Fluor Hanford
Plutonium Finishing Plant

Report from the DOE
Voluntary Protection Program
Onsite Review
April 23-May 3, 2007

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

May 2007

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 (DOE-VPP) to encourage and recognize excellence in occupational safety and health protection. The DOE-VPP closely parallels the Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP), which was established by OSHA in 1982 and has demonstrated that cooperative action among government, industry, and labor can achieve excellence in worker health and safety.

DOE-VPP outlines areas where DOE contractors and subcontractors can comply with DOE Orders and OSHA standards while also "stretching for excellence." DOE-VPP emphasizes systematic and creative approaches involving cooperative efforts of everyone in the contractor or subcontractor workforce at DOE sites, including contractor managers and workers.

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, research and development operations, and various subcontractors and support organizations.

DOE contractors are not required to apply for participation in the DOE-VPP. In keeping with OSHA's VPP philosophy, participation is strictly voluntary. Additionally, participants may withdraw from the program at any time.

Based on and similar to those in OSHA's VPP, DOE-VPP consists of three levels of recognition: Star, Merit, and Demonstration. The Star level is the core of DOE-VPP, and its achievement indicates truly outstanding protectors of employee safety and health. The Merit level is a steppingstone for contractors and subcontractors that have good safety and health programs but need time and DOE guidance to achieve Star status. The Demonstration level is expected to be used rarely; it exists to allow DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Star level.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant is meeting, at a minimum, the basic elements of ongoing, systematic protection of employees at the site. The symbols of this recognition are DOE-provided certificates of approval and the right to fly the VPP flags (e.g., DOE-VPP Star flag for sites with Star status). The participant may also choose to use the DOE-VPP logo on letterhead or on award items for employee incentive programs. Further, each approved site will have a designated DOE staff person to handle information and assistance requests from DOE contractors, and DOE will work cooperatively with the contractors to resolve health and safety problems.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

AJHA	Automated Job Hazard Analysis
ALARA	As low as reasonably achievable
BLS	Bureau of Labor Statistics
CAMS	Continuous Air Monitors
D&D	Decontamination and Decommissioning
DART	Days Away, Restricted, or Transferred
DOE	U.S. Department of Energy
DOE-VPP	U.S. Department of Energy Voluntary Protection Program
DSA	Documented Safety Analysis
FH	Fluor Hanford
GFCI	Ground Fault Current Interrupter
HGET	Hanford General Employee Training
HRP	Human Reliability Program
HSS	Office of Health, Safety and Security
IH	Industrial Hygienist
IDLH	Immediately Dangerous to Life or Health
ISM	Integrated Safety Management
ISP	Industrial Safety Professional
ITEM	Integrated Training Education Matrix
M&O	Management and Operating
MSDS	Material Safety Data Sheet
NAICS	North American Industry Classification System
OSH	Occupational Safety and Health
OSHA	U.S. Department of Labor's Occupational Safety and Health Administration
OJT	On-the-Job Training
PERT	Process Equipment Removal Team
PLEX	Plant Life Extension
PFP	Plutonium Finishing Plant
PIC	Person in Charge
PPE	Personal Protective Equipment
RL	Richland Operations Office
RWP	Radiological Work Permit
SNM	Special Nuclear Material
SSC	Structures, Systems, and Components
SSW	Senior Supervisor Watch
USQ	Unreviewed Safety Questions
VPP	Voluntary Protection Program

EXECUTIVE SUMMARY

The Fluor Hanford Incorporated (FH) Plutonium Finishing Plant Closure Project (PFP) is responsible for safe and compliant storage of special nuclear material (SNM) at PFP until it has been removed from the PFP complex, and subsequent decontamination and decommissioning (D&D) of the buildings to a slab-on-grade condition. The project was awarded the U.S. Department of Energy –Voluntary Protection Program (DOE-VPP) Star status in 2002. It was due for a recertification site visit in 2005, but that visit was delayed until 2007 for a variety of reasons, including contract negotiations and personnel restructuring within FH.

Continuation of Star status in the DOE-VPP program requires an onsite review by the DOE Office of Health, Safety and Security (HSS) DOE-VPP team (Team) every three years. The Team conducted its review during April 23-May 4, 2007 to determine whether PFP is continuing to perform at a level deserving DOE-VPP Star recognition. The purpose of this report is to document the results of the Team review and provide the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding PFP's DOE-VPP status.

Based on interviews with over 20 percent of the project team, extensive observation of work activities, inspection of worksites and facilities within the project scope, and reviews of records, the Team determined that the PFP has maintained and improved a strong safety culture and is performing well in all the tenets of DOE-VPP. Additionally, the accident, injury, and illness rates for the project are well below their industry averages, and show an overall decreasing trend. Consequently, the Team recommends that the PFP continue DOE-VPP program with Star status.

