary of the vice-president for ESH&T, but not all craft personnel agreed. Similarly, the Team heard generally positive comments about the vice-president for Information Management. Finally, MSA recently hired a new Fire Department Chief who is gaining the respect of the firefighters. In these cases, the managers were making active efforts to listen to the workforce, engage their input and suggestions, and act on issues and problems.

In one case, the Team saw the Electrical Utilities Manager observing work by the electrical utilities high-voltage electricians. The manager came to the worksite to observe the job because the work was on energized equipment. The manager made a notable effort to take pictures of the workers performing the work. The manager regularly uses these opportunities to write articles on safe completion of work for internal communications. The workers were very comfortable having the manager observe work and ensure the workers could perform the work safely as planned.

Some managers, however, did not spend significant amounts of time interacting with the workforce. Most managers expressed a desire to spend more time in the field, but identified several reasons that limited their ability to do so. Some workers identified manager visits to the field as *drive bys* because the managers do not spend sufficient time with the workers. The primary reason identified was often due to the number of meetings they were required to attend. Another limitation was a lack of administrative support staff, particularly for lower level managers and field work supervisors (FWS). To support budget cuts, many administrative support personnel have been cut from the MSA organization, leaving managers and, in particular, FWSs to spend inordinate amounts of time performing tasks better suited to administrative personnel. MSA recently recognized that it had cut too far back on FWS and administrative support personnel and was working to increase their ranks. A final obstacle identified by several managers was a recent reorganization at the vice president level. Several of the vice presidents are still *learning the ropes* of their new organizations because MSA placed them in new positions to expand their personal experience base and better prepare them for future assignments. MSA has not yet adequately identified methods to increase senior managers' field visibility, and many workers expressed frustration that they rarely saw the senior managers.

The managers' inability to increase their visibility to the workforce and, in some cases, workers' perceptions that the newly assigned managers do not yet understand the work has adversely affected workers' views of how managers value their efforts and inputs. Many workers expressed concerns that raising safety issues or stopping work would lead to adverse actions by their managers, such as less desirable work assignments or establishing reduction-in-force goals that would get *troublemakers* laid off. Other manager actions appear to workers to be *job shopping* by managers to get other workers to perform a job that another worker has previously stopped. In nearly all cases reported by workers and investigated by both MSA and the Team, the manager in question made honest errors, not malicious errors. In some cases, MSA disciplined managers and supervisors, but MSA cannot disclose those instances to workers.

Employees also expressed opinions that managers did not support them when raising safety issues while working for other Hanford contractors. Workers believed that the other Hanford contractors would complain about a worker calling a stop work, and the other Hanford contractors could request that worker not return to the jobsite. In some cases, managers reported that other Hanford contractors have made such requests, but managers believed they only honored those requests if there was evidence of other disruptive influences.

Finally, opinions about safety or retaliation for raising safety issues spread very quickly throughout the workforce, further damaging workers' trust of managers. For example, the HAMTC safety representatives have been restricted from visiting MSA workers at other Hanford contractors' worksites. Many workers consider this action as retaliation because the HAMTC safety representatives were raising safety issues and stopping work. MSA managers need to find ways to spend significantly more time in the field to help counter rumors, ensure the correct basis for decisions is widely understood, and develop a relationship with the workforce based on mutual trust and respect.

Opportunity for Improvement: MSA managers need to find ways to spend significantly more time in the field to help counter rumors, ensure the correct basis for decisions is widely understood, and develop a relationship with the workforce based on mutual trust and respect.

Managers, supervisors, and workers alike do not adequately understand expectations and procedures for stopping work. DOE-0343, Rev. 3, *The Hanford Site Stop Work Procedure,* clearly establishes four conditions for stop work. The procedure does not define specific steps for resuming work other than assigning supervisors and managers the responsibility for ensuring corrective actions satisfy the worker that called a stop work. The site procedure also requires MSA to document the stop work, but allows the contractor to use its own established system. Because personnel do not adequately understand the stop work process, some actions and practices by managers and supervisors reduce employees' willingness to raise issues or stop work. For example, most workers and managers reported cases where workers would ask a question or raise an issue, only to have the supervisor ask, "Is this a stop work?" By doing so, managers and supervisors are trying to use an informal *pause* or *stepback* in order to avoid documenting a stop work. Consequently, MSA cannot refer to documented cases of stopped work to address workers' belief that *managers are ignoring stop work*. This also hinders workers that ask questions or stop work from being assured that corrective actions adequately address the issue before work resumes.

The desire by managers and supervisors to avoid documenting stop work stems from a misunderstanding and misapplication of the MSA Corrective Action Management system. That system uses an Issue Identification Form (IIF) to document and grade issues. MSA requires that supervisors or managers enter issues or findings on an IIF and track the issue to closure. That system provides a quick method to enter a *trend only* issue. MSA could use the *trend only* option for short or simple stop work events as a means to track a stop work that only lasted long enough for a worker to seek clarification of work controls. Using that system would allow MSA to gather data on frequency of stop work, understand broader systemic problems that might be creating stop work, and improve workers' trust by sharing the stop work data and emphasizing that stop work is honored and valued by managers as an opportunity to make improvements. MSA should train managers and supervisors to use the Corrective Action Management system as a means to document stop works and ensure the system does not create unnecessary administrative burden.

Opportunity for Improvement: MSA should train managers and supervisors to use the Corrective Action Management system as a means to document stop works and ensure the system does not create unnecessary administrative burden.

MSA's practices related to event investigations and factfinding meetings also detract from workers' trust and deter workers from identifying problems. When an event occurs or a worker calls a stop work, MSA will often convene a critique or factfinding meeting. Many people, including SMEs, managers, and DOE personnel, attend those meetings. The large attendance is often born of a desire to get to the solution quickly. This practice has the unintended consequence of making workers feel intimidated. In some cases, people in the factfinding meeting have actually asked why a worker calling a stop work was at the worksite. This question devalues the worker that called the stop work and makes it seem MSA is questioning the worker's integrity. Other Hanford contractors have asked similar questions. In order to restore worker trust, remove the perceived stigma, and prevent worker intimidation, MSA should limit attendance at critiques or factfinding meetings to only those people necessary to establish the facts and timeline of an event. Such a list of attendees might consist of the employees that were present when the event occurred, their union safety representative, their union steward, and a person trained in conducting factfinding meetings. MSA can hold subsequent meetings that involve the other interested personnel to determine causes and formulate corrective actions.

