Mission Support Alliance, LLC
Hanford Mission Support Contract

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
September 26-October 6, 2011

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

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided, but not standardized. For this reason, on January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration (OSHA) VPP. Since its creation by OSHA in 1982, and implementation by DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. The Office of Health, Safety and Security (HSS) assumed responsibility for DOE-VPP in October 2006. HSS is expanding complex-wide contractor participation and coordinating DOE-VPP efforts with other Department functions and initiatives, such as Enforcement, Oversight, and the Integrated Safety Management System.

DOE-VPP outlines areas where DOE contractors and subcontractors can surpass compliance with DOE orders and OSHA standards. The program encourages a *stretch for excellence* through systematic approaches, which emphasize creative solutions through cooperative efforts by managers, employees, and DOE.

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

DOE contractors are not required to apply for participation in DOE-VPP. In keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, any participant may withdraw from the program at any time. DOE-VPP consists of three programs with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star program is the core of DOE-VPP. This program is aimed at truly outstanding protectors of employee safety and health. The Merit program is a steppingstone for participants that have good safety and health programs, but need time and DOE guidance to achieve true Star status. The Demonstration program, expected to be used rarely, allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Merit or Star program.

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

This report summarizes the results from the evaluation of Mission Support Alliance, LLC, during the period of September 26-October 6, 2011, and provides the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding its participation in DOE-VPP.

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ABBREVIATIONS AND ACRONYMS

AJHA	Automated Job Hazard Analysis
ARRA	American Reinvestment and Recovery Act
BLS	Bureau of Labor Statistics
dBA	Decibels
CAIRS	Computerized Accident/Incident Reporting System
CBT	Computer-Based Training
CFR	Code of Federal Regulations
CSHA	Craft-Specific Hazard Analysis
DART	Days Away, Restricted, or Transferred
DOE	Department of Energy
ELM	Enterprise Learning Management
EJTA	Employee Job Task Analysis
EZAC	Employee Zero Accident Council
FWS	Field Work Supervisor
GHA	General Industrial Hazard Analysis
HAMMER	Volpentest Hazardous Materials Management and Emergency Response Training Center
HAMTC	Hanford Atomic Metal Trades Council
HGET	Hanford General Employee Training
HPI	Human Performance Improvement
HSS	Office of Health, Safety and Security
HSWET	Hanford Site Worker Eligibility Tool
IH	Industrial Hygiene
ISMS	Integrated Safety Management System
ITEM	Integrated Training Electronic Matrix
LM/IM	Lockheed Martin Information Management
MSA	Mission Support Alliance, LLC
MSC	Mission Support Contractor
NAICS	North American Industry Classification System
OSHA	Occupational Safety and Health Administration
OJT	On-The-Job Training
PIPS	Performance Incentive Program for Safety
PPE	Personal Protective Equipment
PZAC	President’s Zero Accident Council
RL	Richland Operations Office
SAS	Safeguards and Security
Team	HSS DOE-VPP Team
TRC	Total Recordable Case
VPP	Voluntary Protection Program
VPPPA	Voluntary Protection Program Participants’ Association
WSCF	Waste Sampling and Characterization Facility

EXECUTIVE SUMMARY

Mission Support Alliance, LLC (MSA), is the Mission Support Contractor for the Department of Energy's (DOE) Hanford Site. MSA was awarded the contract in May 2009 and began transition from the previous contractor on August 24, 2009. MSA absorbed several former DOE Voluntary Protection Program (VPP) participants. In order to allow those workers to continue to fly the DOE-VPP flag, MSA entered the transitional process outlined by the Office of Health, Safety and Security (HSS). That process requires an onsite assessment by HSS within 2 years of the contractor transition. This report documents the results of that assessment and provides the HSS DOE-VPP Team's (Team) recommendation to the Chief Health, Safety and Security Officer.

MSA showed an increasing trend in Total Recordable Case and Days Away, Restricted, or Transferred case rates from 2009 to 2010, which is primarily attributed to stresses associated with organizational transition and influx of new workers under the American Reinvestment and Recovery Act. The trend in 2011 has been down significantly. Further, the severity of injuries has been significantly reduced. Overall, MSA injury rates are significantly below its comparison industry rates and fully meet the expectations for participation in DOE-VPP.

MSA managers are clearly committed to establishing a safe and healthy work environment, ensuring workers are intimately and substantially involved in the safety and health process, and ensuring adequate resources are provided. They recognize and value the contribution of the workers in accomplishing the mission of safe, compliant customer service. Changes since transition from the previous contractor have addressed previous trust and communication issues.

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

MSA has a system that provides for analysis of hazards and capturing that analysis. Employees are aware of and participate in the development of that effort. MSA has a system that provides for tracking and trending, as well as involving employees in accident/incident investigations. MSA continues to enhance and improve its systems for analysis and control of hazards. MSA has effectively incorporated engineering controls throughout its operations and continues to evaluate substitution methods to reduce worker exposures.

MSA has a well-established training and qualification program that ensures workers are appropriately trained to recognize hazards and protect themselves and coworkers. The MSA training program helps managers, supervisors, and employees understand the established safety and health policies, rules, and procedures to promote safe work practices and minimize exposure to hazards.

As a result of these observations, the Team is recommending that MSA be admitted to DOE-VPP at the Star level.

TABLE 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
MSA should review the disciplinary process and its implementation to ensure that all investigations are completed before any disciplinary measures are taken.	6
MSA should ensure that workers are intimately involved in all incident investigations and ensure that organizational and cultural influences are adequately addressed before individual discipline is implemented.	6
MSA should ensure that if HPI is used, it does not begin with the culpability matrix, but instead uses a thorough analysis of all the latent weaknesses to identify corrective actions and organizational factors, and possible process substitution or engineered controls.	6
MSA should identify specific actions they want workers to take to reduce accidents and injuries, promote awareness, and improve the safety culture, and then find ways to measure those actions as leading indicators.	7
MSA should continue working with middle managers and supervisors to ensure they are provided adequate incentives and opportunities to participate in safety improvement efforts.	8
MSA should consider discontinuing the use of the clocks displaying days since last recordable at its sites to encourage employees to report all injuries.	12
MSA should ensure AJHAs include sufficient analysis to clearly justify the subsequent control selection to the work planner and the worker.	14
MSA should ensure that workers and supervisors exhibit a questioning attitude with regard to the existence or adequacy of hazard analyses, and that all activities are covered by some form of hazard analysis.	16
MSA should ensure hazard analyses are reviewed and revised when conditions change or workers become aware of new information.	16
MSA should explore methods to track leading indicators, such as near-misses.	17
Pending the outcome of the current venting and balancing evaluation, MSA needs to ensure that the hazards controlled within the hoods are effectively controlled by the hoods.	19

MSA should continue to pursue an alternative method for analyzing beryllium samples that does not have the degrading impact that the acid digestions process presents on the current hood designs and the corresponding air-handling systems associated with those hoods.	19
MSA should evaluate upgrading the current hood designs to control the acid digestions process effects if alternative sampling methodologies cannot be identified.	19
MSA should analyze the potential exposures to workers using or transiting the area adjacent to the glue booth exhaust stack.	20
MSA should work with DOE-RL to ensure MSA gets appropriate information in a timely manner to ensure cases are correctly categorized and tracked.	21
MSA should consider a review of, and revise submittal requirements for, all of its subcontractors to assure that all the subcontractors have an EJTA prior to allowing the workers onsite.	24

I. INTRODUCTION

Mission Support Alliance, LLC (MSA), is the Mission Support Contractor (MSC) for the Department of Energy's (DOE) Hanford Site. MSA was awarded the contract in May 2009 and began transition from the previous contractor on August 24, 2009. The MSC represents a unique contract concept developed by DOE to consolidate infrastructure services across the Hanford Site in order to maximize efficiency of the ongoing environmental cleanup activities. MSA absorbed several former DOE Voluntary Protection Program (VPP) participants. Those participants include the Volpentest Hazardous Materials Management and Emergency Response Training Center (HAMMER), Site Infrastructure and Utilities (formerly Closure Services and Infrastructure), and Safeguards and Security (SAS). The change in contractor at the site also necessitated that the SAS organization be treated as a transitional participant, although changes in management structure have been minimal. The Hanford Guard Union expressed a desire that SAS remain a separate participant, and that component of MSA is addressed in a separate report. HAMMER also remains a separate participant that was reviewed in January 2011. For clarity and simplicity, this report only addresses those components of MSA not covered by HAMMER or SAS, as MSA.

