



**Babcock & Wilcox Technical Services  
Pantex, LLC (B&W Pantex)/  
Pantex Plant, Amarillo, Texas**

**Report from the Department of Energy  
Voluntary Protection Program  
Onsite Review  
February 15-26, 2010**



U.S. Department of Energy  
Office of Health, Safety and Security  
Office of Health and Safety  
Office of Worker Safety and Health Assistance  
Washington, DC 20585

## 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. Assessments are now more performance based and are enhancing the viability of the program. Furthermore, 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 designed to apply to all contractors in the DOE complex and encompasses production facilities, laboratories, and various subcontractors and support organizations.

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

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

This report summarizes the results from the evaluation of Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex) at the Pantex Plant, Amarillo, Texas, during the period of February 15-26, 2010, and provides the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding B&W Pantex’s participation in DOE-VPP.

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**ABBREVIATIONS AND ACRONYMS**

ALARA	As Low As Reasonably Achievable
B&W Pantex	Babcock & Wilcox Technical Services Pantex, LLC
BBS	Behavior-Based Safety
BLS	Bureau of Labor Statistics
CA/MP	Corrective Action/Mistake Proofing
CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
CRAFTS	Continuous Review Assures Future Task Safety
DART	Days Away, Restricted or Transferred
DOE	Department of Energy
DSA	Documented Safety Analysis
EAP	Employee Assistance Program
ES&H	Environmental, Safety and Health
FOF	Force on Force
GET	General Employee Training
HPI	Human Performance Improvement
HRO	High Reliability Organization
HRP	Human Reliability Program
HSS	Office of Health, Safety and Security
IH	Industrial Hygiene
ISM	Integrated Safety Management
JSHA	Job Safety Hazard Analysis
LPS	Lightning Protection System
MAA	Material Access Area
MTC	Metal Trades Council
NAICS	North American Industry Classification System
NNSA	National Nuclear Security Administration
OJT	On-the-Job Training
OSHA	Occupational Safety and Health Administration
PATRIOTS	Pantexan Actions Towards Reducing Injuries Offers True Safety
PDS	Precision Drive System
PER	Problem Evaluation Request
PGU	Pantex Guards Union
PHA	Process Hazards Assessment
PM	Preventive Maintenance
PPE	Personal Protective Equipment
PSC	President's Safety Council
PSTR	Project Subcontractor Technical Representative
RAMS	Radiation Alarm-Monitoring Systems
RWT	Radiological Worker Training
SAFFIR	Safety First
SOAR	Safety Observations Achieve Results
SPO	Security Police Officer
Team	Office of Health, Safety and Security DOE-VPP Team
TID	Throttle Input Device
TRC	Total Recordable Case

TSR	Technical Safety Requirement
VPP	Voluntary Protection Program
WIPP	Waste Isolation Pilot Plant
WTS	Washington TRU Solutions, LLC

## EXECUTIVE SUMMARY

Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex) is an independent company formed solely to manage the Pantex Plant. The company draws from the operational experience of (1) Babcock & Wilcox Technical Services Group, Inc.; (2) BWX Technologies; (3) Honeywell; and (4) Bechtel National, Inc.

Located near Amarillo, Texas, the Pantex Plant was originally built during World War II to assemble conventional weapons, and has been in use to assemble, refurbish, disassemble, and store nuclear weapons since 1951. The application for participation in the Department of Energy (DOE) Voluntary Protection Program (VPP) was received in November 2009, and after review and acceptance by the Office of Health, Safety and Security (HSS), an onsite review was scheduled for February 15-26, 2010. This report documents the results of that review and the HSS DOE-VPP Team's (Team) recommendation.

Assembly, disassembly, and refurbishment of nuclear weapons pose some of the highest risk work in the DOE/National Nuclear Security Administration complex. Hazards encountered by workers on a daily basis include chemicals, explosives, radiation, beryllium, asbestos, as well as the normal range of standard industrial hazards.

The onsite review addressed each of the five tenets of DOE-VPP. Based on observations of work, interviews, and contact with approximately 300 workers, managers, and scientists, the Team determined that B&W Pantex has established a strong commitment to excellence in worker safety and health. Management leadership and commitment to safety excellence was clearly evident. Employee ownership is strongly embedded within B&W Pantex. Managers have empowered employees to proactively administer the safety and health program by partnering with the employees and implementing initiatives that maintain open lines of communication and promote safety and health responsibilities. Managers need to find additional resources and methods to further encourage worker involvement. Most workers interviewed by the Team believed VPP was synonymous with Behavior-Based Safety, a perception that was reducing their awareness of, and participation in, improvements related to all five tenets of VPP. Worksite Analysis was strong for the high hazard operations involving nuclear weapons and explosives, with opportunities to improve in analysis of more routine, but frequently encountered hazards. The hierarchy of controls from hazard elimination through engineering and administrative controls and finally to personal protective equipment was evident. Finally, safety training was both extensive and thorough and linked to plant access. Consequently, the Team recommends that B&W Pantex be admitted to DOE-VPP at the Star level.

The standard for Star status is not perfection, but rather in addition to an excellent safety record, managers and workers are dedicated to and effectively pursuing continuous improvement and excellence in safety performance. Consistent with that goal, the Team identified a number of opportunities for improvement. These opportunities reflect those areas where B&W Pantex can further improve its performance (see Table 1). While no formal action plan is required to address these opportunities, B&W Pantex is expected to consider and specifically address them in its annual status reports.

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

<b>Opportunity for Improvement</b>	<b>Page</b>
B&W Pantex should write and publish a specific safety and health policy that captures and institutionalizes the philosophy of the foundational elements and the commitment to achieving and maintaining best-in-class safety performance.	<b>4</b>
B&W Pantex must ensure subcontractors are held accountable to the same standard of performance expected for employees.	<b>7</b>
B&W Pantex should consider emulating the BBS process in maintenance, safeguards and security, and support services organizations in other organizations by sharing the success of its implementation with others.	<b>10</b>
B&W Pantex should consider revising its nonnuclear/nonexplosive job safety hazards analysis process to capture and document the analysis for all work performed that is not covered by the DSA or PHA processes.	<b>15</b>
B&W Pantex should review all electric carts in use at Pantex for potential similarities to the judgments-of-need identified in the WIPP Type B investigation.	<b>16</b>
B&W Pantex should ensure specific manufacturer-recommended inspection criteria are included in model and year specific (non-generic) electric cart PM work packages.	<b>16</b>
B&W Pantex should consider adding an “employee concern” designator to the maintenance request process to assist in prioritizing and tracking responses to maintenance-related employee concerns.	<b>17</b>
B&W Pantex should continue enhancing current corrective actions in progress for the emergency management personnel accountability program to establish a more positive accountability process.	<b>22</b>

## I. INTRODUCTION

Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex) is an independent company formed solely to manage the Pantex Plant. The company draws from the operational experience of (1) Babcock & Wilcox Technical Services Group, Inc.; (2) BWX Technologies; (3) Honeywell; and (4) Bechtel National, Inc.

The Pantex Plant, located near Amarillo, Texas, in Carson County, has a long history of service to the United States. In 1942, the U.S. Army constructed the original Pantex Ordnance Plant on 16,000 acres. The mission of the Plant was to load and pack conventional artillery shells and bombs in support of the World War II effort. When the war ended in 1945, the site's operations ceased and the land was sold to Texas Technological College (now Texas Tech University) in Lubbock, Texas.

In 1951, Pantex was reopened and refurbished for nuclear weapons, high explosive and nonnuclear component assembly operations. By 1960, the Pantex Plant had taken on a new high explosives development mission in support of the Lawrence Livermore National Laboratory. Between 1965 and 1975, the Atomic Energy Commission moved various weapons modification, assembly, and high explosives missions to the plant from other facilities around the country.

Pantex workers assembled thousands of weapons during the Cold War. The last new nuclear weapon was completed in 1991. Since then, Pantex has safely dismantled thousands of weapons retired from the stockpile by the military, and placed the resulting plutonium pits in interim storage.

Pantex has a long-term mission to safely and securely maintain the Nation's nuclear weapons stockpile and dismantle weapons retired by the military. Much of Pantex's future workload includes life-extension programs designed to increase the longevity of weapons in the stockpile.

In connection with the primary mission, workers at Pantex are exposed to a wide range of potential hazards, from the standard industrial hazards associated with normal manufacturing operations, to chemical hazards associated with explosive formulation and production, radioactive materials associated with nuclear weapons, and hazards introduced due to the security posture of the plant. These are in addition to the normal hazards associated with walking and working surfaces, transportation, weather extremes, and ergonomic hazards (for both administrative and shop activities).

There are approximate 3,500 people employed at Pantex, consisting of various skilled technicians and crafts, protective forces, engineers, scientists, and administrative support personnel. There are two bargaining units that represent workers at Pantex. The Pantex Guards Union (PGU) is an independent union representing the protective forces, and the Metal Trades Council (MTC) of Amarillo & Vicinity, American Federation of Labor-Congress of Industrial Organizations (AFL-CIO), collectively represents 12 different international unions.

