



Mission Support Alliance, LLC  
Volpentest Hazardous Materials  
Management and Emergency Response  
(HAMMER) Training Center

**Report from the Department of Energy  
Voluntary Protection Program  
Onsite Review  
January 24-27, 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 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.

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

Requirements for DOE-VPP participation are based on comprehensive management systems with employees actively involved in assessing, preventing, and controlling the potential health and safety hazards at their sites. DOE-VPP is designed to apply to all contractors in the DOE complex and encompasses production facilities, laboratories, and various subcontractors and support organizations. DOE contractors are not required to participate 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 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 the Mission Support Alliance, LLC, Volpentest Hazardous Materials Management and Emergency Response Training and Education Center conducted from January 24-27, 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
AMH	AdvanceMed Hanford
BLS	Bureau of Labor Statistics
CSHA	Craft-Specific Hazard Analysis
DART	Days Away, Restricted, or Transferred
DOE	Department of Energy
EP	Emergency Preparedness
EZAC	Employee Zero Accident Council
FERO	Facility Emergency Response Organization
GHA	General Hazard Analysis
HAMMER	Volpentest Hazardous Material Management and Emergency Response Training Facility
HAMTC	Hanford Atomic Metal Trades Council
HAZWOPER	Hazardous Waste Operations and Emergency Response
HGET	Hanford General Employee Training
HSS	Office of Health, Safety and Security
JHA	Job Hazard Analysis
MSA	Mission Support Alliance, LLC
MSC	Mission Support Contract
NAICS	North American Industry Classification System
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PRO	MSC Procedure
SIP	Safety Improvement Plan
Team	HSS DOE-VPP Team
TRC	Total Recordable Case
VPP	Voluntary Protection Program

## EXECUTIVE SUMMARY

The Hanford Site Volpentest Hazardous Materials Management and Emergency Response Training Center (HAMMER) was initially certified as a Department of Energy (DOE) Voluntary Protection Program (VPP) Star site in 2002. In 2005, it was recertified as a DOE-VPP Star site. Fluor Hanford operated HAMMER until August 2009 when the HAMMER work scope was placed in the Mission Support Contract and awarded to Mission Support Alliance, LLC (MSA). Following the completion of the transitional process, this assessment for HAMMER provides a review for its continued participation in DOE-VPP.

Injury rates for HAMMER staff for the past 3 years are over 40 percent below the rates for the comparison industry of Educational Services. Injury rates for subcontractors are statistically higher than average for the same industry, but that statistic does not accurately reflect the subcontractors' actual performance because of the relatively few work hours by subcontractors. The method for calculating Total Recordable Case rate magnifies those injuries for sites with less than 100 people. When combined for the entire site (HAMMER and subcontractors), the rates are 30 percent below the comparison industry rate and continue to meet expectations for participation in DOE-VPP.

MSA's HAMMER Managers fully committed to the idea of continuously improving safety and providing workers with the necessary tools, knowledge, and experience to accomplish that goal. They fully support providing the resources to ensure the HAMMER mission of providing safe, quality training *as real as it gets*. However, managers should use caution to preclude an overreliance on individual expertise and ensure hazard analysis procedures and policies are fully integrated into the systematic approach to safe training.

Employee Involvement at the HAMMER facility is excellent. Clear and open communication between managers and employees was evident during the review. Programs are in place to ensure workers have ample opportunity to provide input to improve safe work practices across the facility.

HAMMER has analyzed the major hazards at the facility and continues to actively inspect worksites for new hazards or degrading conditions. Workers at the site have a very good working knowledge of the hazards. HAMMER's current hazard analysis processes sometimes require redundant efforts to analyze hazards because previous analyses have not been documented or kept in readily retrievable locations. Safety professionals currently assigned are working to improve the content and usefulness of existing hazard analyses. Improving the hazard analysis processes and documentation will help prevent decay of this knowledge base.

HAMMER has effective processes and programs to adequately control hazards. The use of the hierarchy of controls (i.e., substitution, engineered controls, administrative controls, then the use of personal protective equipment) was noteworthy across the facility. Initial and ongoing training for workers, supervisors, and managers continues to provide a full understanding of the hazards and controls within their work areas.

HAMMER Managers and staff have successfully completed the transition from the previous site contractor to MSA. Procedures, policies, resources, and personnel changes specific to HAMMER have been relatively minor. Although some opportunities for improvement were

identified, particularly in the Worksite Analysis section, the DOE-VPP Team recommends HAMMER continue to participate in DOE-VPP at the Star level.