Opportunity for Improvement: MSA should limit attendance at critiques or factfinding meetings to only those people necessary to establish the facts and timeline of an event.

MSA manager's relationship with the HAMTC safety representatives has also suffered. Some senior managers have reduced the amount of time they spend with the HAMTC safety representatives, citing a belief that some of the HAMTC safety representatives focus more on personal agendas. This belief may have grown from the protracted bargaining agreement negotiations that concluded late in 2013. In some cases, managers held factfinding meetings for events without inviting the HAMTC safety representatives to attend. While those cases may have arisen from a simple oversight, the HAMTC safety representatives believed MSA managers intentionally excluded them. MSA managers need to regain the full trust and confidence of the HAMTC safety representatives by actively seeking HAMTC safety representatives' opinions and

ideas, continually creating opportunities for dialogue, and not waiting for the HAMTC safety representatives to come to the managers with issues.

Opportunity for Improvement: MSA managers need to regain the full trust and confidence of the HAMTC safety representatives by actively seeking HAMTC safety representatives' opinions and ideas, continually creating opportunities for dialogue, and not waiting for the HAMTC safety representatives to come to the managers with issues.

Approximately 4 months prior to this assessment, MSA finally recognized it had a significant issue with workforce trust. This issue had been building over the preceding years, but MSA did not pay attention to the indicators that an issue was developing. MSA conducted several assessments since 2012 focused on elements of Safety Conscious Work Environment (SCWE). Those assessments included an annual survey at the completion of the Hanford General Employee Training (HGET), assessments of ISM implementation, and annual DOE-VPP reports. Managers chose to focus on very high response rates to the post-HGET survey and on the percentage of *positive* responses to interview questions about safety culture during ISM implementation assessments. The ISM implementation assessments contained many comments by workers that indicated the developing trust issue, but MSA did not identify this issue in safety improvement plans (SIP) or the VPP trimester evaluations. When the former HSS conducted an outreach and awareness visit to establish a better understanding of worker awareness of their knowledge and awareness of their rights under title10, Code of Federal Regulations, part 851, W*orker Safety and Health Program,* (10 CFR 851), workers from MSA were very vocal about these issues. At that point, MSA began to act on SCWE. Actions included listening to the HAMTC safety representatives about managers' and supervisors' inappropriate reaction to stop work, job shopping, attendance at factfinding meetings or critiques, and worker concerns about exercising stop work authority. Approximately 2 months prior to this assessment, the Team received an e-mail communication from the HAMTC President, outlining a long list of concerns and stating that he did not believe MSA warranted continued recognition in DOE-VPP. A week before the assessment started, the HAMTC President sent another e-mail stating that after discussions with MSA, he believed MSA was taking appropriate actions to address the identified issues, but remained skeptical of MSA's commitment to continuing those actions after the Team's assessment. MSA needs to establish a specific list of actions that it is taking to address the HAMTC concerns, share that list with HAMTC, and ensure it does not back away from those commitments in the coming months.

Opportunity for Improvement: MSA needs to establish a specific list of actions that it is taking to address the HAMTC concerns, share that list with HAMTC, and ensure it does not back away from those commitments in the coming months.

In order to address many of the issues identified, MSA instituted an Integrated Process Improvement Forum (IPIF). This forum consists of the company vice presidents, a HAMTC Chief Steward, HAMTC safety representative, the Director of Contractor Assurance, a DOE facility representative, a Training SME, a Work Control SME, a Safety SME, an ISM Surveillance Team member, and the Chief Operating Officer who chairs the forum. The purpose of this forum is to integrate observations and findings from multiple sources and develop effective, integrated corrective actions. For the last several months, the IPIF has met on a regular basis to evaluate issues and develop integrated corrective actions. Some actions currently under

the purview of the IPIF include stop work, supervisor preparation and training, and the use of new technology for workers and supervisors in the field.

Conclusion

MSA managers remain committed to the safety and health of their workers, but a significant trust gap exists between managers and the HAMTC workforce. MSA continues to support outreach efforts to the community and gives workers the opportunity to participate in other activities that support DOE-VPP. MSA continues to seek effective reward and recognition mechanisms to acknowledge worker contributions to safety improvements. MSA should adopt its strength in customer service as it finds ways to improve managers' relationship with the workforce. By following such a model and encouraging managers to follow an approach that treats the workforce as a customer, MSA will regain the trust and support of its workers, become more effective at accomplishing its fundamental mission, and regain the trust and confidence of workers that their experiences and knowledge is a valued asset. MSA must address the workers' trust and confidence in order to fully meet the expectations for the Management Leadership tenet.

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.

In 2011, the VPP Team concluded that employee ownership was strongly rooted across the MSA organization. Employees reported that MSA managers strongly supported employee participation in safety committee activities and safety awareness campaigns and encouraged safety among employees at work and at home. Managers and employees worked together to develop lines of communication to identify and promote safety and health responsibilities and eliminate hazardous conditions.

During this review, the Team observed the Radiological Site Services' Employee Zero Accident Council (EZAC) meeting. The meeting was well attended with many positive discussions, demonstrating employee and supervisor involvement. The meeting included a well-planned agenda with visual aids. Agenda items included safety topics, SIP actions and status of log issues, recent events and safety metrics, manager recognition of survey data and commitment to actions, and pending outreach opportunities. An open forum discussion of current topics and concerns allowed participants to interact with management champions.

The Team also attended the mid-level EZAC meeting for Site Services and Interface Management and Public Works, which was well organized, and the topics and interactions of personnel were positive and valuable. In addition to the agenda above, there was a stretching activity and a discussion on topical areas of values, communications, and a presentation on skills that can have a positive impact on behaviors. One of the EZAC discussions included monitoring of vice presidents' presence in the field. During the EZAC meeting, the vice-president for Public Works recognized the extra efforts by personnel over the Labor Day weekend to repair a water line.

There were several indications that support for the EZACs is not as strong as previously observed in 2011. The Team reviewed the attendance sheet for the mid-level EZAC meeting; approximately half of the expected attendees were not present. A column on the attendance sheet indicating EZAC chair was partially completed. Additionally, an informal review comparing the EZAC chair listing to the attendance indicates that 14 of 19 chairs attended this meeting. Previous attendance sheets indicated nine of 19 chairs attended in August, and eight of 19 chairs in July. A total of 37 people attended this meeting, while only 24 attended in August, and 21 people attended in July. Five of the 19 chairs attended the August President's Zero Accident Council (PZAC) meeting. On an average, 5 of the 19 chairs attended the All Chair EZAC meetings over the past 3 months. This data lends support to the MSA VPP self-assessment determination that some chairs may not be given (or taking) the time to plan, chair, or

attend meetings, contributing to a perception that MSA does not fully support the EZAC processes or safety log resolutions. Interviews indicate that staff responsible for guiding the EZAC process are evaluating and looking for steps to improve attendance and change worker perceptions regarding the value of EZACs. While meeting minutes, actions and status are visible on bulletin boards, MSA also needs to provide additional visibility and support for the EZAC process at the working level.