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

Table 1. Opportunities for Improvement

Opportunity for Improvement	See Page
PFP managers should consider implementing and encouraging a peer observation/behavior -based safety initiative to identify and reduce at risk behaviors during uncomplicated, routine, low hazard activities.	5
FH should add clarification of time commitments and position responsibilities to the Zero Accident Council charter to ensure employees understand the time commitment and responsibility of a Zero Accident Council member.	9
FH should develop training for Zero Accident Council members that includes: accident investigation, inspections, trending, and Safety Improvement Plan development.	9
FH should develop a formal method of providing timely feedback to employees who submit concerns to managers or the Zero Accident Council.	10
PFP should ensure that issues identified to supervisors and managers are recorded, and all identified issues (including those in Safety Logbooks) are compared, evaluated, and trended for potential common contributing causes and that appropriate corrective actions are identified and completed.	11
PFP should periodically review the MSDS system data base to remove redundancies and obsolete and unused chemicals.	15
A pre-start up or pre-use safety evaluation should be conducted on all new equipment or processes. Skill of the craft determinations should be made based on the hazard analysis process, rather than performing hazard analysis based on skill of the craft assumptions.	16
FH should develop written guidance and instructions for health and safety inspections and make them accessible to personnel who participate in these inspections.	17
FH should provide training in hazard recognition and inspection techniques for personnel who participate in health and safety inspections.	17
Recognizing that the *Event Report* form (A-6001-714) is only being used for injury/illness reporting and that no other areas of the form, such as near misses, lock and tag issues, and potential exposure issues, are being utilized, FH should reinstate the *Event Report* form as intended and report on all "Events" (not just injuries and illnesses), or revise the procedure and form to provide guidance for reporting only injuries and illnesses.	18
Industrial Safety Professionals should receive training in root cause analysis and the use of cause codes.	18
PFP should develop and implement a PFP policy and procedure for the installation, tracking, use, maintenance, and removal of temporary load centers. Ensure the policy and procedure meet configuration management expectations for a Hazard Category 2 Nuclear Facility.	22

I. INTRODUCTION

The DOE-VPP onsite review of the PFP was conducted from April 23-May 3, 2007. PFP is managed by FH, the prime contractor for the Management and Integration contract at the Hanford Site since 2002. The DOE Richland Operations Office (RL) provides direction to and oversight of FH.

The Project Hanford Management Contract establishes the following primary tasks for PFP.

- Provide safe and compliant storage of special nuclear material (SNM) at PFP until it has been removed from the PFP complex.
- Operate and maintain the PFP facilities and associated waste sites, structures, operating systems and equipment, and monitoring systems within the authorization envelope.
- Maintain radiological control and access control to ensure personnel safety.
- Disposition SNM packaged in compliance with DOE-STD-3013-2004 and unirradiated fuel by transporting to a DOE approved storage facility off the Hanford Site.
- Disposition slightly irradiated fuel by transporting to a DOE approved storage facility out of the PFP protected area.
- Disposition miscellaneous nuclear materials (sources/standards) not needed to support D&D of PFP or management of the SNM inventory.
- Disposition PFP buildings to slab-on-grade condition.
- Prepare and package waste streams for disposition, as required, and dispose, as appropriate.

Recognition in the DOE-VPP requires an onsite review by the Office of Health, Safety and Security (HSS) to determine whether the applicant is performing at a level deserving DOE-VPP recognition. The Team evaluated PFP's safety programs against the provisions of the DOE-VPP and consisted of safety professionals with VPP experience and expertise from DOE Headquarters and other DOE sites. During the site visit, the Team observed extensive work activities, evaluated relevant safety documents and procedures, and conducted interviews to assess the strength and effectiveness of PFP's health and safety programs.

The Team interviewed many employees, managers, and supervisors, either formally or during observation of field activities. Hazards associated with work at PFP included, but are not limited to, the range of industrial hazards associated with construction or demolition work, and also extensive radiological contamination and residual process chemicals. Recent work to decontaminate and demolish the 241-Z facility presented some of the most hazardous decontamination work encountered within the DOE complex, involving several hundred personnel entries into highly contaminated (radiologically) confined spaces. Most work observed by the Team involved removal of equipment for disposal.

II. INJURY INCIDENCE / LOST WORKDAYS CASE RATE

The HSS Team conducted a review of the Occupational Safety and Health Administration (OSHA) 300 logs. The tables below summarize the OSHA reportable data for PFP employees as reported by Fluor Hanford/PFP.

Fluor Hanford/PFP
INJURY INCIDENCE / LOST WORKDAYS CASE RATE

Injury Incidence / Lost Workdays Case Rate (FH/PFP)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	Total Recordable Case Incidence Rate	Days Away, Restricted, or Transferred (DART) Cases	DART Case Rate
2004	1,374,371	4	0.58	1	0.15
2005	1,441,809	12	1.66	4	0.55
2006	1,039,789	2	0.38	2	0.38
Three Years	3,855,969	18	0.93	7	.36
Bureau of Labor Statistics (BLS-2005) average for NAICS Code # 562 (waste management and remediation)			7.1		4.7

Injury Incidence / Lost Workdays Case Rate (FH/PFP - Subcontractors)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	Total Recordable Case Incidence Rate	DART Cases	DART Case Rate
2004	19,114	0	0.00	0	0.00
2005	27,901	0	0.00	0	0.00
2006	12,505	1	15.99	0	0.00
Three Years	59,520	1	3.36	0	.00
Bureau of Labor Statistics (BLS-2005) average for NAICS Code # 562 (waste management and remediation)			7.1		4.7

Total Recordable Case Incidence Rate: 0.93
Lost or Restricted Workday Case Incidence Rate: .36

Total Recordable Case Incidence Rate for subcontractors: 3.36
Lost or Restricted Workday Case Incidence Rate: 0 .00.

Conclusions

PFP injury rates for FH are well below the averages for the comparable industry and meet the criteria for participation in the DOE-VPP at the Star level. While the subcontractor total recordable case rate is higher, the higher rate reflects only one case in the past three years. The subcontractor three year average TRC rate and DART case rate are below the comparable industry averages, and also meet the criteria.