In August 2008, the 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.

HSS received and reviewed the application and conducted an onsite assessment in September 2011 to determine if MSA meets DOE-VPP requirements as specified in the DOE-VPP Manual. Personnel from the Office of Worker Safety and Health Assistance and subject matter experts from across the DOE complex conducted observations and interviews as necessary to ensure all tenets of VPP were adequately reviewed.

Portions of MSA were in a Conditional Star status at the time of contract transition. Other portions of MSA were not participants in DOE-VPP. Consequently, this assessment included a review of the conditions under the previous contractor that led to the Conditional Star status. Primary issues under the previous contractor were lack of trust between workers and managers in certain parts of the organization and a resulting lack of worker participation and support.

At the time of this assessment, the portions of MSA covered by this assessment consisted of approximately 1,600 workers, supervisors, and managers. Of those 1,600 personnel, the HSS DOE-VPP Team (Team) had contact, either through work observations, walkdowns, or formal interviews, with over 200 personnel. 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

The Team conducted a review of the Occupational Safety and Health Administration (OSHA) 300 logs. Tables 2.1 and 2.2 below summarize the OSHA reportable data for MSA employees and subcontractors supporting MSA, respectively.

Table 2.1 Injury Incidence / Lost Workdays Case Rate (MSA)

Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Rate	Days Away, Restricted, Transferred (DART) Cases	DART Case Rate
2008	6,576,612	30	0.91	15	0.46
2009	3,111,788	15	0.96	6	0.39
2010	3,209,421	25	1.56	15	0.93
3-Year Total	12,897,821	70	1.09	36	0.56
Bureau of Labor Statistics (BLS-2009) average for *NAICS Code # 5612 (Facility Support Services)			4.7		2.6

Table 2.2 Injury Incidence / Lost Workdays Case Rate (Sub-Contractor)

Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART Cases	DART Case Rate
2009	34,271	0	0.00	0	0.00
2010	98,388	0	0.00	0	0.00
2011	84,999	1	2.35	1	2.35
3-Year Average	217,658	1	0.92	1	0.92
Bureau of Labor Statistics (BLS-2009) average for *NAICS Code # 2362 (Non-residential building construction)			2.9		1.3

** North American Industry Classification System*

Total Recordable Case Incidence Rate, including subcontractors: 1.08

Days Away Restricted or Transferred Rate, including subcontractors: 0.56

Conclusion

Comparison with the DOE Computerized Accident/Incident Reporting System (CAIRS) data showed that some cases in the past 2 years were reclassified (from first aid or nonoccupational to recordable) without updating CAIRS. Consequently, the numbers shown in Table 2.1 above are actually higher than the numbers reported through CAIRS. MSA showed an increasing trend in TRC and DART case rates from 2009 to 2010, which is primarily attributed to stresses associated with organizational transition and influx of new workers under the American Reinvestment and Recovery Act (ARRA). The trend in 2011 has been down significantly. Further, the severity of injuries has been significantly reduced. Overall, MSA injury rates are significantly below its comparison industry rates and fully meet the expectations for participation in DOE-VPP.

III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture. The contractor must demonstrate senior-level management commitment to occupational safety and health, in general, and to meeting the requirements of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. 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.

MSA has assembled an experienced and highly qualified management team to support the Hanford Site. They possess a wealth of experience at Hanford, other DOE sites, and commercial industry. MSA is leveraging this knowledge and experience to not only support current needs of the other Hanford contractors, but to work with the local DOE offices to project and plan for future site needs and operations and incorporate safety into its planning efforts. MSA has established a structure to work with the other Hanford contractors to ensure workers providing support to other contractors are involved in work planning efforts and are adequately protected from hazards during the course of work.

The transition process from the previous contractor to MSA began in August 2009 and was completed in October 2009. Initially, MSA had some difficulties relating to workers and helping workers complete the transition process. Many workers were concerned about workforce restructuring and their personal job security. Commitment by managers to seek a single VPP Star for the entire scope of MSA was seen as problematic by workers. Further, MSA was making other management system changes without seeking or including workers' opinions and concerns. Several months after transition was complete, MSA recognized that issues were developing between managers and the workforce. In response, MSA made several senior manager reassignments and reorganizations. As a result of those changes, communications between managers and workers have improved significantly, and workers' trust in their managers has grown.

As part of its mission, MSA develops, promulgates, and maintains all the Hanford site-wide standards. Those standards include: Lockout-Tagout; Chronic Beryllium Disease Prevention; Stop Work; Confined Space Entry; Excavating, Trenching, and Shoring; Fall Protection; Respiratory Protection; Electrical Safety; and a site-wide Industrial Hygiene Database. These site-wide programs are intended to minimize worker confusion and conflicting approaches for site workers who work in spaces or on jobs that are managed by other contractors, or that involve multiple site contractors. MSA manages the process for site-wide standards committees and uses input from all the site contractors to obtain consensus and modify the programs where necessary. Since most of the site standards have now been issued and are in use, MSA has been able to reduce the level of effort in this area, and the responsibilities have been transferred from a specific site-wide standards organization into the safety group.

In addition to the site-wide standards, MSA maintains a comprehensive set of internal policies and procedures that comprise the MSA Worker Safety and Health program. Earlier this year MSA underwent a Phase I/II Integrated Safety Management System (ISMS) verification by the DOE Richland Operations Office (RL). The ISMS verification team recommended approval, but concluded that "additional management attention and focus on maturation of the MSA ISMS is warranted, and MSA's future success is dependent on continuous/frequent self-assessment and correction to mature." MSA developed corrective action plans, and was either complete or making significant progress toward addressing the issues. As discussed later under Worksite Analysis and Hazard Prevention and Control, there remain additional opportunities to improve.

All senior managers contacted by the Team were conversant in their leadership role related to safety and echoed the company policy that safety was an essential part of mission success. They were convincing in their belief that workers must be allowed to actively participate in all aspects of the safety process. Most managers spoke very highly of the HAMTC Safety Representatives as being their most important asset in understanding and addressing workers' concerns. Similarly, most of the HAMTC Safety Representatives were complimentary of the senior managers' willingness to listen and understand workers' concerns, as well as listen to proposed solutions. The commitment and dedication of the management team was evident in the support letters signed by both HAMTC and the Hanford Guards Union, both of which acknowledged improved support from MSA for union involvement in the safety and health program.

Managers are regularly involved with the Employee Zero Accident Councils (EZAC) as champions or sponsors. They attend most EZAC meetings, but do not take over the meetings. Instead, they were observed fostering discussion, asking probing questions of workers, and finding ways to support and promote ideas from the EZAC participants.