Opportunity for Improvement: MSA needs to provide additional visibility and support for the EZAC process at the working level.

During this assessment, MSA provided various employee involvement metrics and survey results to the Team. In general, this information indicates mostly positive and stable or slight improvements in employee involvement measurements. Examples include VPP trimester assessments, computer survey after HGET, safety culture assessments and evaluations, and the ISMS surveillance team field observations. Safety metrics and survey results are readily available online, on bulletin boards, and presented in EZACs and other forums. However, employees interviewed have limited knowledge of results. Several employees could not describe survey efforts other than the HGET survey, the results, any actions, or positive changes resulting from those surveys or evaluations. At the management level, two managers reviewed recent survey results and aspects specific to their organizations. They are committing to take specific actions to improve employee involvement. This is a positive step when managers connect employee survey results to actions, response, and planned improvement.

Some survey data, particularly the survey after HGET, is inconsistent with the Team's field observations and interviews. Employees stated their concern that because the HGET is a computer survey their answers are traceable back to them through their computer user identification, so they provide the expected or desired answers. The VPP Core Team and EZAC chairs coordinate the selection of survey participants for the VPP trimester assessments. The intent of the process for selecting participants is to ensure a diversified set of inputs. This facilitated assessment method used can provide validated and yet anonymous results. Some employees questioned the validity of the participant selection and assessment method and therefore, the results, which only reinforced the lack of trust in some workers' opinion. The ISMS surveillance team periodically bins its interviews, observations, and field activities to safety culture by focus area. A review of this data indicates a 10 to 30 percent lower result than the survey after HGET in many areas. MSA should find alternative methods to evaluate worker perceptions that minimize bias, that workers' trust will provide anonymity, and provide consistent and usable data.

Opportunity for Improvement: MSA should find alternative methods to evaluate worker perceptions that minimize bias, that workers' trust will provide anonymity, and provide consistent and usable data.

MSA has developed and is using numerous and diverse tools and methods to communicate safety, VPP awareness, and encourage employee involvement and participation. Examples include: SIPs, safety slogans, safety sleuths-questions, VPP campaigns, safety tokens, safety starts for back-to-work meetings, EZAC bulletin boards, posters and flyers, MSA Streamline magazine, field and work area safety inspections, internal awards and recognition, MSA safety

toolbox (flippy books), Safety Store for redeeming safety awards, and safety celebrations and lunches. These tools and methods are effective for a portion of the workforce. The challenge for MSA will be to reduce the *trust gap* discussed in the Management Leadership tenet such that more employees participate, use the tools, and contribute to improving the culture.

MSA is not always effectively addressing issues entered in safety logbooks. Entries in safety logbooks reviewed by the Team varied with regard to status of corrective actions, estimated resolution, and communication with the employee. MSC-GD-50606, *Safety Logs*, dated 11/29/2011, states that after 60 days an item may be elevated to the PZAC. Some employees reported they would not use the log because they were concerned about being visible to supervisors and managers. Others stated that they do not use it because they can sometimes use other means to get an item fixed. Some employees said it would be a last resort and doubted its benefit as a tool to effect improvements. Employees indicated that MSA made a recent effort to update and close items in preparation for the VPP assessment. One log had six items over 6 months old with limited status plan, or due dates to address the issues. Two months ago, an entry addressed the lack of attention to the items and it had no status until the week of the VPP review. The Team did not see any entries that documented a stop work. MSA should evaluate the safety logbook process and either improve efforts to support it or develop another method to allow workers to document their issues and concerns effectively.

Opportunity for Improvement: MSA should evaluate the safety logbook process and either improve efforts to support it or develop another method to allow workers to document their issues and concerns effectively.

Conclusion

MSA has systems and processes to promote and encourage employee involvement. The Team observed some employees taking advantage of these tools and opportunities to foster continuous improvement. MSA should review and address issues that affect worker trust and involvement and ensure workers feel valued for their contributions toward improvement. MSA needs further attention to the Employee Involvement tenet to meet the expectations of a VPP Star 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 ISM, defining the scope of work, and identify and analyzing hazards, form the basis for a systematic approach to identifying and analyzing all hazards encountered during the course of work. The results of the analysis must be used in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that are encountered and include a system to ensure that new or newly recognized hazards are properly addressed. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of such hazards.

The hazards encountered by MSA craft employees vary from routine, low-hazard activities to high-hazard activities, such as high-voltage maintenance. MSA uses its hazard analysis process to properly analyze and control hazards and prepare comprehensive work documents or plans. MSC-PRO-079, *Job Hazard Analysis*, defines the hazard analysis process. MSC-PRO-079, *Job Hazard Analysis*, integrates and describes the proper use of three methods of hazard analysis used by MSA. The three methods are: MSC General Industrial Hazard Analysis (GHA), Craft-Specific Hazard Analysis (CSHA), and the Web-based Automated Job Hazard Analysis (AJHA). This procedure defines when and how planners should use GHA, CSHA, and AJHA for hazard identification and control selection for work activities.

MSA develops the GHA and CSHA documents to establish the control measures for hazards common to the core activities of the workers' assigned job position. The scope of the general or craft-specific hazard analysis is limited to hazards that the worker can "reasonably be expected" to recognize and know how to mitigate based on the fundamental knowledge and training requirements of their work discipline. The use of the GHA and CSHA method of hazard analysis is limited to work referred to as *skill-based* as determined in Appendix B of the procedure.