III. MANAGEMENT LEADERSHIP

Management and 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 the 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 clearly communicated policies and goals, clear definition and appropriate assignment of responsibility and authority, adequate resources, and accountability for both managers and workers. Finally, managers must be visible, accessible, and credible to employees.

Interviews with the PFP managers, from the project Vice President down through the project organization, all demonstrated a clear commitment to the safety and health of every member of the project. Managers indicated, and the safety record confirms, that managers within the project view safety as an integral aspect of work. The project Vice President was ardent in his expectation that workers not only have "stop work authority," but a "stop work responsibility." This attitude was evident throughout the workforce, contributing to a safety-conscious culture.

Project Hanford Management procedures define how work is accomplished, and include the integration of safety into all work. The Fluor Hanford Project Execution Plan describes the FH approach to safely accomplish the mission and goals established in the Project Hanford Management Contract (PHMC). A series of PHMC Procedures and PFP Project procedures define how the requirements and management processes are implemented. These processes and procedures adequately define the authorities and responsibilities for safety and health of the workforce. Observations of work and inspection of worksites clearly reflected the use of and conformance with processes and procedures.

The "*Fluor Hanford Safety Policy,"* HNF-5053, establishes a clearly stated policy on safe and healthful working conditions. This policy applies to all workers at the site, including FH employees and subcontractor personnel. This policy is communicated to all workers initially as part of the Hanford General Employee Training (HGET). PFP has published and posted the PFP Code of Values, which include safety, quality, and commitment. Furthermore, PFP has established an unambiguous safety policy that defines management responsibility, stop work authority, and individual accountability.

FH has established specific goals for achieving low DART and TRC case rates. PFP is above the FH corporate average goal for TRC and DART. In the first four months of 2007, there have been four recordable injuries. All these injuries have occurred during uncomplicated, low hazard, routine actions such as getting out of a car, knocking down a cobweb, picking up an extension cord, or lifting a laundry bag. Managers interviewed expressed frustration with finding ways to prevent these types of accidents or injuries. There have been no accidents or injuries associated with the recognized complex, high hazard work associated with the project mission. A potential means of addressing this problem might be more extensive use of behavior-based safety techniques and peer observations. This process would allow employees the opportunity to observe any unsafe or at-risk behaviors among their fellow employees and

communicate back to their peers when unsafe or at-risk behaviors are observed. This process can help mitigate possible near misses or identify recurring unsafe behaviors.

PFP managers should consider implementing and encouraging a peer observation/behavior -based safety initiative to identify and reduce at-risk behaviors during uncomplicated, routine, low hazard activities.

Regular morning safety announcements, incentive awards, and published safety notes are being used to focus workers on using safe behaviors at all times, not just during high hazard work. All managers and employees interviewed were consistent in their understanding that the ultimate goal was "zero," meaning that everyone was focused on trying to prevent all accidents, injuries, and illnesses. The safety statistics tracked by FH are reviewed weekly by the project management team.

The management team at PFP meets on a monthly basis with labor representatives (stewards). All managers indicated that these meetings are a good forum for discussing safety issues and that a significant portion of the discussion focuses on safety. Managers and labor personnel use this meeting to effectively address numerous issues and concerns while ensuring that this meeting does not violate any bargaining agreements. Additionally, in response to the four reportable cases that have occurred this year, the labor management meetings have been held bi-weekly rather than monthly. Employees who were interviewed felt that the communication between labor and management was useful in resolving issues that arise in the plant. For example, this joint labor-management meeting was used to address an issue regarding repair and maintenance of continuous air monitors (CAMs).

The PFP project has been organized to effectively and safely accomplish the mission. The bulk of the work is performed by work teams. The project is currently funded for 14 active teams. These teams consist of the necessary labor (nuclear chemical operators and maintenance crafts) to perform all work. Radiological control technicians are assigned to the teams as necessary, with the same technician typically assigned to each team for continuity as available resources permit. These teams are responsible for the planning, scheduling, and execution of the work tasks. Managers have provided these teams with the necessary guidance and resources, and have encouraged them to identify innovative methods to safely accomplish the project mission, such as the "Turkey Roaster" discussed under *Section V. Worksite Analysis*.

To address the recordable cases occurring during minor, routine activities, the project Vice President has worked with the Z area Zero Accident Council to implement some safety incentives. For example, the project has committed potentially over $70,000 for gift cards and an end-of-year safety celebration (see *Section IV. Employee Involvement*).

Based on the information gathered during this review, sufficient safety resources are available to perform safety and health functions. Approximately 20 percent of the PFP budget is clearly tied to safety. There is a dedicated staff with expertise in industrial hygiene, industrial safety, and radiological controls to provide the necessary support to safely accomplish field work. Because of the pervasive radiological hazards, there are over 50 radiological control technicians assigned to the project, with three health physicists available to provide support. The health and safety team includes five industrial hygienists, two industrial safety engineers, and craft support.

FH performs an annual safety and health program evaluation. For PFP, that evaluation was conducted by a team of 12 people independent of the PFP project organization. The results of that evaluation are incorporated into the PFP Safety Improvement Plan. The Safety Improvement Plan, at most FH Projects, is an annual plan. At PFP, the plan is treated as a living document. Safety improvements are tracked to completion, and the plan can be modified any time as necessary to address emergent issues. This provides for a more responsive plan with adjustments throughout the year and with input from the Zero Accident Council.

PFP has implemented a senior supervisory watch, which is posted on a daily basis. These watches are rotated among managers within the project, and are intended to provide senior level guidance and attention to daily work. The assigned manager may conduct both mentoring and inspection activities focused on safety.