Safety culture at the Hanford Site has been a recent topic of concern for HSS, the Defense Nuclear Facilities Safety Board, and several outside organizations. Although not centered on MSA, concerns about workers' willingness to raise safety concerns, fear by workers of retaliation or retribution for raising safety concerns, and overall willingness of the contractors to recognize and address safety culture issues have been repeated themes in reports, correspondence, and public statements by those organizations over the past year. MSA managers are keenly aware of these concerns and the additional scrutiny. In light of these concerns, the Team made special efforts to identify MSA workers that might have similar concerns or issues. Those organizations with previous history of communication difficulties or nonparticipation were of particular interest. Based on worker and manager interviews and observations, it is clear that MSA has been successful in encouraging workers to speak up, ask questions, and stop work when necessary to address safety issues, no matter how minor those issues might seem at the time. For example, the issues regarding laboratory hoods at the Waste Sampling and Characterization Facility (WSCF), discussed under Hazard Prevention and Control, were raised by a worker. Managers and workers alike agreed that MSA workers were far more likely to ask questions or stop work than their counterparts with other Hanford contractors.

Although all managers fully supported the safety program and its objectives, a small minority were having difficulty communicating that support to their workers. In a few cases, managers' actions were seen as inconsistent or contrary to the company goals. In a few other cases,

managers' were perceived by workers as disconnected from the workers. Senior leadership in MSA recognized those few cases and was working with managers to improve their skill or change their leadership style to address those workforce perceptions, open lines of communication between managers and workers, and improve the workers relationship with their managers.

One area of particular concern to the workforce was the disciplinary process. MSA has a clear disciplinary process that is intended to rehabilitate and prevent future problems, but it is not perceived as being fairly implemented by portions of the workforce. In some cases, workers believed disciplinary actions were taken before adequate investigations had been completed. In other cases, workers believe the Human Performance Improvement process (HPI) is being inappropriately applied (through the modified culpability matrix) during the discipline process to blame the worker rather than accept that in some cases there were other factors leading to the workers' error.

The Team reviewed MSC-GD-29950, *Human Performance Culpability Matrix*, in light of the concerns raised by workers. For example, in the President's Zero Accident Council (PZAC) presentation on October 2, 2011, an incident was presented where a security supervisor backed over a sign. The incident was attributed to the supervisor not performing a 360 degree walkaround prior to entering the vehicle, a behavioral error. In the presentation, the use of the culpability matrix was discussed. The conclusion of the review was that the event did not pass the substitution test, and that corrective training or intervention for the individual was required. The presentation included a note that the incident did not pass the substitution test because "Other officers in the same situation have not typically suffered the same outcome." The substitution test identified in the procedure states:

> *Substitute the individual concerned with someone else coming from the same domain of activity, possessing comparable qualifications and experience. Then ask the following question, "In the light of how events unfolded and were perceived by those involved in real time, is it likely that this new individual would have behaved any differently?" If the answer is "probably not," then apportioning blame has no material role to play other than possibly to obscure potential systemic deficiencies and blame one of the victims.*

In this case, MSA may have misapplied the substitution test by focusing on the outcome rather than the behavior. In reality, MSA has been suffering several vehicle incidents on a regular basis that may indicate an organizational tendency to not perform the walkarounds, with no intervention by peers, supervisors, or managers when those walkarounds are not performed. This would indicate the development of a "normalized deviation," an organizational weakness. The answer to the substitution test in this case could very well have been "probably not" rather than "no," and focused the team on correcting the organizational processes and management/ supervisory methods.

Another problem with the use of the culpability matrix has been the failure to identify the use of hazard removal, substitution of work methods, or development of engineered controls to eliminate the error or make the process error tolerant to avoid the outcome. These evaluations

need to be made as part of the investigation process before disciplinary corrective measures are implemented as part of establishing a just culture.

Although intended to improve identification of individual accountability, this practice has had the effect of missing organizational weaknesses and defaulting to individual blame, making workers suspicious of HPI. MSA should review the disciplinary process and its implementation to ensure that all investigations are completed before any disciplinary measures are taken. MSA should ensure that workers are intimately involved in all incident investigations and ensure that organizational and cultural influences are adequately addressed before individual discipline is implemented. Further, MSA should ensure that if HPI is used, it does not begin with the culpability matrix, but instead uses a thorough analysis of all the latent weaknesses to identify corrective actions and organizational factors, and possible process substitution or engineered controls.

Opportunity for Improvement: MSA should review the disciplinary process and its implementation to ensure that all investigations are completed before any disciplinary measures are taken.

Opportunity for Improvement: MSA should ensure that workers are intimately involved in all incident investigations and ensure that organizational and cultural influences are adequately addressed before individual discipline is implemented.

Opportunity for Improvement: MSA should ensure that if HPI is used, it does not begin with the culpability matrix, but instead uses a thorough analysis of all the latent weaknesses to identify corrective actions and organizational factors, and possible process substitution or engineered controls.

MSA provides resources to ensure safety issues are identified and addressed. Workers interviewed by the Team were very complimentary of efforts by the industrial hygiene and industrial safety staff to proactively monitor potential hazards. Safety personnel are distributed throughout the organization and were recognized by workers for their presence and involvement. MSA also provides resources to the EZAC to allow them to conduct a variety of promotional and educational activities.

Managers have provided excellent resources to encourage workers to go beyond compliance and promote safety and health excellence. Reward and recognition items are provided for promotional activities, special acts or services, and group performance. Lockheed Martin, one of the partner companies, has provided additional resources for morale and recognition for those areas not considered reimbursable under the contract. MSA has also committed resources from award fee to support other nonreimbursable activities. Team building activities have included managers taking entire work groups to Seattle for a Mariners game, and lunches for outstanding performance of mission and safety. MSA sent 31 participants to the Voluntary Protection

Program Participants' Association (VPPPA) National Conference with a focus on soft tissue injuries and methods to prevent them. Several ideas were brought back for consideration.

One issue identified in the rewards and recognition process was that quarterly group safety incentives were tied directly to TRC and DART case rates. This is contrary to recent OSHA guidance that incentives must not have the possibility of reducing employee reporting of injuries. MSA removed that criteria from the incentive award procedure before the end of this assessment and began developing other criteria that would encourage workers to take an active role in improving safety. Further, MSA committed to involving the EZACs in helping to develop those new criteria.

Some workers interviewed by the Team expressed concerns that some equipment was not always available when needed. Specific equipment mentioned included fall protection lanyards and restraints or special tools. In those cases, workers said they did not perform work until the proper equipment was available, but were concerned about the potential impression that safety was causing delays.

Managers have supported extensive efforts to reduce or remove hazards from the workplace and provide a safe working environment. Employees have been rewarded for their efforts to remove hazards from the workplace through substitution of less hazardous processes or materials. For example, the paint shop in the 200 East Area has significantly reduced hazards by reduction of spray painting and substitution of latex-based paints. Similarly, engineered controls at the 200 West water treatment facility were upgraded by installation of the Chlorotainer. Managers have also supported construction of shelters in the equipment maintenance yards, and the purchase of improved tools and equipment to perform equipment and vehicle maintenance.

The Contractor Assurance System has a number of safety performance indicators that have been agreed to with RL, but those indicators tend to be lagging indicators. Further, the indicators are primarily assessment driven and are not derived from realtime information or activities. MSA should identify specific actions they want workers to take to reduce accidents and injuries, promote awareness, and improve the safety culture, and then find ways to measure those actions as leading indicators.

Opportunity for Improvement: MSA should identify specific actions they want workers to take to reduce accidents and injuries, promote awareness, and improve the safety culture, and then find ways to measure those actions as leading indicators.

MSA has implemented some effective self-assessments that provide managers with important information. Specifically, the annual assessment conducted in connection with the VPP was effective in identifying some work groups where workers may not have been fully aware of, or supportive of, the VPP efforts. MSA used that information to develop specific awareness campaigns targeted at those work groups. The campaigns successfully raised worker awareness, but did little to improve those workers support of or participation in the VPP. These groups represented a small minority of the workforce, but MSA should continue to find ways to encourage those workers' participation.