Appendix B identifies criteria for determining the job hazard analysis method and documentation requirements based on the nature of the hazards and the required level of subject matter expertise involvement. All work performed by MSA and its subcontractors is initially evaluated using the criteria in this appendix. This initial evaluation of work activities will result in a determination that either: (1) The work, including the environment where the tasks are performed, will expose the workers and the environment only to hazards that the workers can reasonably be expected to recognize and mitigate on their own, relying only on the base knowledge and training requirements of his or her craft group (skill based); or (2) The procedure uses the AJHA tool to perform the hazard analysis for all other work. Work planning documents contain the results of the initial determination for each job. The GHA or CSHA document *skill-based* work hazards and related control measures as described in section 2.2 of the procedure. MSA can also document the hazard analysis of a specific skill-based work activity using an AJHA. GHA work is typically general industrial hazards, such as ladder use, work platforms, hearing protection, eye protection, hazard communications, vapors, dusts, mists, and others. The hazard analysis procedure focuses the CSHA specifically for each craft discipline and the specific hazards that particular craft routinely encounter.

As discussed in the 2011 review, elements of MSC-PRO-079, *Job Hazard Analysis,* could benefit from continued improvements. This statement is still valid. Specifically, the Team identified some examples during the review that lacked adequate analysis that could result in potential worker exposure to hazards. In the first case, the CSHA for the fleet maintenance mechanics recommended that for chemical use, mechanics should refer to the manufacturer's material safety data sheets (MSDS). This is a common reference in hazard analysis; however, referring the craft worker to the MSDS to determine the appropriate hazard control for the hazard places the responsibility on that worker to perform the adequate hazard analysis rather than on the SME trained to make that determination. In a second example, MSA had not adequately analyzed the impact of noise exposure to workers during work at a welding shop (see Hazard Prevention and Control). Finally, MSA had not adequately analyzed the hazards associated with stacking and storing empty drums in a warehouse (see Hazard Prevention and Control). MSA needs to continue to evaluate the hazard analysis process to ensure that all hazards are analyzed and that the intent of the hazard analysis is effectively defined.

Opportunity for Improvement: MSA needs to continue to evaluate the hazard analysis process to ensure that all hazards are analyzed and that the intent of the hazard analysis is effectively defined.

MSC-PRO-079, *Job Hazard Analysis,* requires evaluation of work activities with hazards beyond skill based using the AJHA system. A specific workscope or activity may exist, which involves more significant hazards; i.e., is beyond skill based, and yet is performed routinely. The intent is to write a standing AJHA for as narrow a scope of work as practical, identify the hazards that can *reasonably be expected* to be encountered during the conduct of this work, and the specific controls necessary and sufficient to mitigate each hazard identified. MSC PRO 079, *Job Hazard Analysis,* specifically states that the intent is NOT to write a standing AJHA that includes every hazard that could possibly exist and the accompanying controls. Such an approach is NOT acceptable as it leads to "a hazard evaluation document that is not specific, is unwieldy, and therefore much less useful or acceptable for the purpose of informing the field work supervisors and workers of the hazards and controls associated with the proposed activity."

However, the Team's review of completed planned work packages containing planned AJHAs indicated some planners were still including extraneous hazard controls within the AJHA documents that did not specifically pertain to the work performed. MSA should continue to emphasize the expectation that the addition of extraneous, nonapplicable hazards and their associated controls is not beneficial to the work package or the workers' use of the package.

Opportunity for Improvement: MSA should continue to emphasize the expectation that the addition of extraneous, nonapplicable hazards and their associated controls is not beneficial to the work package or the workers' use of the package.

In an effort to improve worksite analysis since the last assessment, MSA identifies the voltage (AC and DC) to which personnel will be exposed, boundary requirements, and the personal protective equipment (PPE) necessary in order to minimize the possibility of electric shock using a shock hazard analysis and documents the results on the *Electrical Hazard Evaluation Form* (Form A-6005-738). A qualified engineer performs this incident energy analysis in accordance

with National Fire Protection Association (NFPA) 70E. MSA applies arc flash labels to the electrical equipment that detail the available incident energy based on the analysis.

During an observation of a work evolution, the Team observed workers placing arc flash labels on new equipment. The labels were included in the work package. For all 3-phase equipment, MSA performs an arc flash hazard analysis. The analysis includes a computer-based engineering analysis. The completed and documented analysis determines the arc flash protection boundary and the PPE that personnel within the arc flash protection boundary must use. MSA uses three approved methods to conduct arc flash hazard analyses and documents the analysis on the *Electrical Hazard Evaluation Form* (A-6005-738, Revision 5). This practice makes it easier for employees to adhere to the arc flash PPE requirements, wear only PPE required for the job, improves work efficiency, and prevents work delays.

MSA developed a Safety and Health Reference Information database that improves workers' and planners' access to the information contained in the beryllium assessments, chemical procurement screening, confined space hazard identification, electrical distribution equipment, employee job task analysis, fixed ladder inventory, and carcinogen control program. Work planners, workers, safety and health professionals, and job supervisors can review pertinent information for preparing planned work orders and executing the job safely. For example, the fixed ladder inventory centralizes the structural and design criteria for fixed ladders, displays pictures of the ladder and ladder tags, records the results of the last inspection, and describes if the ladder requires fall protection. The Confined Space Hazard Identification describes confined spaces by location and identification number, contains the Hanford *Confined Space Hazard Identification Form* (Form A-6005-724), and, in some cases, includes pictures of the confined space.

The Team reviewed the MSA comprehensive Industrial Hygiene Baseline Hazards Assessment (IHBHA). The document identified and described the work activities and hazards associated with the crafts' activities. The baseline hazards assessments contain a variety of elements, including facility work location and work process descriptions; potential hazards and existing controls; sampling results (past and current); hazard controls in place, including listing engineered or PPE controls; and provides a qualitative exposure rating (0-4), qualitative health effect rating (0-4), and frequency of contact with the hazard score (0-4). A sampling strategy prioritizes the urgency of sampling in the upcoming year. MSA includes all sampling information on the IHBHA Field Evaluation Form and includes that data in the industrial hygiene (IH) baseline records binder before inclusion in the site-wide IH database. Baseline data exists for 27 different disciplines and locations within the MSA infrastructure. Hazards analyzed included chemical exposures, noise, ergonomic, biological, heat stress, asbestos, lead, dust oils and lubricants, beryllium, isocyanides, radiofrequency, silica, and others.

A review of the IH baseline records binder identified four evaluations that were overdue for updates. Overdue evaluations included the heavy equipment operators' baseline hazard assessment due 01/31/14, the electrical utility operators' reassessment due 1/31/14, the crane operators' reassessment due 6/15/14, and the stores delivery teamsters' reassessment due 7/31/14. MSA should ensure the proper maintenance and execution of the sampling evaluation schedule and the performance of all required sampling per its schedule.

Opportunity for Improvement: MSA should ensure the proper maintenance and execution of the sampling evaluation schedule and the performance of all required sampling per their schedule.