Although all managers were committed to safety, they did not all display detailed understanding and knowledge of DOE-VPP and their responsibilities under the DOE-VPP. Most managers indicated in interviews that employee involvement was the most important aspect of DOE-VPP. They did not clearly understand that management leadership is equally important. The commitment to going beyond the requirements and pursuing excellence in safety needs to be reemphasized to managers, particularly newer managers who were not part of the original DOE-VPP certification.

A concern expressed by all managers was the potential for layoffs from the project and the effect of "bump and roll" within the work force. For years, PFP personnel who were interviewed indicated that PFP had been considered a less desirable place to work by members of the Hanford work force. Consequently, many workers at PFP tend to be juniors. In the event of layoffs, the bargaining unit agreement determines job security on the basis of seniority. This situation can result in significant instability of the PFP workforce. On a positive note, however, many employees who were interviewed indicted that they initially did not prefer to work at PFP, but now do not want to work anywhere else. This is a testament to the improvements in the safety and working conditions since becoming a DOE-VPP participant.

Conclusions

Over the course of the past five years, the safety statistics have improved dramatically. This safety record confirms that managers within the PFP view safety as an integral aspect of work. A system of policies and procedures define how work is accomplished, and include the integration of safety into all work. There is a clear policy on safe and healthful working conditions. Managers have obtained and provided the necessary resources to provide safety incentives, and ensure effective communication with workers. The project is structured to effectively and safely accomplish the project mission. Annual safety and health program evaluations effectively identify most developing problems, and the results are incorporated into safety improvement initiatives and plans. Although the management leadership aspect of DOE-VPP is generally positive, two areas for management attention were identified. First, newer managers may not have received sufficient training or mentoring regarding DOE-VPP and their responsibilities as a DOE-VPP Star site. Second, the potential for future layoffs and work force instability will create challenges that managers will need to address.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels must be involved in the structure and operation of the safety and health program and in decisions that affect employee health and safety. Employee participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices.

PFP has approximately 500 employees including bargaining unit, exempt employees, managers and executives. The Team conducted both formal and informal interviews with approximately 20% of the PFP population.

The employees at the PFP Closure Project are involved in the structure and operation of the safety and health program and with decisions that affect employee health and safety. Employees and managers have essentially the same responsibilities for identifying and correcting hazardous conditions. PFP's philosophy and culture has contributed to a cohesive partnership between managers and employees. The employees of PFP are very compassionate about community outreach such as the Cancer Relay for Life event, supporting the Junior Achievement project and supporting their fellow employees. PFP employees have described themselves as being "family" and it is evident by what they do for their fellow employees in time of need.

Employees who were interviewed indicated they felt the current disciplinary action system was fair and consistent, and they did not express any concerns about inappropriate disciplinary actions among their peers. Employees were aware of disciplinary actions that had occurred at PFP which were directly related to safety infractions by their peers. Employees are accountable for all their performance and behavior. Employees who are involved in any significant or frequent violation of any operating procedures or practices will be counseled and disciplined accordingly. Exempt and bargaining unit employees have received disciplinary actions from verbal warnings to time off without pay.

PFP procedures and the "open door" policy clearly indicate that multiple avenues of employee participation are available. All employees interviewed indicated that their manager and/or supervisor were their first contact for safety concerns. Employees are also encouraged to address a Zero Accident Council representative, safety professional, or place their concern in the Safety Logbook. Employees have the authority to stop any work to prevent or mitigate a hazard that threatens immediate physical harm to any employee or the environment.

PFP managers and the employee Zero Accident Council have established a safety recognition program to encourage and recognize employees for their safety posture. Safety recognition items are distributed to the employees by managers that are based on input from all employee groups. This safety recognition program is implemented by the Zero Accident Council according to the following three tier award structure.

1. Individual or team performance recognition
   This recognition program is based on an individual or a team that has demonstrated outstanding safety performance in one or more of the following criteria.
   a. Safety suggestion or work practice safety improvement.
   b. Change to a work or design package that enhances safety.
   c. Participating in safety improvement initiative(s).

d. Safe work behavior to others.
e. Demonstrated commitment to safety of co-workers.

2. Project performance recognition

   All OSHA recordable injuries are a major concern for PFP. Therefore, FH has initiated a Project Performance Recognition program. The program provides awards ($50 gift certificates) to PFP employees (selected by drawing) if PFP does not experience an OSHA recordable injury in a week and progressively increases the number of awards for each subsequent consecutive week without a recordable injury. If an OSHA recordable injury is recorded then the Project Performance Recognition program starts over. If employees reach the goal of zero recordable injuries for the fiscal year then 950 gift certificates will have been awarded to PFP employees. As part of the Project Performance Recognition program, PFP also sets aside $25 per award given out which will then be put into a pool for an end of the year employee safety celebration.

3. Corporate recognition

   Each quarter that the PFP project meets the corporate recordable injury rate goal, funds are allocated to employee recognition and/or celebration.

Employees are involved in the identification and analysis of hazards, as well as selection of hazard controls. The primary hazard review is conducted using the online Automated Job Hazards Analysis (AJHA) program. A review of any potential safety or industrial hazards is performed by the Person-in-Charge (PIC), as part of the technical document preparation process. In addition, jobs performed through the Job Control System receive a pre-job planning and hazard review. Issues and concerns addressed during the AJHA review are addressed before the job begins. A pre-job walk down after the AJHA is conducted before work commences. Results of the AJHA are incorporated into work packages, work instructions, and pre-job safety briefing checklists. The checklists are then used to conduct safety briefings prior to any work being performed

The planners preparing the AJHA do an exceptional job. During the 2002 DOE-VPP assessment, the AJHA process was in its infancy stage and employees at that time felt, in some instances, that broader worker participation in the AJHA process was limited by what was described as “production urgency.” Employees interviewed during this 2007 DOE-VPP assessment felt that they are now fully integrated in the AJHA process and believe they have ownership of the process. The Team observed several AJHA reviews in which employees were actively involved in the process. Pre-job safety reviews were observed to be thorough, and in some cases the PIC made exceptional efforts to ensure all workers were thoroughly engaged in the briefing by asking questions of specific personnel.