A second process, the ISMS Surveillance Team, was originally created to assure the effectiveness of the corrective actions implementation resulting from the 2010 ISMS verification reviews. That team's reports were considered so effective that the team's scope has been extended and expanded to now ensure continuous improvement across MSA processes and programs. The team members have been trained to MSA PRO 9769, *Surveillance Process*, the MSA surveillance reporting requirements so the reports are well organized and structured. Their scope is to review work documents, observe work activities, and provide immediate mentoring and feedback to the observed workers. When issues are deemed to require corrective actions, the actions are tracked to closure on Issue Identification Forms. The Team Leader provides updates to senior managers every 2 weeks. Senior managers' responses to issues have been positive. This performance-based review process is proving to be very effective.

MSA has an opportunity to significantly improve its self-assessment process by integrating both the VPP self-assessment and the ISMS Surveillance Teams into a single process that compares performance data, employee perceptions and knowledge of safety programs, and employee participation. Finding an effective and efficient integrated assessment approach could provide a model that other DOE sites could emulate in their self-assessment processes.

In some cases, lower level managers have been recognized for their exceptional skills in managing their workforce and have been promoted within the organization. MSA has worked to cultivate and encourage exceptional managers and leaders from within the organization. In cases where middle managers may not have been fully effective in establishing the desired management climate, MSA has worked with those managers to improve their skills. MSA should continue working with middle managers and supervisors to ensure they are provided adequate incentives and opportunities to participate in safety improvement efforts.

Opportunity for Improvement: MSA should continue working with middle managers and supervisors to ensure they are provided adequate incentives and opportunities to participate in safety improvement efforts.

Conclusion

MSA managers are clearly committed to establishing a safe and healthy work environment, ensuring workers are intimately and substantially involved in the safety and health process, and ensuring adequate resources are provided. They recognize and value the contribution of the workers in accomplishing the mission of safe, compliant customer service. Changes made after the transition from the previous contractor have addressed previous trust and communication issues. MSA should be able to make the next big leap in safety culture by addressing some latent issues with the investigation and disciplinary process, and ensuring the proper application of HPI techniques. MSA clearly meets the Management Commitment tenet of VPP at the Star level.

IV. EMPLOYEE INVOLVEMENT

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

MSA employees are actively engaged in the safety and health program. The Team's review of the program documents and information collected from interviews with the employees indicated that MSA has fully empowered employees to participate in the safety and health programs. It was evident during interviews that the employees are motivated about the company's position on building a safe work environment and take home safe working habits. MSA encourages employees to participate in safety committees, safety inspections and the annual Hanford Safety Exposition. Employees are familiar with DOE-VPP and have a sense of ownership of their safety, as well as of their coworkers.

Employee ownership is manifested through involvement in a variety of safety-related programs that encourage individual and group participation. Examples include the EZAC meetings, plan-of-the-day meetings, prejob meetings, hazard assessment sessions, site walkdowns, submissions of issues in safety logbooks, and Monday morning back-to-work meetings.

MSA has an extensive network of EZACs. There are 45 EZACs, which cover 10 organizations and approximately 2,300 employees. EZACs feed into the PZAC. The PZAC meets monthly and gets reports from each of the EZACs and tracks their actions. The monthly meeting is also used to provide safety information and lessons learned from incidents, close calls, performance trends, and grant awards to individuals or teams for safety actions or contributions. Each EZAC has its own charter, which follows the minimum expectations, such as membership, keeping minutes of meetings, maintaining logs of safety suggestions, and project-specific safety awards. The EZAC members serve voluntarily. MSA is encouraging union and exempt employees to serve as chair and co-chair of EZACs. EZACs also meet monthly and keep records of meetings. There is also the North EZAC for the organizations located north of the Wye Barricade and Yakima Barricade and the South EZAC for the organizations located south of the Barricade. The North and South EZACs consist of chairs from the EZACs and hold monthly meetings to discuss safety issues.

The Team attended the PZAC, North EZAC, and the Lockheed Martin Information Management (LM/IM) EZAC meetings. The PZAC meeting consisted of awards and recognition, and several presentations, including summaries from the VPPPA National Conference, the ISMS Champions Workshop, the ISO 14001 assessment, and recent injury and illness cases. While there was little interaction by the audience, attendees clearly felt comfortable raising issues. One attendee commented on the lack of questions from the attendees regarding the injury illness investigations

and was given an opportunity to express his concern fully. His concern was that the vehicle accident investigations presented did not include a full consideration of other factors that might have contributed to the incident. Attendees agreed to follow up on this concern and report at the next meeting.

EZAC meetings observed by the Team also started with a safety topic and discussed the issues identified in the safety logbooks, and lessons learned. They also presented safety recognition awards to individuals and teams. There was good participation by the audience. One of the interesting topics discussed in the LM/IM EZAC was the use of "Ergo Suite" software, which gives the computer users two timely reminders to take a break. If the employee ignores the two break reminders, the software locks the computer and forces the employee to take a break and minimize soft tissue injuries. Ergo Suite is proprietary software of Lockheed Martin. MSA is studying the options to make it available for all of its employees. LM/IM EZAC meeting also had a presentation on ergonomics by an ergonomics specialist from CSC Hanford Occupational Health Services, which generated several questions from the audience. The North EZAC meeting had presentations on fire prevention and Automated Job Hazard Analysis (AJHA), which generated discussion from the audience.

EZAC members participate in the annual VPP self-assessment of the areas not covered by their EZACs. EZAC members also participate in the VPP awareness campaigns, such as the VPP Passport Program and traffic safety.

MSA has several employee recognition programs to encourage safety, which are administered by PZAC, EZACs, and the managers. The MSA President's Star Award is the highest award and is worth $250-$1000. It is awarded to employees who demonstrate self-sacrificing behavior to rescue others. Next is the President's Lifesaving Award for saving the life of a person by actions, such as Cardio Pulmonary Resuscitation, and is worth $150. PZAC also awards safety Honor Roll Awards to employees who have demonstrated commitment to safety through some safety significant action short of saving a life and is worth $100. Finally, PZAC awards President's Safety Team Awards to teams that have made a significant contribution to safety. These awards are worth $100 to each team member or a nonmonetary gift.

Additionally, MSA has the On-The-Spot Awards, which provide immediate recognition of safety consciousness by an employee. The On-The-Spot Awards are awarded by the EZAC and/or the managers and are worth $50 or less. On-The-Spot Awards may also be given in the form of "Safety Tokens," which are redeemable for a safety gift from the safety store. Work groups are also eligible for a small safety celebration each quarter of the year if the entire work group meets certain, standardized criteria. This portion of the safety reward program is known as "Performance Incentive Program for Safety," or PIPS.

As a part of the VPP Awareness Campaign, the company conducted the MSA VPP Passport Program. The employees were required to undertake 20 of the 30 activities and have them signed by their supervisor and EZAC to complete the VPP Passport. The activities included a variety of topics to encourage employees to learn about DOE-VPP. The Passport activities included participating in work area inspection, discussing the stop-work process with coworkers, presenting a safety topic at a safety meeting, browsing the MSA VPP homepage and discussing the information found on it with a coworker or supervisor, attending a project safety or EZAC

meeting and discussing it with a coworker or supervisor, participating in development of an AJHA or reviewing an AJHA prior to start of a job, studying the VPP section in the "Employee Guide to the ISMS," discussing the MSA Injury/Illness Reporting process with the immediate supervisor, discussing one of the five VPP tenets with the immediate supervisor, providing the immediate supervisor with an example of how the employee will take ownership of his/her and coworker safety, participating in an accident, incident or near-miss investigation, and reviewing the Hanford Worker's Bill of Rights. The activities were designed to go beyond reading and included discussion with coworkers and supervisors to promote better understanding of VPP. Upon completion of the Passport, the employees had the option of choosing a jacket, MP3 player, or a digital picture frame as a reward. The program was quite successful, with 1,425 employees choosing to participate.