In September 2009, the application for participation in the Department of Energy (DOE) Voluntary Protection Program (VPP) was submitted by B&W Pantex to the DOE/Pantex Site Office, and the application was forwarded to the Office of Health, Safety and Security's (HSS) Office of Worker Safety and Health Assistance (HS-12) DOE-VPP Team (Team) for review and



approval. Per DOE-VPP requirements, initial certification requires an onsite review to be conducted by HSS.

The Team from HS-12 visited B&W Pantex from February 15-26, 2010, to perform that assessment. The Team had the opportunity to observe work throughout the plant, including both production and maintenance work, attend and observe multiple safety committee meetings, and interview workers. During the course of this assessment, the Team had contact with between 200 and 300 plant personnel. This report documents the results of the onsite assessment, and provides the Team's recommendation to the Department of Energy's Chief Health, Safety and Security Officer.

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

<b>Injury Incidence/Lost Workdays Case Rate (B&amp;W Pantex )</b>					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2007	6,720,936	17	0.51	4	0.12
2008	6,822,966	13	0.38	7	0.21
2009	6,480,654	12	0.37	3	0.09
3-Year Total	20,024,556	42	0.42	14	0.14
Bureau of Labor Statistics (BLS-2008) average for NAICS** Code # 332993			1.4		0.6
<b>Injury Incidence/Lost Workdays Case Rate (B&amp;W Pantex Subcontractors and Vendors)</b>					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART* Cases	DART* Case Rate
2007	159,963	1	1.25	0	0.00
2008	187,219	0	0.00	0	0.00
2009	119,989	0	0.00	0	0.00
3-Year Total	467,171	1	0.43	0	0.00
Bureau of Labor Statistics (BLS-2008) average for NAICS** 2362			4.4		2.2

\* Days Away, Restricted or Transferred

\*\* North American Industry Classification System

***TRC Incidence Rate, including subcontractors: 0.42******DART Case Rate, including subcontractors: 0.14***

B&W Pantex has significantly improved its accident and injury statistics over the past 5 years. They have the best accident and injury performance in the National Nuclear Security Administration (NNSA) complex. TRC rates are approximately 70 percent below their comparison industry. Since 2008, rates have reached a plateau, and B&W Pantex will have to find new approaches to continue to drive these statistics further down. Their current performance and trends clearly meet the expectations for a DOE-VPP Star site.

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

B&W Pantex managers all espoused the foundational elements at Pantex as safety, security, and quality as essential to production. The General Manager repeatedly stated that he considered the priority at the Pantex Plant to be safe, secure, quality production. This approach appears on posters placed around the plant, but has not been captured in a specific Plant Safety Policy. There is a Pantex Strategic Plan for 2009-2020 that establishes an initiative for best-in-class safety performance. The objectives to sustain that initiative are Worker Engagement, Incident Free Safety Performance, and VPP. Goals are established annually through the DOE/NNSA Performance Evaluation Plan, and managers are responsible for establishing derivative divisional, departmental, and personal goals that support the corporate goals. One of the changes made by the current General Manager was to remove references to TRC and DART rates from the performance evaluation plan from NNSA. While that statistic is monitored, the General Manager does not want any pressure placed on plant personnel to hide incidents or injuries. Instead, goals are established that reward specific accomplishments and improvements that should lead to further reducing TRC and DART rates. The General Manager maintains a chart that clearly demonstrates the correlation between reduced accident and injury rates and increased production. Other policies, such as Integrated Safety Management (ISM) implementation, as well as implementing procedures, are clearly documented and readily available through online systems. These varied plans, goals, and objectives can lead to worker confusion regarding the specific B&W Pantex safety policy. B&W Pantex should clarify the plant safety policy in a single, clearly identifiable document that captures and institutionalizes the philosophy of the foundational elements and the commitment to achieving and maintaining best-in-class safety performance.

**Opportunity for Improvement:** B&W Pantex should write and publish a specific safety and health policy that captures and institutionalizes the philosophy of the foundational elements and the commitment to achieving and maintaining best-in-class safety performance.

Managers exhibited a strong awareness of organizational barriers to safety improvements. They are working to address some longstanding cultural barriers. Despite improvements made in safety programs and management focus, some workers have a long history at the plant that they project onto the current contractor. Managers are continuing to work to build trust and help workers understand the changes being made.

One barrier managers must work to overcome is the effect of tight budgets within the weapons complex. Budgets for infrastructure maintenance and upgrade have been essentially flat over the past several years. This often leads to management challenges identifying resources to correct safety issues identified by workers or other assessments. While immediate safety threats and hazards are corrected, some improvements that may not present immediate threats may take several months or more to correct. In some cases, the perception that resources are not available leads managers and supervisors to simply explain why the issue exists, and then close out the issue rather than keeping the issue open and working towards an acceptable closure. This behavior is reinforced by performance indicators that encourage quick closure of issues raised by workers. B&W Pantex has established a goal of 28 days to close out employee concerns, and 24 days to close out employee issues raised through the no-more-surprises system. The HSS Office of Environment, Safety and Health (ES&H) Evaluations (HS-64), in an inspection conducted in June 2009, identified that while some improvements have been made, corrective actions were not always sufficiently comprehensive to address the full scope of the problem, and/or effectiveness reviews were not sufficient to ensure that the problems had been addressed. The Team reviewed the backlog of issues contained in the Problem Evaluation Request (PER) system. The PER system is used by the site to document, track, and evaluate closure for issues identified on site. Based on this review, the Team saw similar issues to those identified by HS-64. For example, an individual documented a concern for water collecting on a sidewalk that would freeze and present a slipping hazard. The condition had already caused one person to slip and fall. The closure for the concern indicated that avoidance of the area was a solution. There were several other issues, such as workplace lighting, that were brought up by workers that had been in the system for several years without any corrective action or discussion with the worker that identified the concern.

B&W Pantex could gain some benefit by implementing a process for senior managers to review closeout of employee issues, such as a corrective action review board. This process would not only ensure corrective actions address the issue, but would also help train less experienced personnel.

Communication of management decisions also presents some unique challenges at Pantex. Processes at the plant tend to be highly specialized and compartmentalized, which results in small groups of workers, sometimes as few as two workers that work closely together over long periods of time, with limited contact with other work groups. This can lead to very strong ownership by the employees of their particular process. When that process is no longer effective or needed, the workers may have significant stress associated with retiring that process. Other stressors include safety process changes that differ significantly from past practices based on external findings (e.g., changes in ISM implementation, more rigorous procedural expectations, more detailed hazard analysis processes). That stress can lead to worker concerns and feelings of disenfranchisement by workers that are very challenging to managers. There are no quick fixes for this problem, but B&W Pantex should ensure that managers and supervisors are trained and equipped with means to manage change and its effect on the workforce. Effective practices and policies should be developed that ensure human resource and training personnel work with managers and supervisors early to help workers transition into new job assignments. Additionally, managers must continue to ensure workers are provided opportunities to voice their concerns over process changes, and workers are provided accurate and timely information that demonstrates why processes are changed or eliminated. More effective management of change by mid-level managers and supervisors may help reduce worker stress and prevent some future worker concerns.

A specific resource issue was identified as a result of the HS-64 inspection performed in 2009. One of the findings specifically addressed Baseline Exposure Assessments that had not yet been performed (See Worksite Analysis). Although the Industrial Hygiene (IH) Department is working to complete those exposure assessments, B&W Pantex identified the cause of the finding as a lack of resources, and the corrective action plan did not address additional resources. B&W Pantex should review resources currently available for completing the exposure assessments and determine if additional temporary resources can be obtained to complete the exposure assessments sooner.

Accountability for safety is established through a system of safety rules, procedures, and annual performance appraisals (for nonbargaining unit personnel). Company safety goals are translated into divisional, departmental, and finally personal safety goals that affect employee ratings and bonuses. There are systems for recognition and reward of individuals or groups, but those systems are not currently being used as effectively or extensively by managers and supervisors. Rewards for safety practices and improvements are relatively infrequent and small (typically \$50 gift cards). Managers and supervisors need to be encouraged to frequently look for, recognize, and reward safety improvements and practices used by workers. Additionally, managers need to find other means to recognize and reward workers (noncash rewards) for their participation in, and support of, safety improvement initiatives.

B&W Pantex has a systematic process for selection and oversight of subcontractors. That process includes evaluation of the subcontractor's safety record before they are determined to be eligible to bid on a contract. Standard contract specifications require hazard analysis that includes a walkdown of the project location and specified controls as part of the bid process. Once a subcontract is awarded, the Projects Group walks down the job with the subcontractor and provides assistance with the development of the Activity Hazard Analysis if requested. The submitted Activity Hazard Analysis is reviewed by the Projects Group safety team for final approval prior to start of work. Typically, each Project Subcontractor Technical Representative (PSTR) is assigned to three subcontracts. The PSTRs are expected to ensure safety and health compliance by the subcontractors and to provide daily logs of inspection results, which are compiled in a database. When subcontractor noncompliances are observed, the individual involved is either warned or, based on the severity, may be removed from the site. On such occasions, the PSTR provides the banned individual's name to the Access Center preventing that individual from receiving access until the PSTR removes the restriction.