PFP has a very active Zero Accident Council, which meets on a monthly basis. The Zero Accident Council is composed of one representative from each organization, with managers, bargaining, and non-bargaining employees being equally represented. The members of the Zero Accident Council are either appointed by their manager or union, or volunteer to represent their designated organization. Zero Accident Council members bring issues and safety concerns to the monthly meetings from their own observations, from employees they represent, or issues and concerns placed in the Safety Logbooks. All meeting minutes and actions are posted on the company website and also discussed with employees during their Monday morning tailgate

meetings. The Zero Accident Council has also begun placing safety items in the Safety Improvement Plan. The items that are placed in the Safety Improvement Plan are tracked with regular status updates. Last year's meeting minutes indicated that issues raised during Zero Accident Council meetings were tracked on a monthly basis until resolution.

The current structure of the Zero Accident Council is aligned with the work organizations within PFP. The meetings are well attended by both managers and employees. PFP also created a VPP Management Champion Steering Committee. This steering committee meets at least once month with an agenda that addresses issues that have risen from Zero Accident Council meetings and other safety concerns. PFP Zero Accident Council also participates in the monthly FH President's Zero Accident Council. Two members of the council or other employees are chosen to represent the Council at this monthly event.

The Zero Accident Council has a generous budget dedicated to the safety program. Safety communication from the Zero Accident Council to the employees is distributed in numerous ways such as safety meetings, Z-News, emails, bulletin boards, Monday morning tailgate meetings, monthly safety agendas, and the senior supervisor watch.

The Zero Accident Council charter defines roles and responsibilities for the co-chairs and team members. However, the Zero Accident Council charter could be strengthened by expanding the definition of roles and responsibilities to include identifying time commitments and position responsibilities. This additional information would allow employees the opportunity to determine if they want to make the commitment to serve on the Zero Accident Council.

FH should add clarification of time commitments and position responsibilities to the Zero Accident Council charter to ensure employees understand the time commitment and responsibility of a Zero Accident Council member.

Zero Accident Council members have not received specialized training on inspections, accident investigations, setting goals and objectives (applicable to the Safety Improvement Plan), or tracking and trending of safety incidents and concerns. Although not specifically required, this type of training is recommended in the DOE-VPP documents, and can contribute to the effectiveness of the Zero Accident Council.

FH should develop training for Zero Accident Council members that includes: accident investigation, inspections, trending, and Safety Improvement Plan development.

Although the Zero Accident Council is active, there is currently no process to measure its effectiveness. FH should identify and establish a process to measure the effectiveness of the Zero Accident Council that includes identifying elements necessary for success. Elements to consider might include effectiveness of committee organization, issue awareness and resolution, recognition programs, training, participation, representation, communication, management involvement, and resources.

Employees at all levels expressed satisfaction with their level of involvement in the structure and operation of the safety and health program and in decisions that affected employee health and

safety. Employee participation is in addition to the individual right and responsibility to notify appropriate managers of hazardous conditions and practices. Employees interviewed by the Team have worked for PFP for periods ranging from less than a year to over 25 years. Almost all employees interviewed indicated that they believed that they were appropriately empowered to raise any type of issue or concern and all employees interviewed knew their Zero Accident Council representative. Employees voiced no fear of retaliation for raising safety issues.

One ongoing problem has been getting employees to use the facility Safety Logbook consistently and accurately so that it will be an effective tracking tool. The 2002 DOE-VPP assessment determined that the facility Safety Logbooks provided an opportunity for employees to express concerns, review status of corrective actions, and review inputs from colleagues. Over the past several years, use of the facility Safety Logbooks by the employees has declined. Employees are comfortable going to managers and supervisors to resolve almost all safety issues and concerns, and consequently do not want to use the Safety Logbooks.

When concerns are identified verbally to supervisors or managers, unless it is a maintenance related concern, there is often no record of the concern or how it was addressed. For example, a group of radiological control technicians reported that over the past 18 months they had repeatedly told management about a valve that was leaking acid that needed to be fixed. The employees thought this was a safety concern as personnel could walk under this elevated piping and have acid drip or splash on them. Upon visual inspection, it was obvious that the valve had been leaking. The area had been roped off with safety signs directing personnel to stay clear of the immediate area. The room was not a high traffic area. The employee who reported the concern did not know that the area had been roped off with signs and management thought that the hazard had been satisfactorily mitigated.

Some entries into the facility Safety Logbooks do not receive timely feedback to the employees. There is only one safety professional addressing the issues in the logbook, and other commitments and priorities limit that person's ability to respond in a timely manner. Information from the facility Safety Logbooks and concerns identified to supervisors or managers are not being effectively documented or trended. Consequently, potential common contributors to safety issues may not always be recognized, evaluated, and corrected.