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

<b>Opportunity for Improvement</b>	<b>Page</b>
HAMMER Managers should consider revising MSC-PRO-26025, <i>Developing Training Programs</i> , to include clearly defined expectations and linkage to the appropriate hazard analysis process.	<b>4</b>
HAMMER Managers should work to use the evaluation process for critical self-assessment in order to continue identifying improvements and avoid complacency.	<b>4</b>
MSA should consider revising <i>Appendix B</i> to MSC-PRO-079 to indicate that ALL criteria must be met in order to not perform a JHA.	<b>10</b>
HAMMER should implement an integrated, systematic, and retrievable JHA for all activities.	<b>11</b>

## I. INTRODUCTION

The Hanford Site's Volpentest Hazardous Material Management and Emergency Response (HAMMER) Training Center began in 1986 as a community-based initiative to improve training for hazardous materials workers, emergency responders, and firefighters in the Tri-cities area of Washington (Richland, Kennewick, and Pasco) adjacent to the Department of Energy's (DOE) Hanford Site. Tri-County Fire Commissioners, the Benton-Franklin Regional Council, and local labor councils developed the concept. The Tri-Cities Development Council Executive Vice President Sam Volpentest convinced Congress and DOE that hands-on training was needed to protect the safety and lives of Hanford Site workers and emergency responders. In 1994, Congress appropriated funds to begin operations in a temporary facility and initiate construction of HAMMER. Upon completion of construction in September 1997, HAMMER was officially dedicated the Volpentest HAMMER Training and Education Center. HAMMER is operated under contract to DOE by the Mission Support Alliance, LLC (MSA).

Located in Richland, Washington, HAMMER is integral in preparing workers and emergency responders for high-risk tasks and the use of new technologies at DOE's Hanford Site and customers from other local, State, and Federal Agencies. HAMMER includes an 80-acre core campus and a 10,000-acre Law Enforcement and Security Training Center. HAMMER provides training that includes the hands-on use of realistic props and settings in order to save lives, reduce injuries, and increase worker productivity in their normal duties. The HAMMER staff helps users identify training needs and develop courses and training methods, provides professional instructors and classroom space, and operates and maintains the training props. Many of the HAMMER courses are taught by worker/trainers who are workers from the other site contractors that have been trained by HAMMER to lead and instruct specialized classes within their craft. Staffed by approximately 100 people, including professional trainers, administrative support, technicians, and skilled crafts, HAMMER provides the initial and recurring training for all Hanford Site personnel on standard site programs. These include Hanford General Employee Training (HGET), Radiological Worker I and II, Radiological Controls Technician, Hazardous Waste Operations and Emergency Response (HAZWOPER), Lockout/Tagout, Beryllium Awareness, and Respiratory Protection. A large variety of additional training topics required by regulations, such as fall protection, confined-space entry, electrical safety, load securement, and hoisting and rigging, is also provided. Finally, HAMMER makes available facilities for a wide range of firefighting, law enforcement, National Security, and Defense organizations. Craft workers at HAMMER are represented by the Hanford Atomic Metal Trades Council (HAMTC).

HAMMER was initially certified as a DOE Voluntary Protection Program (VPP) Star site in 2002. In 2005, it was recertified as a DOE-VPP Star site. Fluor Hanford operated HAMMER until August 2009 when the HAMMER work scope was placed in the Mission Support Contract and was awarded to MSA. Due to the contract transition, the VPP recertification due in 2008 was delayed and HAMMER was placed in a transitional status. Through the transition process, HAMMER has remained essentially intact as a separate entity within the Mission Support Contract. In late 2010, the DOE Office of Health, Safety and Security (HSS) and MSA agreed that the recertification of HAMMER should move forward.

The recertification assessment was conducted from January 24-27, 2011, by two personnel from the HSS DOE-VPP Team (Team). The assessment included observation of training classes, interviews with managers and staff, review of procedures, and inspection of facilities.

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

<b>Injury Incidence/Lost Workdays Case Rate (HAMMER )</b>					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2008	174,084	2	2.30	0	0.00
2009	209,146	2	1.91	0	0.00
2010	197,557	0	0	0	0.00
3-Year Total	580,787	4	1.38	0	0.00
Bureau of Labor Statistics (BLS-2009) average for NAICS** # 611 Educational Services			2.4		.8
<b>Injury Incidence/Lost Workdays Case Rate (HAMMER Subcontractors)</b>					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2008	22,800	0	0.00	0	0.00
2009	27,412	0	0.00	0	0.00
2010	99,917	2	4.00	0	0.00
3-Year Total	150,129	2	2.66	0	0.00
Bureau of Labor Statistics (BLS-2009) average for NAICS** #611 Educational Services			2.4		.8
Total HAMMER and Subcontractors (3 Years)			1.64		0