The Projects Group holds quarterly meetings with all subcontractors to discuss project timelines, cost projections, and safety and health issues observed during the previous quarter by PSTRs. If a trend is identified in the daily logs, those issues are discussed with all the subcontractors working under the Projects Group. Interviews with managers and other personnel responsible for implementation of title 10, Code of Federal Regulations (C.F.R.), part 851, requirements by subcontractors, reflected that B&W Pantex personnel generally have the appropriate level of focus to ensure successful oversight. In one recent case, a subcontractor was identified during a security inspection with carrying a prescription medication. The individual was referred to the site occupational medical facility where it was determined that the individual should not be performing work due to the additional risk. In two other cases that occurred during this assessment, two subcontractors violated site requirements. In one case, a subcontractor failed to report an injury, and in the second case, a subcontractor violated the site lockout/tagout procedure by removing an electrical panel with a lock installed on the panel. Investigations for both events were ongoing at the end of this assessment.

The lockout/tagout event was particularly problematic. Preliminary investigations indicated the PSTR (a B&W employee) and the subcontractor's competent person had identified the tag hanging on the panel prior to removal and had agreed that the work could proceed (a violation of the lockout/tagout procedure). Specifically, the PSTR and the subcontractor's competent person agreed to remove the panel. They effectively removed the lockout device without ensuring that all relevant personnel had this knowledge before they resumed work at the facility as required by DOE Order 5480.19 and Occupational Safety and Health Administration (OSHA) Standard 1910.147(e)(3). A maintenance supervisor that physically moved the tag later (to the wrong breaker) was relieved of his duties for violating the lockout/tagout procedure. Subcontract work was temporarily stopped throughout the plant until lockout/tagout boundaries were verified, but there had not been any disciplinary actions taken against the subcontractor or the PSTR for their violations of the lockout/tagout procedure. This specific incident, and others reported by some employees, leads to a perception by some employees that subcontractors may not be held to the same performance expectations regarding safety as B&W Pantex employees. Senior managers also recognized that there are still improvements needed to ensure subcontractors know and comply with DOE safety and health expectations and requirements. B&W Pantex must ensure employees are not given the impression that subcontractors are held to a lower standard of performance.

**Opportunity for Improvement:** B&W Pantex must ensure subcontractors are held accountable to the same standard of performance expected for employees.

B&W Pantex has implemented a process to perform annual self-assessments, primarily by performing a gap analysis. A gap analysis was performed in the past year as a means of completing the DOE-VPP application process and developing a safety improvement plan. B&W Pantex managers recognized that this approach would not be sufficient for the long term and are currently developing changes to the annual review process that incorporates other methods and assessments.

## Conclusion

B&W Pantex managers are clearly exhibiting the leadership expected of a DOE-VPP Star site. They fully understand the linkage between outstanding safety performance and outstanding mission performance. They have some ongoing challenges that will require additional resources and increased management attention in order to encourage further improvement in what is already industry-leading safety performance. Increased management involvement and leadership in corrective action management and ensuring subcontractor conformity to DOE/NNSA and B&W Pantex expectations will build additional trust with the workforce, and help stimulate further improvements.

#### 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.

There are a variety of methods afforded to employees to become involved. This includes a range of activities from employees teaming together and going to their manager with ideas to improve processes resulting in enhanced safety to participating on one of the many of safety-related committees or becoming involved in conducting the Behavior-Based Safety (BBS) observations referred to as conversations. In various committee roles, employees were involved in developing safety skits, safety films, VPP Webcast, conducting VPP training and associated perception surveys, serving on the VPP implementation team, and serving as safety advocates throughout the plant. Depending on the area of the plant, the level of the employee, and the complexity of the task, employees are engaged at the level that best suits them based on their experience and expertise.

All employees interviewed by the Team clearly understand their rights under 10 C.F.R. 851, including the right to pause or stop work in the event of a safety concern. All employees understood this authority as a responsibility and would not hesitate to use it. In addition, employees are encouraged by managers to use the process without fear of reprisal.

The employees are involved in the development of Job Safety Hazard Analyses (JSHA), procedures, and work instructions. Since direct employee involvement is integral to the hazard analysis process during JSHA development, employees with experience in the process participate in the development/review of JSAs prior to adoption (see Worksite Analysis for further discussion of the JSHA process).

The President's Safety Council (PSC) is a forum for Division Managers, selected line-level managers, leadership of both MTC and PGU, and members of Pantexan Actions Towards Reducing Injuries Offers True Safety (PATRIOTS) and VPP Steering Committee. PSC assembles to discuss current safety and security trends, events, lessons learned and special focus topics. The meeting itself follows a pre-issued formal agenda and results in the distribution of minutes and copies of the presentations to all participants. Participants are encouraged to solicit input from the employee populations they represent for discussion at the PSC and to share the minutes and presentations with the same populations. Most importantly, this forum provides direct communication across organizational lines and through management levels to promote sharing ideas, identify challenges, and unify all the participants' efforts toward improving safety.

B&W Pantex has strongly supported and emphasized BBS as the primary means by which further safety improvements can be achieved. PATRIOTS is the overarching guiding committee, which is made up of facilitators, co-facilitators, and ES&H representatives. There are six

implementing committees that cover all the divisions. Those six committees and their represented divisions are:

- CRAFTS (Continuous Review Assures Future Task Safety) - Maintenance Division;
- SOAR (Safety Observations Achieve Results) - Safeguards and Security Employees;
- Engineering - Engineering Division;
- Applied Technology - Applied Technology Division;
- Manufacturing - Manufacturing Division; and
- SAFFIR (Safety First) - All other divisions not represented by one of the other committees.

These teams are involved with overall safety of their areas, as well as identifying potential deficiencies associated with critical behavior inventories tailored to the organizations. The BBS process not only tracks at-risk behaviors and safe behaviors, but also analyzes human performance improvement (HPI) leading indicators to identify and correct error precursors and associated communication barriers. Each participating organization cascades observation results up to the PATRIOTS safety committee for collaborative discussion and resolution and plant-wide reporting. Error precursor examples identified in January 2010 included time and pressure, inaccurate risk perception, and habits and patterns as areas needing attention and improvement in communications.

The protective forces were noted by the Team as being particularly effective in their participation in safety improvement efforts. Their SOAR program blends BBS and HPI for use by the protective force. The SOAR group is comprised of front-line supervisors, representatives from each department in Division 700, and a team of champions from senior management. SOAR observations require that the observer have a conversation with the person(s) being observed and that no names of the persons being observed be documented. Much like that of other Pantex BBS programs, the observations are entered into their BAPPTTrack/Rincon software system that tracks and trends data of the observations completed. The SOAR committee meets monthly and specifically extracts the trending information based on the observations performed for the protective forces. This information is used by the action team to address issues within protective force. Examples of issues addressed by the team are ascending and descending towers with heavy equipment, handrails for newly installed walkways, parking lot traffic congestion, and firearms storage issues.

Protective force employees are involved daily through a plan-of-the-day meeting at the firing range or a guard-mount meeting that occurs prior to each shift. It was observed at the range's plan-of-the-day meeting that the Security Police Officers (SPO) actively stretched prior to the activities occurring at the range, shared lessons-learned from other DOE sites, discussed safety topics, and assured that SPOs were able to perform the activities of the day. Information shared at the guard-mount briefings included safety information on safe storage of firearms in approved lockers, cart safety, protective force safety incident rates, vehicle safety, and Pantex's Safety Flash. If SPOs are involved in an incident, they are required to attend the guard-mount meetings and share the lessons learned about the incident.

Similar to the protective forces, the maintenance division was also particularly effective in implementing safety improvements. Morning standup briefings, BBS observations by all personnel with data collected and analyzed by the CRAFTS committee, and other suggestions



were all noted by the Team. The efforts by the protective forces and the maintenance division are responsible for much of the improvement in accident and injury statistics at Pantex.

The Team noted varying degrees of effectiveness of each of the six implementing committees. Strong implementing committees include CRAFTS, SOAR, the Engineering Department, and the Support Services SAFFIR process. These committees are a model for the rest of the company when implementing BBS in maintenance, safeguards and security, and administrative environments. They have created an atmosphere of enthusiasm through public recognition of observers and a sense of competition causing an elevated level of safety awareness and increased employee participation. These committees were effective in getting all employees to perform observations and contribute to safety improvements. The Manufacturing and Applied Technology Divisions followed a model where the committee members performed the bulk of the observations, concentrating on quality of observations rather than encouraging all workers to be observant of their coworkers. It is important to note that Manufacturing and Applied Technology have very few accidents and injuries compared to the other divisions, so personnel may not have a sense of urgency related to safety improvements. Nonetheless, they can probably benefit further by getting broader participation in the BBS efforts.

**Opportunity for Improvement:** B&W Pantex should consider emulating the BBS process in maintenance, safeguards and security, and support services organizations in other organizations by sharing the success of its implementation with others.