MSC-PRO-409, *Industrial Hygiene Monitoring, Reporting and Records Management*, applies to the MSA electronic records generated using the MSA portal of the Site-Wide Industrial Hygiene Database (SWIHD) and the standardized forms/templates IH personnel use to document monitoring and sampling results. This includes, but is not limited to, data generated from personal, area, bulk, and surface sample collection, direct reading monitoring, and observations performed to assess employee exposures to physical, chemical, biological, and ergonomic hazards.

MSC-PRO-7652, *Safety and Health Inspection Program*, establishes the minimum requirements for conducting and documenting general hazard inspections for the workplace. The inspections identify existing and potential safety and health hazards and noncompliances with DOE-prescribed Occupational Safety and Health (OSHA) standards addressed in 29 CFR 1910, *Occupational Safety and Health Standards,* and 29 CFR 1926, *Safety and Health Regulations for Construction.*

Based on the requirements defined in MSC-PRO-7652, *Safety and Health Inspection Program*, MSA conducts regularly scheduled walkdowns ensuring that MSA inspects its facilities quarterly. Personnel conduct the inspections using the MSA *General Industry-Based Safety and Health Hazard Inspection Checklist*. The checklist covers a wide variety of potential OSHA-related safety criteria to provide *ticklers* to the assessor and to ensure a comprehensive review of safety elements. MSA uses the *General Industry Based Safety and Health Hazard Inspection Form* (Form A-6004-299 Rev 4), to augment the Building Administrator monthly Fire Protection Inspection. Only the Fire Protection Inspection portion of the checklist is completed. The Team reviewed a random sample of the completed forms retained by the Fire Marshal's office. The Team review of completed surveys indicated that the process satisfies the VPP expectation.

However, as was the case in 2011, the tracking and trending system relies on lagging indicators. While a useful tool, lagging indicators are not effective in predicting or indicating areas where minor events indicate a need for attention before a serious event occurs. In addition, MSA does not effectively use the trended data to apply additional focus on those trends to minimize similar injuries from occurring again. For example, the trending data for 2014 DART and TRC rates show that slips, trips, and falls represented 78 percent of the DART cases, and sprains and strains represented 67 percent of TRC cases. Other than discussing these issues in the Monday morning safety starts, MSA has not developed or implemented any focused safety campaigns addressing either issue. Many DOE-VPP participants have recognized the benefits of focusing additional efforts on such trends in order to reduce the continued recurrence of those injuries. MSA should consider developing and implementing focused reviews based on the trending data to reduce the recurrence of trending injuries.

Opportunity for Improvement: MSA should consider developing and implementing focused reviews based on the trending data to reduce the recurrence of trending injuries.

Conclusion

MSA has a system that provides for the analysis of hazards and developing appropriate controls from that analysis. MSA has incorporated the elements of the DOE Work Control Guidance document (i.e., GHA, CSHA, focused AJHAs), but they need to continue to refine the implementation to ensure nonapplicable hazard controls are not included in the task-specific work packages. MSA has a system that provides for tracking and trending, but needs to focus on that trended information to achieve reductions in those injuries. MSA meets the Worksite Analysis tenet for Star status within DOE-VPP.

VI. HAZARD PREVENTION AND CONTROL

The second and third core functions of ISM, 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 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 and procedures must also be followed by everyone in the workplace to prevent, control the frequency of, and reduce the severity of mishaps.

MSA employs the hierarchy of controls to reduce the hazards of the workplace. Based on lessons learned from CH2M HILL Plateau Remediation Company, Inc., another Hanford site contractor, the carpentry shop has substantially substituted the use of glue, containing methylene chloride with the ultraviolet-light-cured glue, Dymax®, to assemble Plexiglas structures. Methylene chloride, a confirmed carcinogen that required extensive hazard controls, is a component in the adhesive used for assembling Lexan structures. As part of the substitution approach, carpenters have recognized that they can build approximately 80 percent of the plastic structures with Dymax® and Plexiglas, and by not using Lexan can avoid the use of the methylene chloride glues as a result (although Lexan is available if the customer needs a stronger structure). Dymax® cures in a few minutes while the methylene chloride glue requires a few hours to cure, making the carpenters more productive while eliminating potential hazards. All gluing operations take place in the dedicated glue room with slotted exhaust ventilation to remove vapors from the worktable. The ventilation creates 45 air exchanges per hour and air sampling results for methylene chloride is below permissible exposure limits. Air sampling results, along with a discussion of the sampled operation, are written on information sheets and posted in the general area.

Shops toured by the Team demonstrated effective use of hazard controls. For example, the carpentry shop demonstrated good housekeeping with minimal dust on machines and on the floor, the dust collection system is operational, and safety guards were in place on the woodworking equipment. Engineered controls at the Sign Shop include machine guarding for cutters, nippers, and the laser sign etcher. A good practice employed at the Sign Shop is the posting of current noise assessment results near the surveyed equipment. These postings augment the *Hearing Protection Required* signs. The insulation shop uses an exhaust system to remove adhesive vapors when gluing fiberglass insulation to cloth, plastic, or metal substrate. Housekeeping is an important aspect of hazard control, and MSA facilities were generally clean and neat. The Team visited the warehouse, the sign shop, the insulation shop, the paint shop, and the fire system maintenance shop. The Team noticed all the shops are organized, walkways are easily passable, and the general areas are free of clutter.

MSA uses its experience, injuries, and events as opportunities to improve controls. For example, a Hanford Fire Department (HFD) employee recently suffered an injury while removing and installing several heavy batteries into a battery weather enclosure for a siren station. The siren stations are located throughout the Hanford site for broadcasting notifications. After evaluating the cause of the injury, HFD is researching engineered lift options for changing batteries in the field. HFD also recognized they could improve battery movement within the fire system

maintenance area and identified a commercial lifting mechanism to help move batteries inside the facility.

MSA relies on a multitude of administrative controls. The Team observed administrative controls discussed during prejob briefings for electricians, radiological control technicians (RCT), and sheet metal workers. For example, after discussing the arc flash hazard potential, electricians established an arc flash exclusion zone prior to manipulating breakers and applying lockout/tagout devices. Prior to accessing a duct for swipe sampling, the RCT communicated to colocated workers in the area to remain clear while he performed the sampling.