\* Days Away, Restricted or Transferred

\*\* North American Industry Classification System

**TRC Incidence Rate, including subcontractors: 1.64****DART Case Rate, including construction and subcontractors: 0**

Injury rates for HAMMER staff for the past 3 years are over 40 percent below the rates for the comparison industry of Educational Services. Injury rates for subcontractors are statistically higher than average for the same industry, but that statistic does not accurately reflect the subcontractors actual performance because of the relatively few work hours by subcontractors. The method for calculating TRC rate magnifies those injuries for sites with less than 100 people. When combined for the entire site (HAMMER and subcontractors), the rates are 30 percent below the comparison industry rate and continue to meet expectations for participation in DOE-VPP. A review of the logs revealed two cases classified by MSA as “Not Work Related” that may actually be work-related subject to interpretation. One case would be classified as a first-aid case, but the second case may actually be a DART case. If that case is reclassified, it would change the 3-year TRC rate for the site to 1.92, and the 3-year DART case rate to 0.27. These rates are still below the comparison industry rates and qualify for continued participation in DOE-VPP.

### III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture. The contractor must demonstrate senior-level management commitment to occupational safety and health 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.

Managers at HAMMER are clearly visible to the workforce and readily accessible to employees. This stems in large part from the small size of the organization. Managers were observed interacting with personnel frequently during meetings, walkdowns, and safety starts. These interactions demonstrated that personnel had more of a peer-to-peer relationship with their managers based on mutual respect. Managers were clearly open to employee concerns, ideas, and suggestions.

Under the previous contractor, HAMMER had problems with availability of safety professionals. Self-assessments performed during the transition period identified this issue, and MSA has improved access to health and safety subject matter experts. Two safety professionals have been matrixed to HAMMER full time, and their MSA team leader spends 20-30 percent of his time supporting HAMMER. There is also a HAMTC Safety Representative assigned to HAMMER. Personnel interviewed by the Team indicated no concerns about availability of safety professionals, safety representatives, or other resources needed to make safety improvements.

HAMMER has established a group of VPP Champions, employees that meet on a routine basis specifically to identify and discuss potential issues or improvements that can be made in connection with VPP. This group works in cooperation with the Employee Zero Accident Council (EZAC) to resolve issues and address concerns. The group is a strength in the HAMMER approach and an effective method of demonstrating management leadership and support without suppressing or replacing employee participation and involvement.

HAMMER has several methods to make safety policy and expectations known to workers. One of the most visible means is the Employee Resource Guide, which is provided to all workers. This Guide contains nearly all the information a new employee needs to find his/her way safely around the facility and be aware of policies related to safety. The Guide contains a brief description of VPP, Integrated Safety Management, a statement of the policy that "All staff have a responsibility for safety – their own, their co-workers,' customers,' and the communities." The Guide also contains the MSA Master Safety Rules and a copy of the Hanford Site Stop-Work Policy. The first section of the Guide is devoted to "Emergency Preparedness, Safety and Security at HAMMER," including a clear delineation from the HAMMER Manager of the site's open-door policy. This Guide, although too large to serve as a "pocket guide," is an effective resource for HAMMER's workers as a handy desk reference.

HAMMER has actively sought opportunities for outreach and mentoring within the surrounding communities. Some of the companies that HAMMER has been assisting are Hogue Cellars-Constellation Wines, Boeing, DOE National Training Center in Albuquerque, and the National

Institute of Environmental Health Sciences. In addition, HAMMER has been assisting other areas of MSA in strengthening their safety programs through the EZACs.

HAMMER Managers have established multiple policies and procedures to develop and safely conduct potentially hazardous training. Training courses are systematically developed using MSC-PRO-26025, *Developing Training Programs*. That procedure encompasses a systematic approach to training. The procedure requires that hazards associated with training be evaluated, but the process for conducting that evaluation has not been integrated into the training development procedure. Further, there are two hazard analysis procedures: one MSA corporate procedure and one HAMMER procedure. There was confusion among personnel interviewed as to how to apply those procedures. This is discussed further in the Work Site Analysis section. HAMMER Managers should consider revising Mission Support Contract (MSC) Procedure (PRO) MSC-PRO-26025, *Developing Training Programs*, to include clearly defined expectations and linkage to the appropriate hazard analysis process.

**Opportunity for Improvement:** HAMMER Managers should consider revising MSC-PRO-26025, *Developing Training Programs*, to include clearly defined expectations and linkage to the appropriate hazard analysis process.