The Team found that the employees and supervisors consider BBS synonymous with VPP. It is important to remember that BBS, HPI and High Reliability Organization (HRO) are tools to drive improvements. VPP is not a tool, but is a process to recognize that all the tools, which are utilized, are successful. There are other tools that may be ideas developed within the Pantex workforce or borrowed from other VPP sites, which have been proven to be effective at getting the workers involved and enthusiastic about participation in safety programs. The Team encourages B&W Pantex to ensure workers clearly understand the distinction between specific safety improvement efforts and VPP.

When accidents occur, employees with pertinent information are involved in the causal analysis of the event with the goal of learning as much as possible from the event and precluding occurrence of similar events in the future. Employees also participate in corrective action/mistake proofing (CA/MP) sessions to help develop resolutions and corrective actions.

In addition to other employee groups, the Subcontractors' Safety Council provides another avenue for workers to take an active role in their own safety. B&W Pantex employees are appointed by the General Manager. The council meets quarterly to provide an overview of safety tracking/trending and information on plant events, to discuss contract concerns/issues, and to provide an open forum for subcontractors to raise issues and concerns.

B&W Pantex has implemented a Joint Company and Union Safety Council that provides another forum for managers and labor representatives to meet and discuss safety and health issues. This council meets monthly and was identified by the labor representatives from both MTC and PGU as an effective means to improve communication. For example, the council recently discussed providing a smoking hut or as an alternative, funding a smoking cessation program. The council agreed they should analyze both alternatives to determine the future course of action.

In addition to the PATRIOTS and other BBS implementing committees, B&W Pantex has a number of other committees dedicated to improving safety.

Electrical Safety Committee: This committee is made up primarily of subject matter experts and electricians appointed by the Maintenance Division Manager. It performs inspections of all new plant electrical installations, conducts building/facility-specific electrical inspections upon request, and participates in all CA/MP sessions on electrical events.

Health and Productivity Council: Consisting of volunteers, this council functions to engage employees in a variety of ways to develop an interest in bettering their personal health. This is done by raising awareness of personal health risks and engaging employees in taking personal responsibility for improving their personal health. The council develops a variety of programs that benefit the health and welfare not only of Pantex employees but also their families. Examples include controlling diabetes and hypertension.

VPP Steering Committee: Championed by senior leadership, but led and implemented through a diverse core team of plant employees, this committee is comprised of exempt, nonexempt/nonbargaining and union personnel tasked to coordinate the development and submittal of the B&W Pantex VPP application. The committee's goal is to effectively achieve and sustain DOE-VPP certification by promoting, monitoring, analyzing, and contributing to the continuous improvement of safety and health at Pantex.

Fire Department Health and Safety Committee: Consisting of firefighters and other subject matter experts, this committee performs quarterly inspection of firefighter work and associated work areas. The committee is also tasked with review of all Fire Department accidents and injuries to ensure causes are identified and that corrective actions address the causes. Shift representatives on the committee serve as peer contacts if an employee is hesitant to voice a concern. Hazard concerns are announced to shift personnel through the daily shift musters, normally by the Shift Officer. This has resulted in improved communications and improvements in concern resolution. Committee members are all trained in the BBS observation process and receive additional hazard identification training in their certification training.

As Low as Reasonably Achievable (ALARA) Committee: Appointed by the General Manager, this committee makes recommendations to reduce and control radiation exposure and radioactive material releases to help protect B&W Pantex employees, the public, and the environment. The committee evaluates new and ongoing radiological work activities and radiological controls, and reviews the design and construction of new facilities and major modifications of existing facilities where radiological work is performed. The committee also reviews the overall conduct of the radiation safety program and receives the results of all radiation safety program assessments. The committee performs inspections of new major radiological operations and periodic inspections of ongoing operations to evaluate the effectiveness of radiological controls.

Radiation-Alarm Monitoring Systems (RAMS) Committee: This committee specifically addresses worksite issues related to RAMS. The subsequent committee activities (based on the issue) may include participation in RAMS issues, active participation in CA/MP sessions and corrective action identification when dealing with unscheduled RAMS events and issues. Committee members play a supporting role to Radiation Safety when informing plant personnel

of workplace hazards. Members identify RAMS issues in their respective organizations to the committee, which are then analyzed and resolved by the membership.

The VPP Steering Committee sponsored a special “Ramp Safety Team” that was noted as particularly effective. The Ramp Safety Team was a special effort to improve overall safety on the ramps (covered walkways between buildings). The ramps present multiple hazards to workers due to powered cart and forklifts mixing with foot traffic, doors opening into the ramps, storage of materials, steam heating systems, and uneven concrete. The Ramp Safety Team worked over several months to identify and eliminate excess equipment storage, improve traffic signs, alter traffic flow patterns, and raise worker awareness of ramp safety issues. Their efforts continue with regular inspections to maintain improved conditions (Operation Cleanup).

Employees are recognized for excellence by “Spotlight on Excellence Awards.” Recent awards in this area include testing and development of the Rincon database software for migration and upgrading of the BBS database, development of a formal weapons familiarization class for process engineers, and a Technical Safety Requirement (TSR) Awareness Campaign that eliminated numerous steps for users to review the most current issue of TSRs. In addition, the B&W Pantex “Courage to Care” program provides another venue for employee recognition. Recent “Courage to Care” awards included reducing unnecessary battery replacement, identifying an electrical wiring hazard, revitalization of the maintenance BBS program, and saving an employee’s life with the Heimlich maneuver.

Along with the positive awards for improving safety, workers can be held accountable for poor safety practices. B&W Pantex Bulletin, BLTN-852, lists misconducts for which the bargaining (MTC and PGU) and nonbargaining employees can be subject to disciplinary action. The misconduct is grouped in six categories: General, Safety, Security, Neglect-General, Neglect-Safety, and Absenteeism.

The discipline process utilizes a progressive approach starting with informal, undocumented verbal counseling. For more serious cases, written warnings, suspensions, and terminations may be utilized. The Human Resources Generalist conducts the investigation with participation by employee involved, supervisor, witnesses, and other offices as necessary and prepares summary of the investigation and recommendation for disciplinary action. The Human Resources Generalist researches the database for similar misconducts in making the recommendation to have consistency. A review board is utilized to review the recommendation of the Human Resources Generalist. The disciplinary orders are signed by the Human Resources Division Manager except in cases of termination, which are signed by the Deputy General Manager after consultation with the General Manager.

The disciplinary action records are kept in official personnel files for 18 months for MTC members, and 12 months for PGU members and nonbargaining unit employees.

Cases where the alleged conduct cannot be substantiated are classified as “No Action Taken.” In some cases, such as alcohol use, the employee may be counseled by the Employee Assistance Program.

The Team reviewed all disciplinary cases for calendar year 2009. The review indicated that employees received positive reinforcement for safe behaviors and were held accountable for not following safety and health rules through the disciplinary process.

## **Conclusion**

Interviews with managers, front-line supervisors, safety committee members and employees revealed that employee ownership is strongly embedded within B&W Pantex organizations, with some divisions demonstrating far more employee involvement than others. Managers have empowered employees to proactively administer the safety and health program by partnering with the employees, and implementing initiatives that maintain open lines of communication and promote safety and health responsibilities. B&W Pantex meets the requirements of the Employee Involvement tenet of DOE-VPP.

## 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 mitigative measures during work planning to anticipate and minimize the impact of such hazards.

B&W Pantex uses several different processes to analyze hazards at the site. In those plant areas controlled by Nuclear Safety Requirements or Explosive Safety Requirements, B&W Pantex has a rigorous and effective process to analyze and document those hazards, analysis, and controls and integrates the results into procedural documents. This is especially evident in those higher-risk activities when new equipment, processes, or activities are proposed. The Documented Safety Analysis (DSA) requirements of 10 C.F.R. 830, subpart B, apply to those programs and processes that involve radioactive material. For those programs and processes that involve explosive components, B&W Pantex utilizes a Process Hazards Assessment (PHA) to evaluate the hazards associated with those materials. For nonnuclear and nonexplosive activities, B&W Pantex applies a JSHA process to evaluate higher frequency, lower hazard work activities, such as typical industrial hazards. Results of the DSA and PHA are implemented through specific procedures (development instructions, nuclear explosive operating procedures, etc.) that are rigorously followed at Pantex. Typical industrial type controls may be found in craft work documents, procedures, or in other instructions that the workforce uses to perform work. (See Hazard Prevention and Control.)

The June 2009, HS-64 report on ISM at Pantex identified several areas for improvement related to Hazard Identification and Analysis, which the plant has been working on since that visit. B&W Pantex developed a corrective action plan to address the HS-64 issues, and the Team visited with plant personnel responsible for ensuring the corrective actions were being implemented.

HS-64 identified that baseline exposure assessments had not been completed. The Team interviewed plant personnel related to this issue and B&W Pantex indicated there are a significant number of exposure assessments remaining that need to be completed or formally documented into the new assessment format. The IH organization had a plan in place to address the deficiencies and was working to complete those assessments. Discussions with plant personnel indicated that in order to best utilize IH resources, a review of the plan is needed to assure that all identified assessments are still needed and that the assigned priorities are still valid. The Pantex IH organization indicated they had an interim database in place to manage the assessments and baseline information until a fully functional database that has been purchased, can be implemented. The Team recommended to the Pantex IH organization that other contractors within the VPP community might be of assistance relating to hazard assessments and managing that data.