In addition to safety and health related concerns, employees can use the Maintenance Identification Form to report equipment in need of repair. The Maintenance Identification Form process is managed by the facility work control staff and is reviewed by Health and Safety professionals for prioritization and tracked to completion. These forms are located in strategic areas of the facility. A team member witnessed an employee filling out one of the forms to resolve an air lock alarm that kept alarming inadvertently due to excessive wear between the alarm contact and the door. A prioritized list of identified issues is provided to management and the Zero Accident Council on a monthly basis. Imminent safety issues automatically go to the top of the list; however, lower safety concerns may take longer to resolve based on their priority level.

FH should develop a formal method of providing timely feedback to employees who submit concerns to managers or the Zero Accident Council.

Most employees (95% of those interviewed) indicated that they had no fear of reprisal for reporting hazards. However, one employee reported that if they reported a concern with the current method of removing anti-radiation contamination clothing that it could possibly be a "career limiting move." Another employee indicated that some employees did not want to provide management with negative information because of concerns that it may contribute to their selection for the next round of layoffs.

PFP should ensure that issues identified to supervisors and managers are recorded and all identified issues (including Safety Logbooks) are compared, evaluated, and trended for potential common contributing causes, and that appropriate corrective actions are identified and completed.

All employees who were interviewed indicted that they understood the "Stop Work" policy and would have no fear of reprisal for stopping work. Several employees provided examples of when they stopped work in order to get safety issues resolved. This was reported to have been done with no reprisal.

An important part of any safety program is a means for employees to raise safety issues beyond their management chain, anonymously if desired. FH has such a mechanism through their Employee Concerns Program. That program has forms for identifying concerns, as well as a hot-line that any employee can call. The information is available on the FH intranet, but the employee concern phone number is not clearly posted on bulletin boards and forms are not readily available without access to the intranet. This situation has significantly limited employee's awareness of that venue. Few employees interviewed were aware of the program, although they believed if they had a concern that rose to that level, they would be able to find the information on the intranet. FH has decreased the number of personnel assigned to the Employee Concerns Program. As of this review, there were two employees assigned to the Employee Concerns Program and one of those was on short term disability leave. Phone calls to the employee concerns number by the Team went unanswered for four days. Further, the FH Employee Concerns Program does not have an established policy that defines management expectations for how quickly a call to the hotline should be answered. With only one employee, there is the potential that cases might not be handled in a timely manner. Weaknesses in the FH corporate Employee Concerns Program were identified by the HSS Office of Independent Oversight's Inspection of Environment, Safety, and Health and Emergency Management Programs at the Hanford Site Waste Stabilization and Disposition Project in September 2006. FH must ensure corrective actions for that finding are effective.

Employees are actively involved in emergency preparedness drills that are conducted both inside and outside the fence at PFP. General emergency drills are conducted on the average of 1.5 drills per month. Operational drills are run four - five times per month. Drill level difficulty ranges from moderate to challenging. Drill critiques and deficiencies are discussed with all drill participants. The Emergency Planning (EP) Director thoroughly plans a wide range of scenarios including evacuation, take cover, and medical response. All drills are timed and response time is logged to determine effectiveness. The EP Director takes his job seriously and recognizes the disastrous outcomes that could occur if employees are not trained to handle emergency situations in a safe and thorough manner. Examples of recent drills scenarios include the following.

- 241-Z Fire during D-6 Cell Entry/Injury/241-Z Evacuation and PFP Take Cover/Level of difficulty – Challenging
- HC-227-S Glovebox fire in Room 227 of 243-5Z/Evacuation/Level of difficulty – Moderate
- Medical emergency in MO-273 – anaphylactic shock (bee sting)

The Monday morning tailgate meetings are an effective tool for all employees. During these tailgate meetings a safety share is given to employees along with a safety topic, safety improvement, injury and illness reports from the previous week, Z-news, safety recognition program and any discussions from the employees group. During the week of November 20, 2006, 18 employees had their name drawn during the Monday morning tailgate meeting for a $50 gift certificate recognizing employees for PFP going 8 weeks without a first aid or recordable injury. Employees view this program as positive recognition for maintaining a safe work environment.

The Zero Accident Council has implemented a 24/7 Safety Matter initiative that allows employees to identify unsafe acts by putting them into the 24/7 database. This database is designed to increase employee awareness of unsafe situations, conditions, or acts experienced away from the workplace. The database allows employees to express their concerns and to increase the awareness of other employee actions by discussing unsafe acts both on and off the job. This database is something that is new to the employees and they are learning how to access the information on the website. Employees believed that this database is another avenue that they could use to share their safety culture with their coworkers at PFP and across the Hanford Site.

Conclusion

A strong and active safety culture at PFP is evident by the employee's commitment to the DOE-VPP safety process. A strong sense of family was noted and all employees who were interviewed indicated that they "actively care" for their fellow employees. Employees and managers have formed a strong partnership over the past several years and this is evident in their commitment to safety. Effective communication between employees and managers in addressing on the spot safety issues and concerns is commendable. There is strong employee involvement in the AJHA process. Notwithstanding the positive aspects, FH needs to ensure effective processes are implemented to record, track, and trend all safety concerns raised by employees, including those raised verbally to managers or supervisors. In addition, FH needs to ensure that the identified weaknesses in the corporate Employee Concerns Program are addressed in a timely manner.

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 identify and analyze all hazards encountered during the course of work. The results of the analysis must be used in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that are encountered, and a system to ensure those new or newly recognized hazards are properly addressed.

Each of the PFP nuclear facilities has an approved documented safety analysis (DSA). FH has an approved process to review and maintain the DSA that includes an unreviewed safety question (USQ) process. Before any new design or modification of systems or processes, a hazard and accident analysis is completed. This analysis documents the defined processes and specified requirements, lists specific types of hazards and mitigation during design, and ranks categories of hazards. Safety and engineering professionals review design criteria and provide comments and resolutions.