In the area of self-assessments, HAMMER has relied primarily on worker interviews supplemented with some work observations. This process has provided a means for HAMMER to take credit for those program aspects that workers believe are working effectively, but the process has not effectively identified opportunities for improvement. In some cases, the evaluation may not begin with a clear expectation of effective performance. For example, the 2010 self-evaluation (draft) identified as an exemplary area “the implementation of the Training Hazard Analysis procedure for all training activities.” As discussed under Work Site Analysis, this process has some significant areas for improvement and has not always provided an effective process for hazard analysis. One means of improving the self-assessment processes might be to increase management emphasis on leading indicators. While HAMMER has an extensive set of performance indicators based on training hours, facility use, etc., there are few indicators related to safety. Managers primarily rely on accident and injury rates as their primary indicator. HAMMER is working to develop a Safety Improvement Plan (SIP) based on worker input, observations, and the annual evaluation, but those processes had not effectively identified weaknesses in the hazard analysis process. HAMMER Managers should work to use the evaluation process for critical self-assessment in order to continue identifying improvements and avoid complacency.

**Opportunity for Improvement:** HAMMER Managers should work to use the evaluation process for critical self-assessment in order to continue identifying improvements and avoid complacency.

## Conclusion

HAMMER Managers are fully committed to the ideal of continuously improving safety and providing workers with the necessary tools, knowledge, and experience to accomplish that goal. They fully support providing workers with the necessary resources to ensure the HAMMER mission of providing safe, quality training “as real as it gets.” Managers need to be cautious about relying too heavily on individual expertise, and ensure management systems fully support

an integrated, systematic approach to safe training. HAMMER continues to meet the Management Leadership expectations for DOE-VPP.

#### IV. EMPLOYEE INVOLVEMENT

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

The EZAC is a voluntary group of personnel that includes managers, bargaining unit employees, exempt and nonexempt employees, and subcontractors. EZAC provides for representation and participation in the safety and health program at HAMMER and is an essential element of the safety program that helps assure continued and effective worker involvement. EZAC is chaired or co-chaired by a volunteer staff member (currently a nonexempt) and may be a member of the bargaining unit. EZAC responsibilities include sharing lessons learned, discussing health and safety goals, addressing and tracking of resolution to safety issues and recognizing safety accomplishments.

The Team observed strong participation by HAMMER employees in the EZAC process. Communication between managers and the workforce was seamless and active participation by the workforce was evident. Interviews with employees across the site demonstrated their belief that employee input was well received and that individuals felt empowered to make changes through their input.

The Team was present for the EZAC meeting that discussed the SIP for 2011. The safety objectives, tactics, and indicators of success outlined in the plan were thorough and comprehensive. One of the objectives identified in SIP focused on the potential for increase in unsafe acts due to distractions resulting from the stress of anticipated layoffs. SIP recognized the distraction and potential impact layoffs could represent to families and coworkers alike. As a result, EZAC recommended that employees be counseled on how to deal with stress through discussion and utilizing stress-reducing techniques.

HAMMER conducts monthly safety inspections that involve workers, management, and HAMTC safety representative and safety professionals. All workers are expected to participate in the safety inspections on a periodic basis. The Team's observations of the monthly safety inspection conducted during the review noted several positive aspects of the inspection program. The monthly inspection reports were conducted using detailed safety inspection sheets that categorized areas for review and provided checklists of potential weaknesses. The use of the entire HAMMER workforce ensured that individuals not typically associated with facility inspections (i.e., administrative workers, training assistants, etc.) were teamed with more experienced safety and health professionals so that they could learn how to inspect more effectively. Observations demonstrated an excellent mentoring relationship between the safety and health professionals and other workers. Often, the safety professional would actively involve workers with prompting questions to better involve them in the process and stimulate their participation. Workers stated they feel they learn more and more with each inspection and

have applied that knowledge in their everyday life and as a result, are more likely to raise safety issues on their own.

Results of the inspections are documented in safety inspection reports, which are provided to facility management for action and resolution and to inspection participants. Items identified are discussed at EZAC meetings and tracked to completion. The inspection reports are also evaluated for trending.

HAMMER uses the safety logbook process to promote employees raising safety concerns and issues. Four safety logbooks are located throughout the HAMMER compound to facilitate employee use. The logbooks are reviewed on a daily basis for worker input and a master copy of all safety issues is maintained by the work control group. When issues are identified, the employee who raised the issue is contacted and provided the details of the resolution. However, in the event an employee wishes to remain anonymous, there is no mechanism in place to assure they are aware of the corrective action. Under the current practice, any issues raised in the four logbooks are removed from those books and maintained in the main work control group safety logbook. It is in the work control group safety book that the resolutions are maintained as well. HAMMER should consider modifying the current process to update issues that are raised in the same safety logbook to allow employees who raise any issues anonymously to be aware of the resolution while maintaining their anonymity.