In addition to PZAC and EZACs, MSA has several other safety committees. The ISMS/VPP Steering Committee guides the MSA ISMS, VPP, and Safety Culture committees and recommends programmatic changes. It also verifies the completeness of these programs across the entire MSA. The Traffic Safety Enhancement Committee promotes "Safe Driving" through a driver awareness video that employees are required to view, evaluating traffic/vehicle issues, and making recommendations to DOE regarding Hanford Site decisions and funding. The Soft Tissue Injury Reduction Committee develops initiatives that address soft tissue injuries. The AJHA User's Group represents the AJHA users and provides an avenue to address the problems experienced during field work with the AJHA software. The ISMS Surveillance Team, developed during the ISMS Phase II activities, provides immediate response to workers and field supervisors and supports independent evaluations on an as-needed basis.

Safety logbooks are one of the primary means for employees to raise and document safety concerns and issues. The safety logbooks were seen in all areas visited by the Team. Review of the logbooks showed that the issues identified in it were closed in a timely manner and the employees raising them were informed of the actions taken. The employees interviewed indicated that their methods of raising a safety concern were to contact their supervisor, contact their EZAC representative, or note it in the safety logbooks. In addition to the safety logbooks, the charters of EZACs, minutes of EZAC meetings, Safety Improvement Plans, Hanford Worker's Bill of Rights, and injury/illness statistics were posted in most areas visited by the Team.

MSA has provided excellent safety and health information through its internal Web site. A wide variety of timely and pertinent topics are covered and available to workers to review and share. Workers are provided terminals in lunchrooms and office spaces where they can access this information. Unfortunately, many workers interviewed by the Team either were not aware of these resources or chose not to review them on a regular basis.

Based on employee interviews, it was clear that employees understood their rights under title 10, Code of Federal Regulations (CFR), part 851 (10 CFR 851), to take timeout or stop-work if they saw a situation involving an imminent danger to themselves or others. They also understood this authority was a responsibility and stated that they would not hesitate to exercise it without fear of reprisal. The employees also stated that they would report all injuries to their supervisors regardless of how minor the injuries were. They acknowledged that MSA looks very unfavorably on late reporting or nonreporting of injuries and stated that they were

likely to get into trouble for not reporting injuries promptly to their supervisors. Another practice observed by the Team in some locations was the use of clocks in a few areas indicating the time (days, hours, and minutes) since the last recordable injury. Those clocks provide a continuous count, and are highly visible in those locations where workers take breaks, eat their lunches, or attend prejob briefs. Although no specific awards are associated with the clocks, workers may feel a sense of pride in the length of time since the last injury, and some workers might feel uncomfortable about being responsible for resetting the clock to zero. Although not a strong disincentive, MSA should consider removing those clocks from the workspaces and lunchrooms to remove any appearance of disincentives to reporting.

Opportunity for Improvement: MSA should consider discontinuing the use of the clocks displaying days since last recordable at its sites to encourage employees to report all injuries.

Employees at all levels believe a positive and safe work environment exists in the office, and field environment, including construction. The office workers, as well as the craftsmen, indicated they are comfortable raising safety and health concerns to their supervisors and managers. Employees also indicated that they participate in the resolution of the concerns they raise. All employees interviewed by the Team were candid and expressed their opinion freely.

Conclusion

Employee ownership is strongly rooted across the MSA organization. Employees have reported that MSA managers have strongly supported the employee participation in safety committee activities and safety awareness campaigns and encouraged safety among employees at work and at home. Managers and employees have worked together to develop lines of communication to identify and promote safety and health responsibilities and eliminate hazardous conditions. MSA meets the requirements of the Employee Involvement tenet of DOE-VPP at the Star level.

V. WORKSITE ANALYSIS

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

The hazards encountered by MSA employees are varied and cover the spectrum from routine low-hazard tasks to high-voltage maintenance. MSA uses a systematic process to prepare comprehensive work documents or plans to assure the hazards are understood and adequately controlled to prevent harm to the workers. At the heart of the process is MSC-PRO-079, *Job Hazard Analysis.* MSC-PRO-079 integrates the *MSC General Industrial Hazard Analysis* (GHA), *Craft-Specific Hazard Analysis (CSHA)* and the Web-based AJHA. This procedure defines when and how the GHA, CSHA, and AJHA should be used for hazard identification and control selection for work activities. GHA covers typical industrial hazards encountered by the workforce. Typically, these are general industrial hazards, such as ladder use, work platforms, hearing protection, eye protection, hazard communications, vapors, dusts, mists, and others. The CSHA is specifically focused at each craft and the specific hazards that particular craft routinely encounters. For example, pipefitters may encounter heated surfaces when welding or sweating pipe, eye hazards from welding or grinding, chemical adhesives connecting PVC piping, electrical or structural obstructions during the installation of piping, overhead loads, elevated work, or lifting heavy objects, such as pumps. MSC-PRO-079 also contains an Appendix C, which applies to subcontractor construction activities that are managed by MSA. Associated with the Web-based tool, MSC-GD-17132, *Job Hazard Analysis Process Guide*, is used to help the team preparing the AJHA follow the process and ensure the input is useful to the worker.

MSC-PRO-079 has evolved over the years with improvements and enhancements. One of the enhancements was the addition of a section to capture the analysis logic that validates the control selection is applicable to the hazard encountered by the worker during the performance of a particular task under specific conditions. This is a major step in the right direction in that it ensures corporate memory is preserved and transferred to new workers.

The next step in the evolution of MSC-PRO-079 is to assure the documented analysis is of sufficient quality and captures the basis of the controls to be useful. The Team encountered numerous examples of analysis that was missing, minimal, incomplete, or simply stated “contact industrial hygiene.” For example, MSA has a regulated “Guzzler Truck” that is utilized in radiologically controlled areas to remove contaminated dirt and debris. This unit is a very large, truck-mounted vacuum cleaner. The vacuum unit is noisy and sound survey data by MSA indicates sound pressure levels exceed 85 Decibels (dBA). The controls section describes the operation as a significant noise hazard and establishes a 50-foot boundary as a control for hearing protection.

The analysis section does not include a reference to the sound surveys. In addition to the regulated vehicle for use in contaminated areas, MSA has an unregulated guzzler for use in noncontaminated areas, with the same 50 feet restriction. The Team contacted the preparer of the AJHA to determine if there was data that could be added to substantiate the 50-foot boundary. The preparer indicated the boundary was not established for noise, but for flying debris created during guzzler operation. The boundary requires that personnel entering the controlled area be trained and qualified prior to entry. This hazard analysis for the flying debris was not found in the AJHA for guzzler operations.

In another AJHA that addressed the operation of a diesel generator, the control section in the AJHA called out a requirement for workers to use hearing protection as posted. The area was posted as requiring hearing protection, and the AJHA indicated that noise levels were above 85 dBA. MSA could not find any noise survey information that supported the noise level determinations.

The Team reviewed an AJHA for disconnecting abandoned telecommunication cables. MSA planned to use a bucket truck to reach the cables. Two discussions in the AJHA address fall protection issues associated with working from the bucket above 6 feet. Controls identified are required training (*Fall Hazard Recognition and Prevention Course* and *Fall Protection PFAS USERS course)*. The specifics relating to approved equipment and the approved tie off points were not addressed in the AJHA. The AJHA also identified heat stress as a hazard, but simply referenced "contact IH prior to start of work" as the control. In this case, the Industrial Hygiene (IH) personnel should have been contacted during the AJHA development process to provide additional analysis of the heat stress potential for the work, and identified specific conditions under which the heat stress procedure should be initiated.