MSA is committed to effective application of administrative controls when appropriate. For example, MSA established an administrative control prohibiting workers from using the loading dock rollup doors as entry/exit doors using signs and training to reduce the risk of workers being hit by vehicles using the rollup doors and implemented the use of spotters to restrict pedestrian traffic during forklift operations. The result is workers remain clear of the loading docks and spotters help guide the movement of loads. Another administrative control, coordinated with the painters, craft management, and IH, limits spray paint can use to two spray cans per hour and for outdoor use only. MSA based this control on air sampling results and the operations that the painters perform. A spray paint booth handles larger spray painting operations. The *Sign Painter's Hazards Analysis,* FS-HA-SP, Rev. 2/Change A, effectively documents the analysis of hazards and lists the controls. MSA effectively employs PPE throughout the site. For example, the carpentry and sign shop use earplugs for hearing protection. Sheet metal and sign shops use leather gloves to prevent hand injuries from metal and plastic, and safety glasses are required in industrial areas for eye protection. Electrical workers used rubber gloves with a current inspection date, protective leather outer gloves, and arc flash protective clothing.

Anticipating upcoming regulatory changes to 29 CFR1910.269 (g), *Personal Protective Equipment*, the high-voltage electrical workers began purchasing the DBI SALA Exofit XP arc flash, flame-resistant harnesses several years ago. They also began purchasing the DBI SALA 6-foot Shockwave2 Nomex/Kevlar arc flash tubular web stretch, shock absorbing lanyards with the harnesses. The high-voltage electrical workers currently have approximately 25 of each device and have stayed ahead of the regulatory requirements with that forward-looking approach.

An MSA employee raised a concern to the Team that in the late fall and winter months fog or other inclement weather makes elevated equipment/barricades, such as stanchions, jersey barriers, fire hydrants, or transformers difficult to see. Many of these objects are unmarked, increasing the risk of a vehicle striking them. The worker had recommended that MSA mark these objects with reflective tape or paint to prevent injuries, events, or vehicle damage as soon as possible. MSA should evaluate controls for vehicle operation during reduced visibility conditions, as well as additional markings for obstructions.

Opportunity for Improvement: MSA should evaluate controls for vehicle operation during reduced visibility conditions, as well as additional markings for obstructions.

Empty drums in warehouse 2101M are stacked four rows high, and are usually shrink wrapped for stability of the stack. Warehouse personnel use pallets and cardboard spacers between the drums to ensure stability. Workers pull drums from the top row, and then place unbundled drums back on the top of the stack. The height and weight of the drums make them susceptible

to falling if the stack were to shift from a bump by a forklift or by material handlers working near the drums. The Team identified several examples of unbundled drums and informed a warehouse supervisor about the hazard associated with the loose drums. The associated AJHA, *(L&T) Warehousing and Stores Delivery*, SIU-1014 Rev: 8, 03/06/14, did not address the hazard associated with the storing of loose barrels on top of stacks or stipulate any controls for that hazard. Warehouse managers need to reevaluate this hazard and implement controls to ensure workers secure the loose barrels to prevent the barrels from toppling over and causing an injury.

Prejob briefings occur daily before work begins and use the graded approach of: (1) a relatively brief discussion that focuses on any changes (routine prejob brief); (2) an informal supervisor-to-worker discussion of the work scope, hazards, etc. (informal prejob brief); or (3) a formal, structured and documented meeting (formal prejob brief). MSA uses the prejob briefing to confirm readiness before authorizing the initiation of individual work activities/tasks, and provides the job participants with a collective understanding of the assigned task. Topics discussed included requirements for performing the task, hazards and necessary controls, environmental impacts, current facility conditions, emergency contingency actions, and each individual's roles and responsibilities. The Team attended several effective prejob briefings that included appropriate work hazards and controls discussions between the FWS and workers.

The Team observed another site contractor, Washington River Protection Solutions, LLC's (WRPS) workers building a Top Hat (a metal structure used to cover tank risers) outside Building 2266E for use on the tank farms. Due to workers' concern about welding fumes inside the shop, the workers decided to perform the work immediately outside of Building 2266E welding shop. The workers failed to establish an outside work boundary to prevent incidental workers from entering the work area. The work activity involved cutting, grinding, and oxygen acetylene burning and welding on large stainless steel material. The FWS and the workers did not note changes to the work order. This was a loaned labor job and WRPS was responsible for managing the work. MSA failed to communicate the requirements to WRPS to perform welding work within the shop at Building 2266E, the specifics of *Hot Work Permit Requirements,* 2013-275 Rev. 0, issued December 18, 2013, and the AJHA requirements. The workers performing the job wore earplugs provided in the shop during the hammering, redirected employees to other building entrances, but workers and supervisors did not adequately evaluate these controls, and that the work may require additional controls. The work activity required occasional hammering on the Top Hat creating impact noise and exposure to people entering the building, people in near proximity inside the building, and the welders. OSHA regulations for hearing protection establish 140 decibels (dBA) as a maximum exposure for impulse or impact noise. The Team stopped the job to allow review of the process, procedures, and hot work permit. An MSA industrial hygienist reviewed the permits, noise levels, and PPE. Later, the Fire Marshal issued a hot work permit for welding outdoors. In addition, the industrial hygienist contacted the Environmental Compliance Officer per the AJHA. MSA needs to communicate the requirements of permits and AJHAs to other contractors when the other contractors perform work in MSA facilities.

IH and safety professionals are visible and readily available to workers to discuss or analyze potential hazards in the workplace. The lead painter described that although the majority of paints used at the paint shop are water based and exposure to organic vapors is minimal, painters review the product safety data sheet (SDS) for potentially hazardous constituents. If there are unfamiliar chemicals in the paint SDS, they call IH to discuss the hazard potential. An industrial

hygienist routinely analyzes activities that require the use of solvent-based paint to determine exposure potential.

The Team attended the Hanford Site Respiratory Protection Program (HSRPP) committee meeting. HSRPP is composed of Hanford site-wide contractors and trades. They discussed several issues that include high-fit test results for respirators (approaching a 100,000 protection factor) obtained from MSA Ultra Elite respirators and the validity of such results. The committee also discussed the expected life cycle of powered air purifying respirator (PAPR) batteries. The committee is trying to develop a battery life expectancy metric that will predict the appropriate changeout of the battery before it expires. This is significant considering the potential if someone depends on a PAPR in a high-hazard activity. The committee discussed other issues and reviewed the HSRPP open action item list. The Team observed robust discussion and participation by most attendees.