The majority of employee safety training occurs at HAMMER. The fundamental concept of HAMMER is "Workers Training Workers." HAMMER has established a partnership between the Training Center and the Labor Unions that allows the bargaining unit employees with subject-specific expertise to train other employees in a hands-on environment at the HAMMER facility. The "Workers Training Workers" technique has proven very effective in sharing current trade experience and incorporating that into the hands-on training. MSA and other site contractors, including CH2M HILL Plateau Remediation Company, Washington Closure Hanford, LLC, Washington River Protection Solutions, LLC, and Pacific Northwest National Laboratory, all support the "Workers Training Workers" technique at HAMMER in Lockout and Tagout Training, Hazardous Waste Training, Respiratory Protection Training, and Radiological Training. The Worker Training Worker program is an excellent method for outreach, mentoring, and expanding employee participation in other parts of the Company.

Observations by the Team demonstrated effective interfaces between instructors and students. The instructors' teaching techniques were excellent. In all hands-on training activities observed, the instructors patiently allowed students to work through their mistakes to ultimately arrive at the correct solution. This technique ensured the students had to think about and understand the controls they were utilizing rather than just being told.

HAMMER has implemented several safety recognition programs based on worker input through EZAC. These programs are dynamic and change periodically to provide continual emphasis on safe behaviors in the workplace. One example discussed during the review was the On-the-Spot Safety Awards. Under that program, HAMMER recognizes workers in the field at the time the action contributing to safety is witnessed. The resulting award enables the employee to redeem that award at the Safety Award Store. The Safety Award Store is not located on the HAMMER facility and as a result did not have significant visibility to the employees. While the contents of the Safety Award Store were available online for employees to review, the significance of the program was diminished by this lack of visibility on site. In order to better promote the On-the-Spot Safety Award program, HAMMER Managers could consider

displaying samples of available items from the Safety Award Store in high traffic areas, such as the cafeteria and main lobby. Increasing the visibility of a program that awards safe behavior might result in greater recognition of the program to HAMMER workers.

## **Conclusion**

Employee involvement at the HAMMER facility was excellent. Clear and open communication between managers and employees was clearly evident during the review. Programs are in place to ensure workers have ample opportunity to provide input to improve safe work practices across the facility. HAMMER has satisfied the DOE-VPP element for Employee Involvement.

## 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 at HAMMER are very stable and understood by the staff. Although the purpose of the Center is realistic training for hazardous situations, the use of simulations and props is well planned. As mentioned in the Management Leadership section, HAMMER has several processes that are used to analyze hazards in conjunction with training and operations. Workers and managers alike have a very good working knowledge of the hazards.

HAMMER conducts regularly scheduled (monthly) walkdowns of the site, such that the entire site is covered quarterly. Team observations demonstrated these walkdowns were effective at both identifying new hazards, but also as a means of training and educating workers and stimulating employee involvement (see Employee Involvement).

MSC-PRO-26025, *Developing Training Programs*, defines the process for developing training courses. As previously discussed, this procedure only contains one sentence requiring evaluation of the hazards, but provides no further guidance (see Management Leadership). Personnel developing training rely on their personal knowledge and expertise to understand that there are two processes for performing that hazard analysis.

The first process is the MSC-PRO-079, *Job Hazard Analysis*. This procedure was inherited from the previous site contractor, and revised in November 2010. This procedure is used to integrate the MSC General Hazards Analysis (GHA), the Craft-Specific Hazard Analysis (CSHA), and the Automated Job Hazard Analysis (AJHA) processes. There is an associated guide for this procedure, MSC-GD-17132, *Job Hazard Analysis Process Guide*, which provides information and instruction to support consistent and effective implementation of job hazard analysis (JHA). It is MSA's intent that the JHA process defined in MSC-PRO-079 be applied for all activities.

MSC-PRO-079 contains an *Appendix B* that identifies criteria for when a JHA does not need to be performed. The first two criteria essentially require that there has been a previous JHA that adequately covers the work or activity. That hazard analysis may be a GHA, CSHA, AJHA, or standing JHA. This determination is essential to ensuring that all hazards are analyzed. This approach is a good example of an effective graded approach to work planning based on hazard analysis.

There can be some confusion to the individual planning an activity in the application of the criteria in MSC-PRO-079, *Appendix B*, in that the procedure does not clearly state that ALL criteria must be met in order to not perform a hazard analysis. MSA should consider revising *Appendix B*, to MSC-PRO-079 to indicate that ALL criteria must be met in order to not perform a JHA.

**Opportunity for Improvement:** MSA should consider revising *Appendix B* to MSC-PRO-079 to indicate that ALL criteria must be met in order to not perform a JHA.