For environmental surveillance, two AJHAs addressing environmental surveillance and sampling were compared. Both addressed the use of firearms for collection of animals and the noise hazard associated with their use. One AJHA specified hearing protection with a noise reduction rating of 33 dBA. The other AJHA specified that employees shall wear hearing protection to reduce noise to a minimum of 85 dBA. These control recommendations are unsupported by any analysis in the AJHA. OSHA regulations for hearing protection establish 140 dBA as a maximum exposure for impulse or impact noise. The noise levels a person may be exposed to as a result of firearms discharge can vary widely depending on type of weapon, type of ammunition, and the conditions under which the firearm is used (indoors, outdoors, within a shooting blind, etc.). In some cases, firearms discharge might exceed levels in which 33 dBA reductions would not be sufficient. Wearing hearing protection that would reduce a 140 dBA exposure to 85 dBA would significantly limit the individual's ability to hear anything else, creating an additional risk.

Opportunity for Improvement: MSA should ensure AJHAs include sufficient analysis to clearly justify the subsequent control selection to the work planner and the worker.

In a few cases, some workers still prefer to rely on an expert-based approach to work control, rather than using the existing systems to document and analyze hazards. For example, the Electric Utilities group is staffed with highly qualified, high-voltage electricians with extensive

experience. However, interviews with the electricians demonstrated their tendency to rely on their expertise and collective knowledge rather than capture their knowledge in a formal work control process for proper analysis and resolution.

Recently, three switching station metering knife switches at the A-6 Substation were discovered to be wired backwards. The A-B-C phase voltage was still energized even though the switches indicated open position. The electricians acknowledged the anomaly but did not believe any further action was required. The electricians reasoned that they are the only electricians that work in that controlled area; therefore, there was no need to either correct the anomaly or post a warning. The responsible system engineer who was present at the discovery insisted the incorrectly wired switches needed to be corrected and instructed the electricians to submit the issue in their safety logbook. Electricians interviewed by the Team indicated a hesitancy to use the safety logbook, but made the entry anyway. When their manager observed the logbook entry regarding the switches, he immediately confirmed to the workers that any abnormal condition needed to be clearly posted until it is resolved. As a result, a tag was posted identifying the anomaly and planning is underway to correct the problem.

Another issue at the A-6 Substation is related to induced voltages in deenergized equipment. Induced voltage in deenergized components is a normal hazard in high-voltage equipment. Consequently, national standards for grounding of deenergized components have been established and high-voltage electricians follow standard work practices to prevent worker exposure. In the A-6 Substation, workers have identified voltages up to 2,000 volts on deenergized equipment during isolation operations. Also, the perimeter lighting around the A-6 Substation has been observed "powering up" even after power had been isolated during maintenance operations. Electricians believe that some high-voltage equipment may not be properly grounded and may be preventing induced voltages from being bled off to ground. At the time of the review, Western Electrical Services was conducting ground grid testing at the A-6 Substation to attempt to identify potential causes and initial results identified some grounds with high resistance. Although known by workers and their supervisors, these issues were not captured in the issues management process, and no additional hazard analysis was being included in work packages for the A-6 Substation to address the potential increased risk.

MSA has not performed a documented hazard analysis that covers movement of heavy equipment and other rolling stock. MSA could not identify or provide a standing job hazard analysis, AJHA, CSHA, or demonstrate that this activity was covered by the GHA. Although drivers and equipment operators were observed to be cautious and aware of their surroundings and operated the equipment in a safe manner, the Team observed that some additional controls may be warranted. For example, although drivers and operators were aware that spotters could be used when backing up, they are rarely, if ever, used. In some cases, equipment is backed up in situations where moving too far can put the equipment or driver at risk, such as when backing sewage trucks to dump them in the sewage lagoon. The only engineered control at the lagoon was a railroad tie that could have been easily crossed by the truck. In those cases, MSA might have identified additional or more effective engineered controls by using a documented hazard analysis.

Opportunity for Improvement: MSA should ensure that workers and supervisors exhibit a questioning attitude with regard to the existence or adequacy of hazard analyses, and that all activities are covered by some form of hazard analysis.

Opportunity for Improvement: MSA should ensure hazard analyses are reviewed and revised when conditions change or workers become aware of new information.

The Team attended the Hanford Site-wide Beryllium Working Group meeting. This working group is made up of safety professionals and bargaining unit employees across the Hanford Site. A representative from MSA is the facilitator for the working group. This working group is tasked with developing the Beryllium Program for the site for use by all Hanford Site contractors. Some of the deliverables include baseline inventories, data management, exposure monitoring, periodic sampling, beryllium work permits, employee notifications, orientation, training, Employee Job Task Analyses (EJTA) for beryllium workers, tracking systems for Beryllium workers, work planning and control for beryllium work, and medical surveillance. There was active participation by the membership on activities and schedule of deliverables. The overall impression was that the group is dedicated and trying to ensure that the deliverables are adequate and meet the expectations for completeness and usability for the site. Although the progress is slow, the goal is to achieve consensus and do it right the first time. Discussion topics during this meeting included the training modules for beryllium workers, industrial hygienists, and supervisors. Other topics discussed included Baseline Beryllium Inventory, the Beryllium Web site, beryllium permit, and beryllium characterization. The Team was provided the "Beryllium Product Development Deliverables/Criteria/Expectations" document that contains the Corrective Action Plan work breakdown structure with product descriptions. The approach is documented and understood by the working group with support from all site contractors to achieve a usable process that addresses the hazards and provides controls for exposures.

MSA conducts regularly scheduled walkdowns of job sites such that the worksites managed by MSA are covered quarterly. As a means of expanding employee involvement and awareness, workers are actually assigned to the walkdown team. Inexperienced workers are teamed with more experienced personnel, including managers and safety professionals, to help them learn what to look for during the walkdowns. This practice enhances worker knowledge and ownership and empowers the workforce to take ownership of safety.

MSA has a process to address upsets and accidents. The process is contained in MSC-PRO-077, *Reporting, Investigating, and Managing Health Safety and Property/Vehicle Events*. The Management Leadership section has more information relating to this process.

MSA tracks and trends a variety of information, such as budget, radiological exposures, chemical exposures, deliverables, contractual commitments, safety issues, and other items. The accident injury rates are tracked and trended to indicate any adverse trends or similar issues that may escalate into an adverse cultural shift. Currently, 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.

For example, near-misses in a particular area may be a leading indicator of a process flaw that if left uncorrected could lead to a serious injury. One of the opportunities that MSA might consider for improvement would be to identify leading indicators to avoid upsets or accidents.

Opportunity for Improvement: MSA should explore methods to track leading indicators, such as near-misses.

Conclusion

MSA has a system that provides for analysis of hazards and capturing that analysis, but that system is not always effectively used to document the analysis. Employees are aware of and participate in hazard analysis. MSA has a system that provides for tracking and trending, as well as involving employees in accident incident investigations. MSA continues to enhance and improve its systems for analysis and control of hazards. The opportunities for improvement offered in this section should be considered by MSA to take the next step toward excellence. MSA meets the Worksite Analysis tenet for Star status within DOE-VPP.

VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (by substitution or changing work methods) or addressed by the implementation of effective controls (engineered controls, administrative controls, or Personal Protective Equipment (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 has effectively incorporated engineered controls throughout its operations to minimize worker exposure, prevent the spreading of contamination, and reduce the need for additional PPE. For example, facility ventilation systems are employed in the fleet heavy equipment maintenance, carpenters, and welding shops to limit worker exposure to exhaust by-products. Based on carpenter employee suggestions, a new glue booth was designed and installed in the carpenters shop to remove the glue off gassing from the shop environment. In addition, the carpentry shop continues to use the "Stop Saw." This saw, which is used for precise cutting of large sheets of plywood and plexi-glass, includes a sensor and braking system, which can detect the presence of nonwood objects near the blade and stop the saw within 5 milliseconds.

MSA has installed "Chlorotainers" for chlorine storage at the water treatment facility. The Chlorotainers are engineered containment vessels for chlorine cylinders. This "passive mitigation system" is approved by the Environmental Protection Agency for reducing offsite consequences in the event of a chlorine leak. In addition, MSA has required that all chlorine deliveries are scheduled for "Off Fridays and Saturdays," reducing potential exposures to employees in the event of a leak during transfer activities.

MSA has utilized the substitution method to eliminate hazards where possible. Extensive efforts were noted to substitute or eliminate harmful chemicals in the MSA paint shop and replacing them with low-hazard paints and coatings.

Identification and posting of PPE requirements in the MSA shops have significantly improved since the previous VPP review. The shop postings now require the use of required PPE (safety glasses and steel-toe boots) during working hours, as well as when the shop equipment was in use. The new posting requirements have effectively addressed the issues the shops experienced previously when personnel entered the shop with no equipment in use, but were not in proper PPE when equipment was then utilized.

While the majority of hazard controls were observed to be effective, some weaknesses were identified at the WSCF laboratory that requires further consideration by MSA. For example, the current mission at the WSCF laboratory has expanded to require the analysis of beryllium through a nitric acid digestion process. The WSCF hoods are not designed to effectively perform this type of process. During the nitric acid digestion process, significant amounts of nitric acid condensate have been observed "raining" down the face of the baffles. Within the past year and a half, this process has resulted in significant degradation of the hoods being used for this process. WSCF is evaluating changing the sampling method from digestion to using "hotblocks"

to reduce the nitric acid condensate; however, there is no control in place to neutralize acid vapors and prevent degradation of the hoods or ventilation ducts. If the "hotblocks" process does not prove to be an effective alternative, WSCF needs to evaluate upgrading the current hood design to address the nitric acid degradation of the hood components.

In addition, the baffle draft hoods have demonstrated problems with maintaining proper ventilation flow rates due to venting and balancing issues and work products and instruments blocking the baffle entrance in the back of the hood. The concern regarding the effectiveness of the flow rates had been developing over the past several months prior to this review. It began when workers commented about the continuous presence of chemical odors in the laboratories during operations. Chemical odors should not normally be occurring if the hoods are functioning as designed. WSCF engineers reevaluated the airflow testing criteria and decided a more comprehensive method was necessary. Using the new testing criteria, the majority of the hoods failed to pass airflow testing and was taken out of service until venting and balancing could correct the issue. A panel of workers, engineers, and outside experts has been established to correct the issues, but MSA should ensure that underlying issues that led to this condition are adequately addressed (e.g., inadequate hood configuration control, inadequate testing standards, ventilation system maintenance, and hazard analyses associated with hood changes and new processes).

Opportunity for Improvement: Pending the outcome of the current venting and balancing evaluation, MSA needs to ensure that the hazards controlled within the hoods are effectively controlled by the hoods.

Opportunity for Improvement: MSA should continue to pursue an alternative method for analyzing beryllium samples that does not have the degrading impact that the acid digestions process presents on the current hood designs and the corresponding air-handling systems associated with those hoods.

Opportunity for Improvement: MSA should evaluate upgrading the current hood designs to control the acid digestions process effects if alternative sampling methodologies cannot be identified.

In one case identified by the Team, MSA did not adequately evaluate the potential residual exposures resulting from a new engineered control. The glue booth in the carpenters shop (previously discussed) is not scrubbed or treated, but simply vented to the outside through a 12-foot stack at the rear of the 2266 E carpenter shop. The stack is located within 15 feet of an established smoking area. Although the efforts to control and exhaust the glue vapors away from workers in the shop is commendable, MSA did not analyze the potential exposure to workers outside the shop as a result of the new control.

Opportunity for Improvement: MSA should analyze the potential exposures to workers using or transiting the area adjacent to the glue booth exhaust stack.

The MSA safety organization is staffed with numerous IH, Health Physics, Certified Safety Professional and other safety professionals. All safety professionals are matrixed into the field to provide closer support to designated organizations. Work observations and interviews by the Team showed consistent support of the safety professionals and improved availability due to their placement on site.

MSA effectively uses PPE as the final protection level for hazards that engineered controls, substitution and administrative controls could not mitigate. In nearly all Team observations, workers were observed wearing the appropriate PPE, and the PPE was appropriate for the hazards encountered. However, document reviews identified examples of conflicting PPE requirements specified in the AJHAs for similar work activities. For example, SIU-1070, *Biological Control Herbicide Application/Vegetation Management*, does not require long-sleeved clothing, but SIU-1141, *Biological Control Herbicide Application using the Nitro Truck*, with identical chemicals does require long-sleeved shirts as a control for the herbicide. This inconsistency in identifying and capturing hazard controls reflects a tendency for MSA to continue to rely on an expert-based approach to work planning and, in particular, hazard analysis and controls. This issue is addressed in detail in the Worksite Analysis section of the report.

MSA electricians identified concerns with the MSA vendor responsible for the laundering Arc flash-resistant/fire-resistant clothing. The laundry vendor is required by contract to repair damaged clothing or recommend replacement if the damage cannot be repaired. The process requires workers to pin a note to the damaged clothing identifying the damage. Workers expressed concern that the vendor was not always responsive and simply laundered and returned damaged clothing.

MSA has made good progress in trying to reduce soft tissue injuries by providing time and opportunity for workers to participate in stretch and flex exercises and making workstations ergonomically safe. Many of the workers reported that they perform stretch and flex exercises daily, sometimes in a group setting. MSA has encouraged its employees to seek ergonomic evaluation of their workstations by ergonomic specialists and, in some cases, had performed the ergonomic evaluation before an employee is assigned to a new workstation. Most of the employees interviewed reported that ergonomic evaluation of their workstations was conducted and appropriate modifications to the workstations were made, including purchase of ergonomically designed furniture.

MSA has a preventive maintenance program in place to ensure equipment operates properly, as well as mitigate potential safety issues. For example, service vehicles are maintained by the fleet repair facility based on established General Services Administration mileage requirements. Infrastructure equipment, such as pumps, fans, electrical components or air-conditioning systems, are maintained by MSA crafts to vendor-determined specifications and life-cycle requirements.

As the site support contractor, MSA maintains the emergency planning and preparedness function. MSA works closely with RL to maintain a state-of-the-art emergency operations center that supports RL, the local emergency response organization, and the local and State governments. Annual full participation exercises are conducted and evaluated by RL and used to identify issues and make improvements. The most recent exercise was conducted June 16, 2011, and identified three findings, along with several strengths and other suggested improvements. An assessment by RL of MSA's Emergency Preparedness Program conducted between May 4 and June 30, 2011, had no findings, two strengths, and three suggestions, and determined that MSA's Emergency Preparedness program was satisfactory.

MSA employees are knowledgeable of appropriate response to emergencies as a result of annual Hanford General Employee Training (HGET), postings in all major facilities, and documentation, such as the Health and Safety Plans.

The MSA Radiation Protection program is responsible for site surveillance and monitoring of mostly outside areas (tumbleweeds, animals, etc.) and control of MSA's two radiological facilities (WSCF and B Reactor). All other facilities are controlled by other site contractors. Interviews with both the radiological protection managers and radiological technicians demonstrated satisfaction with resources and support.