There is a 1-year backlog of preventative maintenance (PM) and corrective maintenance (CM) work and the current plan is to complete the work in the next 3 years. However, the backlog is causing workers to lose confidence that management will prioritize and schedule PM work appropriately. In some cases, workers frustrated with waiting for equipment repairs have created workarounds. For example, in a hallway near the Electrical Utilities lunchroom of Building 2101M, a light fixture has been broken for over 2 years according to the manager. Electrical workers need adequate hallway lighting to review maps and work locations before they deploy to customer locations. Workers obtained a four foot fluorescent ceiling light and attached an extension cord, then ran the cord up through the ceiling to an electrical outlet in another room. The makeshift ceiling light is on the ground and leans against the wall when not in use, creating a potential hazard if a passerby accidently knocks it over. The workers built the temporary lighting solution out of frustration with the inability to get the lights repaired in this dark hallway.

In another case, the lunchroom in warehouse 2101M has a sink for warehouse employees to wash their dishes, but the water is out of service. There is no posting or other explanation telling affected employees why the faucet is out of service. Workers may have devised other workarounds to improve their work conditions. MSA needs to walk down work areas and inventory any PM or CM work that is affecting the work environment, prioritize that work accordingly, and ensure workers understand the priorities and schedule. Further, it needs to train managers and supervisors to recognize and eliminate, rather than tolerate, these workarounds.

Opportunity for Improvement: MSA needs to walk down work areas and inventory any PM or CM work that is affecting the work environment, prioritize the work, and ensure workers understand the priorities and schedule. Further, it needs to train managers and supervisors to recognize and eliminate, rather than tolerate, these workarounds.

MSA is responsible for maintaining the overall infrastructure of the Hanford site, which includes the water purification and treatment plant, potable water distribution, firefighting water, sanitary and storm water sewers, and electrical power distribution. In the past year, MSA has begun experiencing more failures of the water distribution systems, with seven water main ruptures. Additionally, audits by MSA and DOE have identified 35 specific permit violations associated with operation of water and sewer systems. These violations range from not having access to the

appropriate operation and maintenance manuals to not performing permit-required maintenance and inspections. Fire water tanks in both 200 East and 200 West areas show signs of failure, and many sewage lift and transfer stations are not operational. As previously discussed, the backlog of maintenance on facilities currently exceeds 1 year. MSA recognizes this is an untenable position to maintain and puts the other Hanford contractors, as well as DOE, at risk. MSA has developed a project plan to address the noncompliances and prioritize the maintenance backlog, but that plan depends on obtaining the necessary resources (personnel and time) to complete the work. MSA is working with DOE to identify costs to implement infrastructure upgrades that will be necessary to support the long-term waste cleanup activities.

MSA is transforming its PM program into a predictive maintenance program. MSA hired Genesis Solutions, a consulting firm, to help establish the program. The goal is to move maintenance from a reactive state; i.e., equipment is fixed after it fails, to the predictive state where measurements are taken, such as oil, structural, or vibration analysis, to indicate the condition of the equipment so it can be fixed before it fails. Ultimately, the program will enter the continuous improvement phase. MSA facilities management is spearheading this program and has identified the water, sewer, and electrical utilities maintenance for transition first into the program. As MSA learns how to transition to the predictive maintenance program as outlined in its *Maintenance Program Five-Year Plan,* HNF-56046, Revision 1, MSA will apply the conversion process to other maintenance areas.

In 2012, MSA began management of the radiological site services, which includes the radiological records program, the radiological instruments program, the internal dosimetry program, and the external dosimetry program. As MSA acquired the programs, it relocated several of the programs from Pacific Northwest National Laboratory (PNNL) (Building 318) to the Federal Building and to the old Waste Sampling and Characterization Facility laboratories (Building 6266). Although MSA handles the majority of equipment calibrations, PNNL will continue to perform the more unique calibration methods.

MSA maintains the site emergency planning and preparedness function. Every year MSA and DOE-RL work with a different contractor to conduct and evaluate an exercise. Eventually this rotation evaluates all Hanford contractors. In June 2014, PNNL conducted an exercise that involved a criticality event, evacuation of a laboratory, neutron doses, injuries, and a take-cover response. The draft report identified several findings and suggestions to improve PNNL's response and two suggestions to improve MSA's response. Additionally, the Office of Independent Oversight, within the former HSS, in a report dated November 21, 2013, reviewed Hanford's preparedness for severe NPEs and provided MSA with four findings. MSA created corrective action plans for each finding and tracked each plan to completion.

The current date of the 283West water treatment plant emergency planning hazards assessment is September 2013. The primary hazard is chlorine gas used for disinfecting drinking water. Cylinders of chlorine contain one ton of the element and pose a significant health hazard to the workforce if suddenly released to the environment. MSA maintains a drill program to test organizations, like the fire department, water utilities, emergency operation centers, and others, and to ensure proficiency in responding to chlorine gas release.

In June 2012, the HPM Corporation (HPMC) won the DOE contract to provide occupational medicine services for the entire Hanford Site, approximately 9,000 workers. HPMC has offices

in Richland, Washington, and on the Hanford site. The site occupational medicine doctor oversees the services of two doctors, four physician assistants, and a nurse practitioner. MSA case managers maintain a good working relationship with HPMC personnel on medical cases and other medical care issues, including regular case management meetings that provide a forum to discuss and clarify medical issues.

The Team attended the case managers' meeting, which included the HPMC representative, a safety professional, MSA case managers, and DOE-RL. The five case managers, each representing a different MSA work area, conducted a thorough discussion of the injuries and classified each case with a specific reference to 29 CFR 1904. One case that involved a change in treatment, eventually classified as a reportable injury, consumed most of the discussion time. Another discussion ensued on the definition of restricted work, and the group agreed that supervisors who restrict the work of employees cause the case to be redefined as restricted. DOE-RL reviewed the injury and illness reporting in April 2013 and found several injury cases had not been reported correctly, and other cases did not have the specific exemption criteria of 29 CFR 1904.5(b)(2) reference. MSA corrected both issues by revising the cases as recordable and specifying the exact exemption. Overall, the case management process ensures MSA appropriately classifies, records, and reports injuries.

Conclusion

MSA uses the hierarchy of controls, such as substitution, administrative and engineered controls, and PPE, throughout its work areas to reduce hazards and to protect workers. Work areas are generally free of clutter indicating workers place a high value on their work area and safety. MSA needs to establish a workable priority scheme for the PM and CM backlog to restore worker confidence that MSA is dedicating the resources to fix broken items and prevent workers from resorting to improvised repairs in order to fully satisfy the expectations for the Hazard Prevention and Control tenet.