The primary tool for implementing MSC-PRO-079 is the Web-based AJHA tool. The tool provides a systematic approach for personnel planning an activity to define the major steps of the activity, identify the hazards associated with the activity, document the analysis of those hazards, and justify the subsequent controls. This process, when applied correctly, leads to a documented, retrievable hazard analysis that can be used for future reference when planning similar work, as well as captures lessons learned regarding hazards and controls for the activity.

MSC-PRO-079 requires: “If any hazard analysis tool is used other than AJHA for analyzing work hazards related to work determined to be beyond skill-based, it must be prescribed in a level 3, MSC procedure/instruction and approved by the Interpretive Authority for MSC-PRO-079.” For training activities, HAMMER has chosen to implement another process in HM-FP-01-3.3, *HAMMER/Hanford Training Hazard Analysis and Control Process*. The Team reviewed this process and its implementation at HAMMER and has some concerns. First, unlike MSC-PRO-079, HM-FP-01-3.3 does not begin with the determination that a hazard analysis has already been performed and documented. Instead, it implements a graded approach to hazard analysis. Consequently, this procedure does not ensure that all hazards are analyzed as required by MSC-PRO-079. HM-FP-01-3.3, rather than establishing a tool in place of the AJHA process, has implemented a less rigorous set of criteria for when hazard analysis should be conducted. Second, the HM-FP-01-3.3 procedure does not effectively capture the hazard analysis and clearly justify the selected controls. While the procedure allows the use of the AJHA tool for medium or high hazard activities, it is not required. Hazard analyses reviewed by the Team that were performed under HM-FP-01-3.3 were inconsistent in their level of detail and were often of poor quality. In some cases, controls identified were nonspecific, leaving analysis to the worker at the time of work; chemical hazards simply pointed the user to the Material Safety Data Sheet and “appropriate personal protective equipment (PPE)”; and in at least one case, controls for adverse weather hazards (lightning) were not in accordance with Hanford Site policy.

While reviewing the various training hazard analyses, interviews with the technical points-of-contact indicated several of them maintained the only copies of the hazard analysis documents and did not forward those documents to a central document repository. Consequently, these documents were not available to other personnel developing similar activities or controlled in any other fashion. By improving the documentation and retention of hazard analyses, HAMMER will be able to gain additional benefit from the analyses by minimizing repetitive efforts and capturing future changes and lessons learned.

Other hazard analyses, referred to as General Prop Safety Plans (similar to a facility hazard analysis for the training props) exist, but personnel were unfamiliar with them. Some thought they had been deleted or were unaware how they were to be used. These plans were not identified in the training development procedure or the hazard analysis procedure. Safety professionals interviewed by the Team were aware of their existence and were working to improve those plans. In their current form, they were not considered to be useful by the safety professionals. The newly hired safety professional team lead has developed an improved version of the General Prop Safety Plans that is more focused on ensuring proper hazard identification and implementation of controls. A sample of this revised process was reviewed, and it is the Team’s recommendation that HAMMER proceed with implementing the newly designed process. The newer process will be a useful tool for the safety professionals to utilize when

analyzing new training plans for current training props. Because these plans represent a facility hazard analysis for the training props, HAMMER should also consider including the original design specifications for the individual training props in those documents.

The lack of consistently documented hazard analysis has created some difficulties for HAMMER personnel in responding to safety issues and concerns. For example, when the fire training pad was modified to provide more effective simulation of burning liquid fires, the possibility for entrainment of the mercaptan from the propane by water was not identified. The mercaptan follows the water through a drain system into a pond so that water used for firefighting training is captured and recycled. Not long after implementing these modifications, workers using the nearby respiratory training tower began raising concerns about smelling gas in the tower. Monitoring was performed that confirmed that it was not a propane leak. The source of the smell was determined to be the mercaptan coming from the drains in the tower that were linked to the fire training pad drains. HAMMER is currently evaluating options to prevent the smells, but in the meantime has identified new controls. Those controls are captured in the facility scheduling system, but have not been documented and captured in any of the hazard analyses. Further, the analyses for the modifications to the fire training pad never identified the mercaptan entrainment, which still has not been captured in the hazard analysis for that prop.

A second instance where failure to document a hazard analysis was identified through worker interviews. The workers discussed the question with the Team, but had not yet discussed it with managers. When the Team discussed the question with the applicable manager, the manager recalled that the question had been considered during the original facility setup several years ago and had been resolved. That analysis was not documented and could not be retrieved. Consequently, in order to address the workers' question, that analysis will need to be repeated. Further, without the documented resolution, there was no assurance that future changes would not reintroduce a problem.