Pantex is one of the few sites in the DOE/NNSA complex that actively works with beryllium components. As a result, they have an extensive beryllium control program that includes regular

surveys of worksites where beryllium components are handled, medical monitoring for beryllium sensitization, and an active list of beryllium sensitized workers. One individual interviewed by the Team was identified as a beryllium-sensitized worker, who for personal reasons had opted to continue working in a job where beryllium exposure was possible. The work area contained engineered controls in the form of local exhaust ventilation, was regularly cleaned and monitored, and had a record of all surveys being below the beryllium housekeeping standards. Air and surface sampling have been conducted, but the worker expressed concern that the effectiveness of the engineered controls being used had not been validated by conducting breathing zone samples for beryllium when a curtain around the area was closed, the normal condition when performing work. The team reviewed the workspace and discussed the processes involved with the IH department. Due to the short duration of operations, the ability of a breathing zone sampler to detect beryllium levels at the OSHA limit was questionable, but they were planning to perform sampling as a means of trying to help the concerned worker. The worker had also been counseled by the department manager that if concerns could not be allayed, a job change assignment should be considered. Exposure assessments for beryllium have been conducted, but the worker was not satisfied that those assessments had been validated.

In the area of nonnuclear or nonexplosive worksite analysis, HS-64 identified that “worker safety aspects of ISM and results of B&W Pantex hazard analyses processes within Manufacturing and Applied Technology Divisions are not sufficiently documented and/or effectively communicated to workers.” Discussions with plant personnel and a review of current process documentation indicates changes to the process are being developed and implemented, but that the revised process had not yet been completed or matured such that an evaluation of the process can be made. Of particular importance is the documentation of the analysis part of JSHA that B&W Pantex implements for nonnuclear or explosive work. Work Instruction 02.01.01.05.03, *Conducting a Job Safety Hazard Analysis*, requires the use of PX-3271, *Job Safety Hazard Analysis Form*. The form utilizes a three-column approach to hazards analysis (1) identify the scope; (2) identify the hazards; and (3) identify controls. This approach minimizes documentation of the analysis that explains the who, what, when, where, how, and why linkage of the hazard to the control selection. Although the workers involved in the process may be discussing and considering the essence of analysis, there is currently no vehicle to capture the rationale and corporate knowledge that embodies that analysis. Those hazards and warnings that are identified through the JSHA process are being captured in procedures and developmental instructions for use by the workforce, but the workforce does not have access to the analysis rationale that determines the control selected. The JSHA is immediately available to the worker, and can be reviewed by the worker if there are questions regarding the hazards. Furthermore, it is not considered a substitute for a work instruction or procedure.

**Opportunity for Improvement:** B&W Pantex should consider revising its nonnuclear/nonexplosive job safety hazards analysis process to capture and document the analysis for all work performed that is not covered by DSA or PHA processes.

In June 2009, the performance assurance group provided information regarding an accident at the Waste Isolation Pilot Plant (WIPP) to the Pantex Maintenance Group. That accident resulted in a severe injury and subsequent DOE Type B Accident Investigation. The objective of the performance assurance group was for the maintenance group to evaluate the causal factors and judgments of need identified by the Type B Accident Investigation and ensure a similar risk did not exist at Pantex. The maintenance group simply determined that since the Taylor Dunn

Electric Carts cited in the WIPP incident are not used at Pantex, no further analysis was necessary. Consequently, similar potential risks were not identified and analyzed. For example, the Type B Accident Investigation determined that the designed location of the electric cart acceleration pedal contributed to the accident and that Washington TRU Solutions, LLC (WTS) needed to install a manufacturer's approved retrofit for the electric cart accelerator to prevent inadvertent engagement by the passenger. Several Pantex electric carts have a similar pedal configuration, but the risk was not evaluated.

The Type B Accident Investigation also identified that maintenance of the electric carts did not include periodic adjustment of the drive chain, as well as the semiannual and annual maintenance items established by the manufacturer. At WIPP, the combination of the accelerator being depressed and the existing conditions of the cart (loose drive chain and worn brake linings) resulted in an override of the braking system. WTS needed to incorporate and implement the manufacturer's recommendations in the maintenance and servicing of the electric carts. Similarly at Pantex, the Team's review of the Pantex generic Preventive Maintenance (PM) work package for electric carts identified several manufacturers' recommended actions were not included in the PM inspection package. For example, the recommended PM test for assuring the operability of the Precision Drive System (PDS) for the EZ-Go cart was not included in the Pantex PM work package. The PDS test is significant in that the PDS system (among other functions) regulates and ensures the vehicle's top speed. If the PDS is not functioning properly, the electric cart may be able to exceed its recommended top speed in downhill operations. In addition, the EZ-Go recommendation to inspect the shocks was not included in the Pantex PM work package. The Club Car (model years 2001 to 2002) electric cart maintenance requirements specifically state that the type of Throttle Input Device (TID) must be identified prior to servicing because the service and adjustment procedures differ significantly. There are three separate types of TID for this model year, but this information was not included in the generic Pantex PM work package.

**Opportunity for Improvement:** B&W Pantex should review all electric carts in use at Pantex for potential similarities to the judgments-of-need identified in the WIPP Type B investigation.

**Opportunity for Improvement:** B&W Pantex should ensure specific manufacturer-recommended inspection criteria are included in model and year specific (nongeneric) electric cart PM work packages.

Managers and employees routinely walkdown the facilities and processes to identify safety and health issues. PX-5398, *Facility Inspection Checklist*, form is used to evaluate walking/working areas, general environment/indoor air quality, fire protection, electrical safety, Personal Protective Equipment (PPE), material handling, machine guarding, power tools and equipment, hoists, cranes, rigging, compressed gas and cylinders, ladders, chemical storage, housekeeping, and environmental management. The form allows descriptions of conditions identified that need improvement. Interviews with managers indicate they would like to be able to do these walkdowns on a more frequent basis, but other demands impose time constraints. Interviews with some employees indicated they would like to see managers more frequently in the work spaces.

All employees contacted by the team were comfortable reporting issues to either the safety committees or supervisors. Employees did express some concerns about resolution and completion of corrective actions (see Management Leadership). In reviewing employee concerns, it became apparent that many of the concerns resolution resulted in work requests being generated. Concerns involved areas, such as icy bridges, vent hood repairs, leaky roofs, and burnt-out lights. The priority of these concerns was determined by the facility representative in the submission of the work request to work planning. However, there was no process to designate that these work requests were associated with an employee concern. For example, a burnt-out light may appropriately be designated a level 4 - low priority. However, if it is an employee concern for the overhead light for an employee's cubicle area, and not repaired for a long time, it can quickly diminish employee morale and result in a feeling of their concerns not being a priority. Therefore, some type of employee concern designation allowing closer tracking may be appropriate as an enhancement to the employee culture/morale. In the selection and tracking of random employee concerns that were several years old on the maintenance backlog, it was discovered that several of the "open" backlog items had, in fact, already been completed as part of other packages. A process to periodically review and update that backlog would assist in addressing the employee perception presented by some that it takes years to get an issue addressed. The VPP and BBS committees have been working to design such a process for tracking employee-generated concerns. The CRAFT group has developed a comprehensive system for tracking these concerns to closure, but other division elements are not as well-defined or effective yet.

**Opportunity for Improvement:** B&W Pantex should consider adding an "employee concern" designator to the maintenance request process to assist in prioritizing and tracking responses to maintenance-related employee concerns.

B&W Pantex tracks and trends a variety of items associated with plant performance and safety indicators. For example, Behavior-Based Safety Observations are tracked and included in annual personnel performance reviews. Observations are broken out by divisions monthly and the top five at-risk behaviors are highlighted. The performance assurance organization tracks assessment completion status and requirements assessments by division. Occurrences are tracked by issue type, reports per quarter, and Occurrence Reporting and Processing System's reports. There is a safety-related backlog that is tracked monthly with a performance indicator to maintain 30 work orders or less in the safety-related backlog. The fire system backlog mimics the safety-related backlog tracking. Facility inspections are tracked and findings, such as housekeeping, electrical safety, walking/working surfaces, and PPE use, are documented. As previously discussed, B&W Pantex monitors and tracks the closure time for employee concerns and issues.

B&W Pantex has developed a unique method of predicting potential safety issues. Called the Pantex Work Environment Forecast, the method involves collection of information from varied sources and correlating that data to human performance, mechanical system performance, or other issues. Data included in the forecast are historical accident and injury data, leave usage, weather data, equipment failures, holidays or activities that might cause workers to be distracted, and other incident data. By correlating these data, managers can forecast what areas may present the most concern, and take action to train employees, prepare safety notes, and raise worker awareness of additional risks. For example, during the PSC, the forecast for March identified that the use of over-the-counter medications for allergies would rise, and high winds and large



temperature extremes could be expected. Actions for managers to take included preparing for severe weather but not putting away winter weather equipment, looking for safety concerns in simple activities, and performing housekeeping inspections for items that could become airborne in high winds.