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 managers' expectations and approved procedures.

In 2011, the VPP Team observed that the MSA training and qualification programs were well established to ensure that all MSA and subcontractor employees received appropriate training to recognize hazards of work environment to protect themselves and coworkers. The training process was systematic and provided requisite knowledge, skills, and abilities to perform tasks competently and safely. It applied to all employees and all aspects of MSA operations, design, procurement, construction, and support activities.

The 2011 VPP Team also observed that most of the safety and health training was provided by HAMMER. Some facility-specific safety training with unique hazards or conditions required training outside of the HAMMER facility. This observation remains current in 2014. Although HAMMER is a separate VPP participant with Star status, its training processes and programs are not part of this MSA review. MSA employees receive training via classroom instruction, computer-based training (CBT), and on-the-job training (OJT).

All new employees are required to take HGET, and the current employees must take the HGET refresher annually. The training requirements for subcontractor employees are the same as for MSA employees. In addition, experienced workers conduct OJT for new employees that require trainees to pass knowledge tests and demonstrate proficiency on the equipment. MSA continues the good practice of pairing new workers with experienced workers who act as mentors.

Managers and supervisors take the same safety and health training as workers and may receive additional training in safety, operations, and security. FWSs complete a specific training course before MSA appoints them as an FWS. As part of its recent efforts to improve the relationship between workers, supervisors, and managers, MSA is developing a leadership course for managers and supervisors that include the concepts of communication and SCWE principles.

As identified in the Employee Involvement tenet, the Monday *Safety Start* meeting helps reorient employees back to the work environment and hazards. The 2011 Team indicated that most employees regarded these weekly safety meetings as part of their safety training since these meeting served as a venue for safety topics, lessons learned, new safety procedures, and resolution of issues identified in the safety walkdowns and safety logbooks.

As noted in the 2011 review, MSA continues to use managers to prepare the training plans for new and reassigned employees using the CBT selection tool and the employees' Employee Job Task Analysis. Each department has a training coordinator who schedules the training indicated on the training plans. MSA still uses training coordinators to check the training status of employees monthly and inform the employees of the upcoming training 60 days and 30 days before the training is scheduled. In case of past due training, the manager is notified so that the employee is not assigned to jobs for which the training has expired.

The HAMMER records office maintains all of the training completion records in the Integrated Training Electronic Matrix (ITEM). In addition to ITEM, the Enterprise Learning Management (ELM) system manages training for MSA and is linked to ITEM via a Web Portal to access the training-related reports.

First line supervisors assigning potentially hazardous tasks to employees have access to the Hanford Site Worker Eligibility Tool (HSWET) to ensure that prospective employees are qualified to perform that work. HSWET serves as a one-stop tool that will display a list of worker qualifications and training, including medical clearances.

The Team observed a portion of the MSA new-hire orientation. The handouts provided to new hires includes the MSA Safety Toolbox, MSA Ethics Guide, Standards of Conduct, Reporting Employee Concerns, HPMC Employee Assistance information, Recognizing Harassment in the Work Place, information on the Time Information System, a site map, company organizational chart, and van pool information. Part of the orientation was a presentation on safety and health. It covered key people in the safety department, safety representatives from HAMTC and the Hanford Guards Union, recordable events in the past year, AJHA overview, VPP, workers' Bill of Rights, master safety rules, and a challenge to new workers to get involved with safety at their work location.

Employees interviewed indicated that their training was comprehensive and covered the information needed to identify hazards and respond to upset conditions in a safe manner. The employees interviewed were well aware of hazards, knowledgeable of controls, and properly trained for the tasks they were performing. Employees also voiced their preference for more classroom training versus CBT. Additional concerns voiced by employees centered on how they would meet training requirements with the change to the new 10 hours per day, 4-day workweek. This was a significant concern in the steward and safety manager meeting the Team attended. MSA knows about this concern and is working with HAMTC to identify acceptable solutions.

As discussed in the Worksite Analysis tenet, the trending data for 2014 DART and TRC rates show that slips, trips, and falls caused 78 percent of the DART cases, and 67 percent of TRC cases resulted from sprains and strains. The HAMMER facility has a slip simulator, which according to HAMMER is infrequently used. MSA should consider including the slip simulator as part of initial employee training.

Opportunity for Improvement: MSA should consider including the slip simulator as part of initial employee training.

MSA measures the effectiveness of its training program by reviewing training attendance numbers and course completion, assuming training was effective if the student passed the examination. This approach provides an indicator that its training is effective, but this indicator is not consistent with the Team's observations related to stop work, involvement in safety initiatives, and EZAC participation. MSA should identify better performance indicators that determine effectiveness of training by observing workers' practices and measuring perceptions in response to training.

Opportunity for Improvement: MSA should identify better performance indicators that determine effectiveness of training by observing workers' practices and measuring perceptions in response to training.

Conclusion

MSA continues to employ the training approach observed in the previous VPP review. HAMMER conducts most of the core safety and health training for MSA employees. MSA should evaluate its training needs to ensure its training meets performance expectations and take advantage of the slip simulator training at HAMMER. Employees generally are satisfied with their training. MSA meets the Safety and Health training expectations for a DOE-VPP Star participant.

VIII. CONCLUSIONS

Since completing the transition process in 2011, MSA has faced numerous challenges to the relationship between managers and the HAMTC workforce. In many cases, events and actions by managers, although well intentioned, have had the effect of significantly reducing the workers' trust. Workforce restructuring, budget reductions, and other cost saving measures have produced an environment where many workers do not feel confident exercising their stop work authority. Although they believe they would never perform work unsafely, they rely on their HAMTC safety representatives or union stewards to stop work for them. Some nonunion workers have also used this method to raise safety issues or address safety concerns. Although most managers believe they are available for workers to talk to and genuinely want to ensure safety concerns are addressed, their actions have communicated a different message to workers. MSA finally realized the problem a few months prior to this assessment and is acting to regain workers' trust, but those actions, in addition to the opportunities for improvement identified in this report, need time to mature and convince workers those actions are not just short-term commitments made to satisfy the assessment team. Therefore, the Team recommends that MSA retain DOE-VPP Star status for MSS *on condition* that it continues to pursue its improvement efforts with a verification of the effectiveness of those actions by the Team in 12-18 months, after which the Team will make a final recommendation.

Appendix A

Onsite VPP Audit Team Roster

Management

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