Employee Job Task Analyses are used to evaluate the general tasks performed by individual workers. Those analyses are reviewed by industrial hygienists, and are also provided to the site medical provider to evaluate annual medical requirements. The Employee Job Task Analysis is renewed and updated periodically or whenever the individual has a change in his/her potential exposures or routine scope of work. Additionally, Employee Job Task Analyses are used to determine fitness for duty requirements and work capacity evaluations.

The major hazards present in PFP have been identified and characterized. Baseline Hazard Assessments have been performed and are maintained for each of the following facilities:

- 236-Z Plutonium Reclamation Facility and 242-Z Americium Recovery Facility;
- 241-Z Waste Treatment and Storage Tank Facility;
- Ancillary Facilities; and
- 234-5Z Facility.

Baseline identification of hazards and energy sources was performed using the checklist provided in HNF-8739, *Hanford Safety Analysis and Risk Assessment Handbook (SARAH), Table 1-1.* The checklist profiles a list of hazard categories (e.g., electrical, flammable materials, and ionizing radiation sources) to assist in the identification process. The appendices of HNF-24404, *Programmatic Health and Safety Plan for the PFP Closure Project,* document the hazard categories evaluated and list applicable Health and Safety professionals that assist in the evaluation including safety, fire, industrial hygiene, and medical professionals.

Because of the history of PFP and the current decontamination, deactivation, and demolition mission, FH has decided not to update the Industrial Hygiene baseline hazard assessment on a periodic basis. Activities performed in and around the facility can result in frequent changes to the hazards. Therefore, personnel are performing hazard analysis by the job rather than by the building. The physician's assistants from the site medical contractor participate in worksite analysis of hazards, along with FH safety professionals and technicians. This approach more effectively identifies applicable hazards. Risk-based monitoring and personal exposure monitoring are then performed based upon the job hazard analysis.

In recognition of the age of the facility, PFP has prepared several plant life extension (PLEX) reviews utilizing the standardized process of HNF 29434,"*PFP Plant Life Extension Process.*" Structures, systems, and components (SSC) evaluated were selected based upon the definition of a critical SSC in HNF 29439. RL has requested that FH evaluate the impact to the PFP complex to address the baseline change for slab-on-grade from 2009 to extending the facilities operation use to 2016. Some examples of systems evaluated include electrical; heating ventilation and air conditioning; breathing air; laboratory support; emergency notification; and sanitary and process water.

A number of actions recommended by the PLEX review are listed below.

- Continue preventive maintenance interoperability testing of the diesel generators. Continue the practice of replacing components on all three generators when a component is replaced on any one engine due to failure.
- Replace the automatic transfer switch to allow for automatic transfer of power from the standby power system to security related systems on loss of normal power.
- Establish an electrical predictive preventive maintenance program for panel boards/breakers, switchgear bus and supports, and motor control centers in the facility.

In addition, several SSCs were determined by FH to be critical and are detailed in the report. PFP's extensive and detailed review of these critical facility components demonstrates management's commitment to ensure facility hazards are appropriately controlled despite budget uncertainty.

HNF-PRO-079, *Job Hazard Analysis,* establishes the minimum requirements for integrating activity-based job hazard analysis into work planning. Job hazard analysis is used to identify, evaluate, control, and communicate potential hazards and environmental impacts relative to discrete work activities/tasks to be performed, and establish an appropriate level of controls as well as setting priorities for the most hazardous jobs. The procedure also implements and integrates the AJHA tool with the job hazard analysis process. The AJHA is used to identify hazards and establish controls for work activities that are determined to be beyond skill-based work. All work that is considered beyond skill of the craft is performed using the principles of integrated safety management (ISM) in the work control system.

Based on a review of work packages, jobs are appropriately broken into discrete steps, with hazards identified for each step. For each hazard listed, one or more prevention or control measures are provided. Employees performing the work are normally involved in the hazard identification process, along with assistance from safety and health professionals and radiological control technicians. The job hazard analysis process also normally includes a thorough walk down of the job prior to sitting down in the AJHA meeting. Any specialized tools and equipment and other hardware involved in work process are also analyzed for hazards as part of the job analyses.

One noteworthy practice utilized by the PFP Process Equipment Removal Teams (PERT) involved the use of detailed, color coded, three dimensional drawings of the glovebox trains to help plan and identify work to be performed during material removal activities. Each PERT team has copies of the large drawings posted on their team's pre-job meeting room walls and uses the drawings as part of their daily briefing. The drawings are used to identify the materials

to be removed or sampled for each entry. This visual aid was very useful because the teams could and did discuss potential "trouble points" for the work activity before entering the contamination area. Examples of the trouble points addressed included identification of tools that would accommodate the limited space for certain cutting activities, pieces needed to be removed and the order of their removal, and components that had potential for high contamination that need to be sampled. With the nature of the work being performed at PFP, particularly with regard to the PERT work, any visual aid or technique that increases the team's familiarity with the equipment to be worked on and limits the team's exposure time in the contamination area is valuable. The teams also used the drawings to discuss the day's progress with supervisors and safety professionals in their post job discussions.

Employees reported that if there were incorrect steps in a procedure or if previously unrecognized hazards were identified that work would be stopped until the work package could be revised to accurately identify the methods for performing the work. Several employees indicated that, although this process was time consuming, they had personally been involved in this process before and would continue to stop work if necessary to perform work safely and in accordance with approved work packages.