B&W Pantex has a robust and effective accident/incident investigation process. There are approximately 300 trained personnel onsite to lead these teams. The process is driven by procedure and uses an event fact sheet (PX-5157) to explore and document events or process anomalies. The results of this effort may drive further investigation based upon the significance of the anomaly. For example, an inspection of a lightning protection system (LPS) on a roof revealed the bond from the air terminal on the exhaust hood to the adjacent vent pipe was not physically connected. The facility manager determined that this was of significance and the reliability of the LPS was in question. The operations center was notified and maintenance was called to correct the problem. By the end of the day, the problem had been corrected and the operability of the LPS assured.

## **Conclusion**

B&W Pantex has extensive processes to identify and analyze the unique hazards associated with nuclear explosive and radiological program activities. These hazards are well understood by workers. Hazards associated with more routine industrial activities are well understood by workers with the identification and controls documented through JSHAs. B&W Pantex is not as effective in capturing the analysis of those hazards through JSHAs. A large backlog of exposure assessments remains in response to the HS-64 findings, and B&W Pantex should continue working to find alternative approaches and resources to complete those assessments.

## 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.

The initial approach to workplace hazards is to eliminate the hazard through substitution of a less hazardous material, provide engineering controls that eliminate the hazard at the point of generation, or add administrative controls that limit the employee's exposure to a level of ALARA. The team observed many examples of hazard elimination and engineered controls. For example, ventilation systems are used at the firing range to capture and prevent exposure to airborne contaminants. Special collection tanks were installed at the firing range for collection and containment of lead in an oil and water mixture. "SAWStop" Saws have been installed in woodworking shops that detect any contact between the saw blade and a person's finger and stop the saw before any injury occurs. Laser interlocks have been installed on brake presses in the boiler shop; horizontal material storage drawers with vacuum lift attachments are used for storage and movement of heavy metal stock; adjustable work platforms have been installed in the electronics laboratory; and extensive local ventilation systems are available in maintenance and tooling shops. Engineering controls are also extensively used in the performance of weapons-related production work through development of specialized tooling and facility design.

Only when hazards cannot be eliminated or for operations that are conducted while engineering controls are being instituted are employees allowed to work in a potentially hazardous environment with PPE as the first line of defense. In practice, this is an extremely rare occurrence. In most cases, the work is postponed until such time as the engineering controls have been fully implemented, tested, and proven to be effective.

Job responsibilities are evaluated for each new employee coming onto the site. When the manager indicates on the job task evaluation form that the worker has the potential for exposure to any physical or environmental hazard on the job, that information is reviewed and evaluated by an industrial hygienist and/or a safety engineer. If PPE is indicated by the task requirements, recommendations for such equipment are made prior to the new employee being placed in that work environment. If the use of such PPE might cause a physical hazard to the employee, that employee is referred to the Occupational Medicine Department for physical evaluation prior to the work assignment or issuance of equipment.

In all work activities observed, personnel were wearing the appropriate PPE, knew the specific hazard they were being protected from, and the appropriate way to inspect and wear PPE.

The B&W Pantex PM program systematically plans and schedules actions to prevent premature failure of facility structures, systems, and equipment.

The work processes associated with PM activities are formalized in process documents and work instructions that are available in hardcopy and electronically through the Business Requirements and Information Network.

The B&W Pantex PM program includes more than 12,600 active, scheduled preventive maintenance activities. The Maintenance Division annually processes approximately 500 PM evaluations each year. A graded approach, based on the degree of risk and the nature of mission activities, is used to prioritize resources. A master equipment list identifies structures, systems and components covered by the maintenance program.

Work is executed by personnel using controlled work procedures under formal administrative controls. Any B&W Pantex employee may request an evaluation of any facility, structure, system, component, or equipment for inclusion into the PM program by completing a PX-3145, "PM Evaluation Request." Once received, the form is logged into a tracking database and assigned to a preventive maintenance specialist for processing. When determining PM actions and frequencies, the PM specialist considers many factors, including, but not limited to, manufacturer recommendations, consensus codes and standards, maintenance knowledge, history, experience, and equipment usage.

Once a PM is approved, a model work order is established in the Computerized Maintenance Management System (CMMS), and the PM schedule(s) is established for the identified item. The CMMS automatically initiates PM work orders using the established schedule and approved work documents.

Because the PM program executes many of the nuclear facility surveillances and in-service inspections required by the plant safety basis, these PM actions receive the highest priority. Systems and equipment required to comply with national consensus codes and regulatory requirements are classified as "important to safety."

Maintenance planning includes analysis of worksite hazards, including legacy contamination hazards. Hazards and mitigating actions are documented in individual work packages and are included in prejob briefings.

The protective force has professional armorers onsite to perform PMs on firearms. This PM supplements the SPOs' cleaning of firearms that is performed after use. PMs occur at least every 6 months and as often as every 2 weeks depending on the firearms. There is a specialized section within the protective force that conducts the PMs. The armorers have received specialized training and qualifications to perform repairs. Armorers keep written records in their personal logbook that tracks the firearm by serial number, model number, date, and work performed. For larger firearm movement about the armory, the firearm is secured to a cart to minimize carrying heavy firearms. To aid in the PMs of the firearms that are mounted on a vehicle, a lift hoist is used to support the removal/replacement of the firearm.

An excellent example of preuse/startup evaluations was found in the security forces. Prior to conducting a force-on-force (FOF) exercise, the protective forces group is required to develop a detailed FOF Exercise Plan. The plan outlines the purpose, scope, schedule, participants, methods, objectives scenario description, controls, safety, observers, emergency notifications, resource requirements, logistics, training requirements, oversight responsibilities, and emergency numbers. The plan also dictates the rules of engagement, contact information, and notification with local law enforcement, as well as neighboring properties. There are clear directions specified in the plan as to the process to "stop work" or halt the exercise. Within the plan is a section that ties the planned FOF exercise into DOE's ISM process. The plan defines the end of

FOF exercise, along with the accountability of personnel, firearms, and equipment. A physical walkdown of the area where the FOF is being held is also conducted prior the exercise.

The B&W Pantex Emergency Management Program is founded on the requirements of DOE Order 151.1C and DOE Guide 151.1-1, *Emergency Management Guide*. The program develops and maintains the capabilities necessary to effect acceptable levels of protection for the health and safety of workers, responders, the public, the environment, and the national security in the event of an operational emergency. The comprehensive emergency management system is designed to minimize the consequences of an emergency; prevent environmental damage; and protect the health and safety of workers and the public from hazards associated with Pantex operations.

The emergency response program is strong. Emergency responders are qualified, professional, and experienced. Training sessions observed reflected commitment to excellence in response and teamwork. Two response incidents were observed during this review. One involved fire response to an equipment fire. The emergency service dispatchers and facility managers monitoring the plant were observed during the response and their response was calm with appropriate levels of plant control and incident awareness accordingly. The other incident was observed on scene as two fire trucks, incident command, ambulance, and security joined for appropriate equipment and resource staging for effective response. Equipment was in satisfactory condition with management support and commitment for emergency management apparent in the purchase and plans for the new incident command vehicle, the implementation of several National Fire Protection Association requirements to meet 10 C.F.R. 851 that were particularly challenging for the site, and the training and encouragement for actual rescue teams being offered. In the emergency planning area, the site has had some challenges in response to two reviews by the HSS Office of Emergency Management Oversight (HS-63) in the past few years. However, resultant improvements are apparent. A prime example of these improvements is the significant work this year on identifying and controlling hazardous chemicals. The finding in this area was related to weaknesses in the control of hazardous chemicals, which complicated ensuring that appropriate quantities for maximum material-at-risk were analyzed in the Emergency Planning Hazard Assessment. B&W Pantex implemented a set of controls that also resulted in the removal of 18,000 pounds of chemicals from the site. However, one set of corrective actions for the HS-63 review is still in progress. Those corrective actions are related to the accountability program. Per DOE Guide (G) 151.1-1A, the base program DOE Order 151.1C includes the mandate that facilities/sites have the ability to maintain accountability of affected employees in the event of an emergency. The 10 C.F.R. 851 also implements the accountability requirements in 29 C.F.R. 1910.38, which requires employee emergency response plans that include procedures to account for all employees after an emergency evacuation has been completed. DOE G 151.1-4, *Response Elements* includes a full section on accountability that states the facility emergency response staff should be able to identify any missing persons. The program is to include employees, subcontractors, visitors, and any person that may be inside a facility. Per the Guide, the objective of the accountability procedures is to ensure that search, rescue, and assistance efforts can be initiated promptly to provide for the safety of facility personnel who may be injured, trapped, or unaware of the emergency condition. This can only be determined if the accountability process has a method to determine “who is missing” versus simply determining “who is present and accounted for.” The second objective is to prevent sending responders to conduct a search (thus increasing their risks) when it is not necessary. The current system focuses on reporting to muster stations during an evacuation and phoning in names of personnel at the station. Currently, Pantex lacks an effective method for comparing

that information to a list of who should be there to assist in identifying if anyone is missing. It is dependent on someone being informally aware of others in the area. The current access system can give excellent information on the number and names of personnel that have entered the area; thus, giving highest potential numbers in a disaster. However, there is no logout process, so the system cannot track who has left the area. Based on the recent HSS Operating Experience Summary on an incident at a Russian hydroelectric plant that included lessons from their accountability disaster involving subcontractors, visitors, and even tourists, B&W Pantex Emergency Management is encouraged to not only continue with planned implementation of the latest accountability program corrective actions, but is encouraged to consider more expansive improvements to ensure each potential “missing” person is readily identifiable.