The result of these hazard analysis processes is that HAMMER relies very heavily on individual expertise and knowledge of the particular hazard or activities. This knowledge is not effectively supplemented by a systematic approach to hazard analysis, particularly when the work is considered low or medium hazard. The decision to preferentially use a process other than the AJHA for training development leaves the site vulnerable to assumptions about the hazards involved. HAMMER could gain significant long-term efficiency, as well as limit vulnerability to staff changes and loss of knowledge, by implementing a systematic and retrievable JHA for all activities.

**Opportunity for Improvement:** HAMMER should implement an integrated, systematic, and retrievable JHA for all activities.

## Conclusion

HAMMER has analyzed the major hazards at the facility, and continues to actively inspect worksites for new hazards or degrading conditions. Workers at the site have a very good working knowledge of the hazards. HAMMER's current hazard analysis processes sometime require redundant efforts to analyze hazards because previous analyses have not been documented or kept in readily retrievable locations. Safety professionals currently assigned are working to improve the content and usefulness of existing hazard analyses. Improving the

hazard analysis processes and documentation will help prevent decay of the existing knowledge base and lead to process efficiency. HAMMER continues to meet the expectations for the Worksite Analysis tenet.

## VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (by substitution or changing work methods) or addressed by the implementation of effective controls (engineered controls, administrative controls, or PPE). Equipment maintenance, processes to ensure compliance with requirements, and emergency preparedness must also be implemented where necessary. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. These rules/procedures must also be followed by everyone in the workplace to prevent mishaps or control their frequency/severity.

HAMMER has established effective hazard controls with regard to the hazard control hierarchy. With regards to substitution, HAMMER researched and identified less hazardous chemicals to utilize in several of their training props. The use of training foam in lieu of the industrial grade foam reduced potential chemical exposures and resulted in a less toxic environmental impact. In addition, theatrical smoke (vegetable oil based) was utilized for security training events to eliminate the need for respiratory protection during exercises.

HAMMER also implemented effective engineered controls throughout their processes as well. Because of the number of training exercises that utilize fire water and fire suppression foam, many of the training props have been designed to recycle the fire water and foam to an isolation pond for treatment and reuse. This engineered control reduces potential chemical exposures and reduces potential environmental impacts. The Burn building utilizes significant safety features and monitoring equipment to ensure safety levels are maintained during live-fire exercises. For example, if predetermined temperatures in the Burn building are exceeded for any reason during an exercise, the monitoring equipment safety interlocks will shut down the burn.

Additionally, the effective use of labels and postings was broadly evident throughout the review. Due to ongoing construction activities, HAMMER is temporarily maintaining a walkway designated by traffic cones that directs students and teachers away from the construction areas. Daily briefings also inform workers when particular phases of the construction may impact additional areas and appropriate steps are taken to ensure safe walking paths are designated.

A potential weakness identified by the Team was the lack of effective delineation for foot traffic and automobile traffic in the central parking area (the lot housing the fire tower and the Burn building). Vehicle traffic through the area could be present as staff or students use the parking areas around the perimeter. HAMMER should consider planning appropriate walkway paths for this area to either limit vehicle movement or reroute pedestrian traffic.

HAMMER operates its own maintenance program consisting of a work control group, which is supported by full-time pipefitters, electricians, and laborers. If additional crafts are required, the work control group tasks additional crafts through the MSA central maintenance pool. Because of the relatively young age of the facility, the maintenance backlog for HAMMER is low. The HAMMER work control group uses the MAXIMO work package system for preparation of work packages and the tracking and scheduling of all routine preventive maintenance.

Occupational health services are provided by AdvanceMed Hanford (AMH), which provides contract services through a prime contract with DOE Richland Operations Office. These services include health maintenance examinations, medical surveillance examinations, staffing of field first-aid stations, medical consultation, and assistance in injury case management.

AMH is responsible to establish a compliant and comprehensive occupational medicine program for workers employed at HAMMER that work on a DOE site for more than 30 days in a 12-month period or are enrolled for any length of time in a required medical or exposure monitoring program. The process HAMMER uses to notify the occupational medicine provider is the Employee Job Task Analysis process.

HAMMER falls under the MSA Emergency Preparedness (EP) program in accordance with MSC-PRO-7647, *Emergency Preparedness Program Requirements*; it describes the Facility Emergency Response Organization (FERO) roles and responsibilities, training requirements and the conduct of operations. Each project is responsible for developing and maintaining EP Hazards Assessments, Building Emergency Plans, Facility Response Plans, and Emergency Response Procedures as applicable. Drills are an integral part of the EP program, used to train employees and test the effectiveness of emergency response capabilities. All FERO personnel participate in a minimum of one EP drill annually or enough to maintain proficiency in accordance with MSC-PRO-7647.