The majority of the MSA employees are Rad Worker II trained and participate in the Thermo Luminescent Dosimetry monitoring program.

CSC Hanford Occupational Health Services is the DOE contracted site medical provider and provides the occupational medical program for MSA employees. CSC Hanford Occupational Health Services is directly contracted by RL. In a recent change by RL, CSC Hanford Occupational Health Services is prohibited by contract to provide treatment beyond first aid. Further medical treatment is referred to private providers in town, but referrals cannot be specific. In addition, the workers compensation program does not facilitate MSA or CSC Hanford Occupational Health Services obtaining necessary information concerning injuries, including those that are work-related. These changes have resulted in significant case management issues for MSA.

The Team attended an MSA case management meeting in which MSA personnel revealed that due to the lack of a clear reporting structure with private medical providers, they were unable to obtain timely information for categorization of injuries. One case involved a worker who was injured 3 months ago and just returned from surgery; however, MSA knew nothing of the surgery or other necessary details of the treatment. MSA should work with RL to ensure MSA gets appropriate information in a timely manner to ensure cases are correctly categorized and tracked.

Opportunity for Improvement: MSA should work with DOE-RL to ensure MSA gets appropriate information in a timely manner to ensure cases are correctly categorized and tracked.

The site Employee Job Task Analysis (EJTA) is used to clearly define an individual's work tasks and then define that person's training and medical surveillance requirements. The Industrial Hygienist works with the person and their supervisor to prepare the EJTA program and performs an annual assessment of the status of EJTAs as part of the Safety Improvement Plan. Job activities requiring medical surveillance are scheduled for evaluation by CSC Hanford Occupational Health Services, which uses the EJTA information to guide medical surveillance and monitoring. Use of EJTA is a key avenue that MSA coordinates with CSC Hanford Occupational Health Services medical monitoring and surveillance.

Conclusion

MSA has effectively incorporated engineering controls throughout its operations and continues to evaluate substitution methods to reduce worker exposures. However, some weaknesses in hazard control were identified by the Team for MSA to consider improving its hazard control process. MSA satisfies the requirements for the Hazard Prevention and Control tenet for Star status in DOE-VPP.

VII. SAFETY AND HEALTH TRAINING

Managers, supervisors, and employees must know and understand the policies, rules, and procedures established to prevent exposure to hazards. Training for health and safety must ensure that responsibilities are understood, personnel recognize hazards they may encounter, and they are capable of acting in accordance with managers' expectations and approved procedures. MSA training and qualification programs are well-established to ensure that all MSA and subcontractor employees receive appropriate training to recognize hazards of work environment to protect themselves and coworkers. The training process is systematic and provides requisite knowledge, skills and abilities to perform tasks competently and safely. It applies to all employees and all aspects of MSA operations, design, procurement, construction, and support activities.

Most of the safety and health training is provided by HAMMER. It should be noted that HAMMER is a separate DOE-VPP Star site and its training activities were not a part of this assessment. The safety and health training consists of classroom training, 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. Several members of the Team took HGET and concluded that it covered safety and health training comprehensively and provided sufficient description of ISMS and VPP. The training requirements for subcontractor employees are the same as for MSA employees.

OJT is provided by experienced workers and requires the trainees to pass knowledge tests and demonstrate proficiency on the equipment. Additionally, workers are provided information about the site-specific hazards and controls by the supervisors and the safety and health professionals. MSA has a good practice of pairing new workers with experienced workers who act as mentors. New employees have about 6 weeks of training before they are permitted to perform work at a site.

Managers and supervisors take all of safety and health training and may receive additional training in safety, operations, and security. Field work supervisors (FWS) complete a specific training course before being appointed as an FWS.

Each Monday at the start of the work week, MSA requires all employees to attend a "Safety Start" meeting. Most employees regard these weekly safety meetings as part of their safety training since these meeting serve as a venue for safety topics, lessons learned, new safety procedures, and resolution of issues identified in the safety walkdowns and safety logbooks.

The managers prepare the training plans for new and reassigned employees using the CBT selection tool and the employees' EJTA. The EJTA and employee training plans are updated annually. Each department has a training coordinator who schedules the training indicated on the training plans. The training coordinators 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.

All of the training completion records are maintained by the HAMMER records office in the Integrated Training Electronic Matrix (ITEM). In addition to the managers and training coordinators, the employees have access to their training records. Enterprise Learning Management (ELM) is MSA's new system to manage training for MSA and is linked to ITEM via a Web Portal to access the training-related reports. Many of the employees were able to demonstrate access to their training records. Some employees and managers were not fully conversant with the ELM system, but were able to get the training information from the training coordinators. The Team reviewed the training records and EJTA for several departments of MSA and Lockheed Martin, as well as subcontractor employees. Most of the training records were current. However, the subcontractor FWS at one location was not clear what group would need training or an EJTA. In this case, several employees were found to be working for a number of days without a medical evaluation.

Opportunity for Improvement: MSA should consider a review of, and revise submittal requirements for, all of its subcontractors to assure that all the subcontractors have an EJTA prior to allowing the workers onsite.

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, given the user's selection of job criteria, display a list of workers meeting those criteria. Among the qualifications are medical clearances and completion of appropriate training.

The Team observed a portion of the new-hire orientation. A senior manager welcomed the group and emphasized working safely, reporting all injuries, and the right to stop work. The safety briefing included a detailed explanation of VPP, ISMS, and the Hanford Workers Bill of Rights. The safety presentation emphasized the role of EZACs and safety logbooks as means of identifying the safety issues.

A review of the training documentation and interviews with employees indicated that their training is being carried out in a thorough and systematic manner. The employees interviewed were well aware of hazards, knowledgeable of controls, and properly trained for the tasks they were performing.

Conclusion

MSA has a well-established training and qualification program that ensures workers are appropriately trained to recognize hazards and protect themselves and coworkers. The MSA training program helps managers, supervisors, and employees understand the established safety and health policies, rules, and procedures to promote safe work practices and minimize exposure to hazards. MSA meets the requirements of the Safety and Health Training tenet of DOE-VPP at the Star level.

VIII. CONCLUSIONS

Although MSA showed an increasing trend in TRC and DART case rates from 2009 to 2010, that trend appears to be reversing in 2011, and was primarily attributed to stresses associated with organization transition and influx of new workers under ARRA. The decreasing severity of injuries, as well as the workers demonstrated willingness to report injuries, indicates MSA is on the right path to further reductions. Overall, MSA injury rates are significantly below its comparison industry rates, and fully meet the expectations for participation in DOE-VPP. MSA managers are clearly committed to establishing a safe and healthy work environment. They recognize and value the contribution of the workers in accomplishing their mission. They are visible, credible, and accessible to workers. They have proactively addressed many of the challenges resulting from the contract change and changes in the Hanford Site operating model. Employee ownership of safety and health is a strength of the MSA program. Employees have a myriad of opportunities to participate in, and they are strongly encouraged by their managers to do so. Managers and employees effectively communicate and cooperate to promote continuous improvement in safety and health responsibilities. MSA has a system that provides for analysis of hazards and capturing that analysis. MSA has effectively controlled hazards by elimination, substitution, and engineered controls to reduce or eliminate worker exposures. Although some weaknesses exist in hazard analysis and control, the extent of those weaknesses does not demonstrate a systemic failure or breakdown in the work control system, but rather an opportunity for MSA to make additional improvements. Finally, MSA has a well-established training and qualification program that ensures workers are appropriately trained to recognize hazards and protect themselves and coworkers. As a result of these observations, the Team is recommending that MSA (those portions not associated with HAMMER and SAS), be admitted to DOE-VPP at the Star level.

Appendix A

Onsite VPP Audit Team Roster

Management

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