**Opportunity for Improvement:** B&W Pantex should continue enhancing current corrective actions in progress for the emergency management personnel accountability program to establish a more positive accountability process.

Building evacuation drills are conducted by the Fire Department using the Emergency Management Division’s drill program. During building evacuation drills, it is assured that people are able to safely evacuate. B&W Pantex has designated muster stations for use by plant personnel for buildings/facilities that are regularly occupied. Muster Station Maps are located on the Pantex intranet and physically posted throughout the plant.

B&W Pantex conducts radiological operations in a manner assuring the health and safety of the public and all persons engaged in site radiological work. Radiation exposures to Pantex workers and the public and releases of radioactivity to the environment are maintained well below regulatory limits. Deliberate efforts are taken to further reduce exposures and releases to ALARA levels.

The Radiation Protection Program at Pantex is implemented under 10 C.F.R. 835, *Occupational Radiation Protection*, the pertinent Implementation Guide (G 441.1-1B), and applicable portions of the DOE *Radiological Control Standard* (STD-1098-99). Using these documents as its basis, the Radiation Safety Department developed MNL-RS0001, *Pantex Radiological Control Manual*, to implement its radiation protection program.

The level of radiological training an employee receives is based on the work assignment. General Employee Radiological Training is provided to every employee and general contractor required to enter a controlled area. Employees whose work requires them to enter a Radioactive Material Area or handle radioactive material complete Radiological Worker Training I (RWT I). Employees whose work requires them to enter a Contamination Area or handle contaminated material complete Radiological Worker Training II (RWT II). RWT II focuses on contamination control and includes a practical evaluation of donning and doffing anti-contamination clothing. These courses collectively provide information required for workers to protect themselves from radiological hazards while at Pantex. Additional job-specific radiological training is provided on a case-by-case basis.

The ALARA program is managed by the Radiation Safety Department to ensure that exposures to workers and the general public are as low as reasonably achievable. This program uses three approaches that must be followed in the design, commissioning, operation, and decommissioning of facilities where radioactive materials or ionizing radiation generating devices are used or

stored. First, radiological and safety considerations are applied to the design and modification of facilities to reduce exposures to individuals and releases to the environment. Second, radiological controls are applied during operation, production, and maintenance to minimize exposures. Third, monitoring of radioactive materials, radiation dose rates, and measurements of workers' radiation doses are performed to verify and document that doses are maintained to ALARA and to determine where additional attention to radiation safety issues is needed. A committee is chartered to advise the General Manager on ALARA activities and to provide an important forum for reviewing radiological control plans and performance, focusing management resources on radiological control issues.

The Radiation Safety Department monitors radiation exposure and uptake from normal operations and accidents, radiation emissions from x-rays, linear accelerator, and/or computed tomography exposure. Radiological surveys are performed and documented as specified in work instructions, manuals, and radiation work permits.

Pantex has established and provides comprehensive occupational medicine services to its workers, including 24-hour emergency medical services. The Workforce Health & Reliability Department has access to any hazard information necessary to carry out its functions, thereby promoting its communication, coordination, and sharing among operating and environment, safety, and health protection organizations. Medical clinicians have read-access to IH databases to research exposure data, as well as direct interpersonal access to IH personnel for necessary discussions. While Employee Services administers the contract for the Employee Assistance Program (EAP), psychologists may refer individuals to the program, but normally individuals self-refer. Psychologists and physicians administer their portions of the Human Reliability Program (HRP). Occupational Medicine Program personnel provide the following services: perform health examinations, diagnose and treat occupational injury or disease, and provide personnel counseling and health education.

Pantex has nationally certified emergency medical technicians/paramedics onsite 24/7/365 who provide first aid, cardio pulmonary resuscitation, triage, and/or transport to advanced care medical facilities. Paramedics report through the Fire Department. In incidents involving a medical emergency, physicians, nurse practitioners, nurses and lab technicians are onsite for consultation and treatment during the day shift Monday through Friday and off-shift for medical oversight and instruction to the paramedics and emergency medical technicians.

The Occupational Medical Program includes physicians, psychologists, nursing staff and additional technical and support staff. Programmatically, there are a myriad of programs, such as EAP, HRP, physicals, occupational health coordination with exposure monitoring programs (i.e., respirator program, hearing conservation, lead exposure, biohazards program, chemical exposures, etc.) and others. The program also addresses chronic medical conditions, such as diabetes, as well as an admirable wellness program. The facility and staff recently received a full 3-year accreditation by Accreditation Association for Ambulatory Health Care as meeting clinical and credentialing requirements for this type of clinic. This is a significant achievement and not only denotes professional abilities and programs, but reflects significant customer (employee) satisfaction achieved.

The Occupational Medical Program has several other notable attributes. Examples of excellence include their approach in resolving employee concerns by soliciting teams to assist in resolutions. This approach was recently used in the Bloodborne Pathogens program. From an

employee concern on the receipt of Hepatitis B vaccinations, the Team expanded to revamp the full Bloodborne Pathogens program. This included training, determination of appropriate personnel for training from a task-based approach, questions and answers on the vaccine itself, and delivery and tracking accordingly. Another example of excellence included the occupational health controls reflected for job transfer, even if just on a temporary basis. Complete task determination ensures appropriate occupational health risks are identified, and mitigated. This was done during the “ramp” team’s assignments, which included personnel that had previously performed administrative tasks only.

Certified professionals are used by the ES&H division to provide fire, safety, medical, radiation safety, and industrial hygiene services. Certifications are through the State of Texas and/or through National professional associations.

Pantex medical personnel (physicians, psychologists, nurses, nurse practitioners, x-ray, laboratory and drug/alcohol technicians) are certified/licensed through the State of Texas. Licensure requirements include providing proof of continuing education units to the State. Medical personnel annually provide proof of licensure to Pantex. The applicable State of Texas Board (Medical, Nursing, Psychology, etc.) endorses successful training completion, as part of the licensure process. Medical also uses the Plateau Training Management System to track medical personnel credentialing.

Pantex is in the process of implementing an HRO initiative that aligns HPI processes more completely with ISM. This is not a new safety program, but a logical framework to better understand how existing programs support safe Pantex operations and taking these operations to the next level of system safety. The process will be rolled out over a 3-year period as a joint effort between B&W Pantex and the Pantex Site Office.

All new-hire employees are introduced to the site safety and health rules in initial general employee training (GET). These courses help train each employee to perform assigned work in a manner that promotes safety of self, coworker safety, and protection of plant property and the environment. Depending on the nature of guidance required, written instructions are provided in work plans. Employees are required to participate in, and sign off on a JSHA or equivalent information relevant to the work they are performing. When special conditions warrant, plant personnel participate in “safety standdowns.”

Dissemination of safety-related information is also provided through plant bulletins, toolbox/standup meetings with direct supervision, all-hands meetings, webcasts, and as part of safety meetings within sections, departments, and divisions.

Site personnel demonstrated an appropriate level of knowledge and awareness of the safety and health rules. New employees interviewed indicated that they are introduced to the site’s safety and health rules in GET. The applicable safety rules for all employees are also contained in the B&W Pantex employee manual. Positive reinforcement of safety rules was reflected in various divisional safety newsletters that contained articles regarding employees receiving incentive awards for following the safety rules.

## **Conclusion**

B&W Pantex has a strong program in place that applies the appropriate degree of rigor to proper selection of controls to eliminate or minimize workers' exposure to hazards, and meets the requirements of the Hazard Prevention and Control tenet of DOE-VPP. Significant efforts continue to be made in identifying and incorporating engineered controls throughout all aspects of the operations. Improvements in the emergency accountability process need to continue to ensure a robust accounting of personnel in a timely manner following an emergency condition.



## 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.

All structured training programs are managed and maintained in the Plateau Training Management System. The training program for each employee is documented in their individual learning plan, which is based upon the Training Program Description of the position and duties to which they are assigned. The formal B&W Pantex safety and health training program is comprised of approximately 800 safety-related training courses that are delivered by various training methods, including classroom, on-the-job training (OJT), and computer-based training. Computer-based training comprises 46 percent of all training. The Pantex Formal Training Program is a systematic approach to training that uses the performance-based training method of analysis, design, development, implementation, and evaluation. The analysis phase identifies performance/training requirements. The design phase uses the information collected during the analysis phase as the basis for developing training programs. Development incorporates design activities to produce lesson plans and training aids. Periodic evaluation of training materials and methods and soliciting feedback from trainees and supervisors are systematically performed to determine training effectiveness and needed improvement to training programs.