No emergency drills were conducted at HAMMER during the review. However, discussions with individuals involved in the program demonstrated that HAMMER was effectively addressing issues specifically related to its facility. For example, HAMMER identified the potential for student disturbances and/or fights, or even “active shooters” as plausible emergency scenarios. Training for all HAMMER personnel to deal with this type of threat was given. Recently, this scenario was used by staging a fight in the main lobby. As a result of the training, personnel in the lobby overcame their natural fearful reaction and responded appropriately by notifying emergency personnel. This combination of analysis, training, and realistic drills is an excellent example of HAMMER’s commitment to preparing their workers to effectively respond in stressful emergency situations.

In order to ensure that employees have a safe, productive, and desirable working environment, HAMMER has established acceptable work behaviors, standards, and practices. In the event that violations occur, HAMMER has established a disciplinary process that will ensure a thorough evaluation of the facts and a consistent application of the principles of progressive discipline if disciplinary action is warranted. The procedure for disciplinary action is found in MSC-POL-11385, *Standards of Conduct*. All employees are expected to abide by these work behaviors, standards, and practices.

## **Conclusion**

HAMMER has effective processes to ensure hazards are adequately controlled. The use of substitution, engineered controls, then administrative controls or PPE was noteworthy across the facility. HAMMER continues to meet the tenet for Hazard Prevention and Control.

## **VII. SAFETY AND HEALTH TRAINING**

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

HAMMER provides initial and recurring training for HAMMER employees, and all other workers at the Hanford Site. These include: HGET, Radiological Worker I and II, Radiological Controls Technician, HAZWOPER, Lockout/Tagout, Beryllium Awareness, and Respiratory Protection. A large variety of additional training topics required by regulations, such as fall protection, confined space entry, electrical safety, load securement, and hoisting and rigging, is also provided. Finally, HAMMER makes available facilities for a wide range of firefighting, law enforcement, National Security, and Defense organizations. HAMMER has been consistently and repeatedly praised by the other site contractors, the local unions, and other organizations for the quality and effectiveness of the services they provide. As such, the workers themselves at HAMMER are some of the most knowledgeable workers about the hazards and controls in use at the Hanford Site.

The Employee Resource Guide, discussed in the Management Leadership section, is an excellent reference for new workers at HAMMER. It provides them with the information they may need to address safety concerns, understand the organization and goals of HAMMER, and the geographical layout of the facility.

Each week, HAMMER holds Safety Start Meetings based on a preselected topic. Those meetings are used to provide all HAMMER staff with relevant safety information and heighten their individual awareness. Topics are presented on a 1-2 page handout and supplemented by group discussion and personal observations and experience. The handout includes supervisor briefing points and recommended questions and is designed to stimulate discussion. As such, they are an effective means of helping people focus on performing their work safely.

The observations in Worksite Analysis related to the use of JHA were, in part, due to inexperience of the HAMMER staff in using the AJHA system or due to insufficient knowledge of how to perform quality hazard analysis. As such, HAMMER would benefit from fully implementing the hazard analysis model in MSC-PRO-079, developing a quality training module on that model, and then reaching out to other Hanford Site contractors or DOE sites with that training. Many other DOE sites are struggling with the same issues, particularly related to what many believe is low or moderate hazard work. Combining their unique qualifications as professional trainers with an effective system for hazard analysis could make HAMMER a leader in the DOE complex for driving improvements in work planning and control based on effective, quality hazard analysis.

### **Conclusion**

Initial and ongoing training for workers, supervisors, and managers continues to ensure they fully understand the hazards and controls within their work areas. As the premier professional training site within the DOE complex, HAMMER staff is among the most knowledgeable and best trained personnel at the Hanford Site. HAMMER continues to meet the expectations of the Safety and Health Training tenet.

## **VIII. CONCLUSIONS**

HAMMER Managers and staff have successfully transitioned from the previous site contractor to MSA. Procedures, policies, resources, and personnel changes specific to HAMMER have been relatively minor. Throughout the contract transition period, the emphasis on performing the mission safely has not been lost. Accident and injury rates are below the averages for the comparison industry and are being driven primarily by minor accidents (slips, trips, and falls). Injury rates for subcontractors are above the comparison industry average, but that statistic does not accurately reflect their performance due to the relatively small number of subcontractor work hours. HAMMER Managers have recognized this and are working with EZAC to find ways to address and prevent those minor accidents without stifling reporting of injuries, as well as finding ways to prevent minor injuries among subcontractor personnel. The use of substitution, engineered controls, then administrative controls, or PPE was noteworthy across the facility. Although the Team did identify some opportunities for improvement, particularly in the Worksite Analysis section, HAMMER continues to meet the expectations for continued participation in DOE-VPP as a Star site, and the Team recommends the same.

## Appendix A: Onsite VPP Assessment Team Roster

### Management

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