The training program consists of GET and job duty/task-specific training. GET is a series of courses offered each month by professional instructors and/or via computer-based training that provides key training and information to all plant personnel. There are numerous courses in GET with a major portion being safety-specific. Some of these courses are continuing training – refreshed every 12 to 24 months – while others are on a one-time basis. GET begins with new-hire training. B&W Pantex uses an employee's birth month as the designated month to take continuing GET. Plateau, a formal, electronic training records system, tracks training due and completed. It also provides associated information to managers and employees. Individuals are assigned curricula based on the job being performed. This information is tracked in Plateau, and supervisors receive a monthly report to verify qualification. In addition, supervisors can use Plateau from their desktop to verify and identify needed training for their personnel. For example, a pipefitter that shows incomplete training in a Rigging Fundamentals Duty Area will not be assigned tasks requiring rigging skills. Core qualifications, as differentiated from duty areas, must be kept current for the employee to be assigned any related work. Access to the Material Access Area (MAA) is even more rigorously controlled. Access to MAA is denied to personnel who have not completed all of the training and qualification requirements for MAA access.

Production Technicians receive extensive training and qualification before they are allowed to perform production operations. Training begins with GET, followed by 3 to 4 weeks of production technology core training, and followed by 10-20 weeks of weapons-specific work. Successful completion qualifies Production Technicians to obtain a P-level certification allowing them to work under direct supervision of a C-level Production Technician for one to two calendar quarters. Production Technicians subsequently must demonstrate proficiency and pass oral boards to obtain C-level certification. Production Technicians that are not successful during

oral boards must repeat the weapons-specific 10 to 20-week training. They must also requalify every 2 years.

Pantex's Protective Force Security Division has an extensive training program that encompasses a wide variety of safety and health classes, as well as job-related training needs. There are over 200 classes that an entry level SPO-1 participates in while other levels (SPO-II and SPO-III) receive increasing levels of training based on their needs. Classes vary from GET, RWT I, laser safety, chemical response, cart safety, vehicle safety, and use of firearms. The method of training consists of OJT, vendor-provided training, and computer-based training, as well as qualified instructor-led classes.

The training courses are very specific and SPOs are not authorized to use equipment that they have not been qualified on. Specific courses are offered in electric cart safety; patrol vehicles; high-mobility, multipurpose wheeled vehicles; shuttle patrol vehicles; and defensive driving techniques.

The SPOs use a variety of firearms to provide security at the site. New SPOs are not allowed to carry a firearm until that individual has been trained and qualified with that firearm. Qualifications on firearms occur every 6 months. To ensure safe use of firearms and to determine qualification status, Pantex has a variety of training areas that include indoor and outdoor ranges, an elaborate indoor training simulator with a full-size vehicle, including gun mounts and a variety of simulator firearms, and live-fire shoot house. Prior to use of live firearm training, a briefing is held with all participants and a walk-through is performed. The SPOs are divided into small groups with direct supervision adjacent to SPOs during the drill.

Another form of training conducted with the SPOs is FOF exercises. This is an elaborate training event that simulates a full scale assault on the complex. Preplanning of the event includes a scope, responsibility and accountability, risk assessment, operational considerations, safety, and goals. FOF events use no live ammunition. To participate as a controller, the individual controller must attend FOF Controller/Evaluator Training. Detailed exercise prebriefings are conducted with all employees involved and awareness information is shared with general plant employees.

In courses where OJT techniques are used, the instructor demonstrates the task on which the employee will be evaluated, then allows a practice phase for the employee, and concludes with the employee conducting an unassisted performance demonstration. The OJT training method focuses not only on showing the student how to perform steps safely and accurately, but also teaches how to recognize hazards, including those which have been identified in the hazard analysis and are now imbedded in the procedure or work package. Knowledge of possible hazards is gained through various safety-related courses taken by employees and identified within their assigned training curricula.

Supervisors, like nonsupervisors, also receive recurrent training via birth month training courses. Some of the training received is common between supervisors and nonsupervisors; however, the application of the acquired knowledge may be different based on the difference in roles. Supervisors also receive supervisory-specific training applicable to their position and responsibilities. For example, supervisors of personnel in HRP have unique responsibilities for the health and safety of their workers and receive HRP Supervisor Training and an annual refresher.

Training of supervisors on how to respond to employee safety and health concerns is accomplished through both informal and formal training methods. In regards to formal training, HPI Fundamentals provide focus on supervisory leadership responsibilities relative to hazard identification and error prevention. This course specifically discusses supervisor responsibilities associated with the promotion of open communications and the encouragement of employees to communicate safety and health concerns. This training discusses the various forms of reporting concerns ranging from reporting deviations from requirements or expectations to the reporting of near-misses and nonconsequential events. Additional emphasis is placed on effective approaches to communications that favorably influence the quality and quantity of employee concern reporting. This includes such factors as ease of making the report, positive consequences for submitting reports, prompt feedback on resolution of report, confidentiality (if desired by author), and the avoidance of disciplinary action except for serious or intentional violations.

Supervisors receive HPI training, which consists of responsibility relative to facilitating open communications, promoting teamwork, reinforcing desired behaviors, and eliminating latent organizational weaknesses. This course encourages supervisors to facilitate the identification of problems that may exist in the work area by encouraging and rewarding open communication with workers and listening to workers when they report safety and health concerns. The course specifically addresses the importance of creating an environment that encourages and rewards frequent, open, and relevant communications. Supervisors discuss ways to root out obstacles and inhibitions to communications.

B&W Pantex supervisors and managers have participated in professional development training such as *Proud to Lead*. This course is designed to enhance employee engagement skills of the first line supervisors and enhance the coaching skills of department managers. Three hundred and eighty-seven managers have completed this module. Additional modules are being developed in cooperation with B&W Y-12 using shared resources. *Proud to Lead* consists of scenario-based training involving personal leadership, interpersonal effectiveness, professional maturity, and customer value.

All new hires, supervisors, and managers receive ISM, HRO, HPI, BBS, Conduct of Operations, VPP, and Core Training Relative to Safety and Health. Selected supervisors have attended and successfully completed the OSHA 30-hour course for supervisors through Amarillo College in Amarillo, Texas. Safety professionals and supervisors have completed the J.J. Keller OSHA Safety Training course. This training also covers OSHA General Industry training.

Informal training methods are used for the dissemination of safety and health-related information and associated knowledge transfer to employees. These include (1) weekly staff meetings; (2) organizational safety meetings; (3) daily standup and toolbox meetings; (4) communication of lessons learned; (5) electronic safety publications; (6) safety-related newsletters; and (7) required reading. All these methods have proved to be successful; however, the mentoring that each supervisor receives from peers, subject matter experts, and their manager is believed to be the single, most effective informal training method relative to supervisor development.

The Team attended BBS, Asbestos Awareness, and Causal Factors Training for Facilitators, and Bloodborne Pathogens Training. The instructors were knowledgeable and course material was appropriate. There was appropriate attendee participation. All courses except Causal Factors for Facilitators were performance-based and required an 80 percent score on the written examination

to pass the course. The Bloodborne Pathogen course had medical personnel in attendance to answer clinical questions from the attendees, which is standard practice at this course.

### **Conclusion**

B&W Pantex has a well established training and qualification program that ensures employees are appropriately trained to recognize hazards and to protect themselves and coworkers. Workers generally know and understand policies, rules, and procedures established to recognize hazards to prevent exposure. B&W Pantex meets the requirements of the Safety and Health Training tenet of DOE-VPP.

## VIII. CONCLUSIONS

B&W Pantex, as the management and operating contractor for the Pantex Plant, deals with the most potentially hazardous work performed in the world. The unique combination of chemical, radiological, and explosive hazards present at Pantex provides daily challenges to workers and managers. The consequences of a failure in this work would be devastating. These hazards and risks are recognized and understood by everyone working at the Plant. Overall, B&W Pantex is performing admirably in its worker safety and health program. They have the best accident and injury performance in the NNSA complex and are committed to continued improvement. Managers at all levels exhibited strong leadership and commitment to safe, secure, and quality production. Worker involvement was strong in several areas with more active involvement evident in some divisions than in others. Operations at Pantex are supported by an NNSA-approved DSA, and high-hazard operations are strictly analyzed and controlled. Worker qualification and training to perform high hazard operations is rigorous and thorough. Support from the labor unions was evident. PGU and MTC have both been instrumental in making and supporting changes over the past few years that have significantly improved safety and health performance. In particular, PGU and the protective forces at the Plant have the best overall safety and health statistics of protective forces throughout the DOE/NNSA complex, while maintaining the training programs necessary to ensure the materials at Pantex are adequately protected.

The Team identified some opportunities for improvement primarily centered on providing additional resources to actively encourage and promote more employee involvement, ensuring subcontractors are held to the same expectations as B&W Pantex employees, ensuring corrective actions appropriately address the identified concerns, and looking for additional improvements beyond BBS. The Team is confident that B&W Pantex has systems and processes in place to address these improvements and continue the positive trends. Therefore, the Team recommends that B&W Pantex be admitted to DOE-VPP at the Star level.

**Appendix A****Onsite VPP Audit Team Roster****Management**

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