Before the use of any new chemicals or tools, a pre-use/pre-startup analysis of potential hazards is performed by the safety organization. Depending on the application, industrial hygiene, industrial safety, and fire protection may be involved in the review. For example, industrial hygiene professionals reported on a new saw that was acquired for use inside a high radiation glove box. Before use of this new saw was approved, a mock-up of the areas was used and noise measurements and air samples (looking in particular for chrome vapors) were taken. When a new chemical arrives at the PFP, it is inventoried by their chemical management person, evaluated by both safety and industrial hygiene personnel, and logged into the system with the proper Material Safety Data Sheet (MSDS) prior to use.

Employees reported that the MSDS system is overloaded and is in need of housekeeping. For example, there were 15 different MSDS's for a single lubricant (WD-40). This was one example cited where several MSDS's sheets should be culled if they are no longer needed. The MSDS system is growing so large that it is becoming difficult to use, and may discourage employees from reviewing MSDS during the job hazard analysis or prior to chemical use.

PFP should periodically review the MSDS system data base to remove redundancies and obsolete and unused chemicals.

Completed work packages must be reviewed by an assigned radiological engineer. A Radiological Work Screening form is completed and included in the package to determine the radiological risk of the work. Based on this review, the work is assigned a radiological risk categorization of low, medium, or high. This graded approach determines the radiological controls needed to mitigate the radiological hazards (i.e. its air-born contamination potential). If considered high risk, a job receives a special screening by the enhanced as low as reasonable achievable (ALARA) committee.

The results of the radiological risk evaluation are then used to develop the radiological work permit (RWP). The RWP identifies hazardous conditions and engineering or administrative

controls that will be used to mitigate of the hazards. The RWP defines personal protective equipment (PPE) and personnel training and qualification requirements.

In at least one case, workers identified an engineering control to more effectively prevent release of contamination from gloveboxes during equipment removal. During the post work package evolution, an employee had an idea to more safely, easily, and quickly remove sharp and heavy material from a high radiation area. The employee took his idea to managers who supported the in-house development of a manufactured metal cylinder that is used to collect sharp and heavy objects from a high radiation glove box (locally called a "Turkey Roaster"). The concern with these gloveboxes was the potential for tearing the plastic bags used to collect the items during bagout, and exposing workers to high doses of air-born contamination. Instead, the metal can is lined with plastic and attached to the bagout port. A second plastic bag is placed over the metal container. Objects are placed inside the can, and the inner and outer bags are sealed shut when the can is removed. This work process was observed in the field and was an impressive improvement to both process efficiency and worker safety. Workers spend less time in the radiation area, and the risk of contamination release is significantly reduced. The development of the Turkey Roaster was a good example of the benefits of employees participating in the safety improvement process.

Although the AJHA system is used extensively to identify and mitigate hazards for new pieces of equipment and processes, it is not used for tasks that are considered "skill of the craft." In one case, a new piece of equipment known as a "Dextriet Bulb Crusher" (a device that attaches to a 55 gallon drum and is used to dispose of fluorescent light bulbs) was assumed to be a skill of the craft tool and was not reviewed through the AJHA process. Subsequently, this piece of equipment was in use for nearly a year when one of the industrial hygienists began to question the potential for hazardous vapors to escape. Sample monitoring was performed and found that unacceptable levels of mercury were leaking from the apparatus. The system was taken out of service and was being moved to a location that would ensure appropriate ventilation for safe operation of this equipment.

A pre-start up or pre-use safety evaluation should be conducted on all new equipment or processes. Skill of the craft determinations should be made based on the hazard analysis process, rather than performing hazard analysis based on skill of the craft assumptions.

Building and area managers are responsible for conducting routine hazard inspections of their respective areas. The Industrial Safety Professionals (ISPs) at the PFP coordinate these routine inspections which are governed by HNF-RD-7652, *Safety and Health Inspections.*

The guidelines contained in HNF-RD-7652, *Safety and Health Inspections,* are readily available to personnel who are assigned to perform health and safety inspections. The appendix of this procedure contains a 214 item checklist that encompasses 36 individual categories. Safety professionals reported that the checklist in the procedure is cumbersome and is difficult to use because of its length and size. Subsequently, they have developed an "abbreviated" PFP Safety Inspection Checklist that has two categories: a Behavior-Based Observation section that has nine items; and a PFP Safety and Health Inspection section that has ten items.

The ISPs inspect office areas, field operations, maintenance and D&D shipping and storage areas on a monthly basis using the abbreviated PFP Safety Inspection Checklist while D&D worksite areas are informally inspected daily with no written record of these inspections. There is no written guidance or records (other than the checklists) that specify designated areas and frequencies other than to delineate between facilities and D&D activities.

FH should develop written guidance and instructions for health and safety inspections and make them accessible to personnel who participate in these inspections.

Safety and health professionals, line managers, and employees all participate in these monthly safety inspections. Employees are integrated in the process either as active participants or as sounding boards to provide perspectives on program effectiveness and consistency of implementation. Employees who participate in these inspections have not received training in hazard recognition or inspection techniques. They use the abbreviated PFP Safety Inspection Checklist. Employees interviewed believe they are effective in identifying hazards and have confidence that what they identify is resolved through coordination of the ISP and the applicable manager.

FH should provide training in hazard recognition and inspection techniques for personnel who participate in health and safety inspections.

There is no formal documented mechanism for tracking issues identified during these self inspections. The industrial safety professionals are tasked with ensuring that any deficiencies noted on the inspection form are resolved. In practice, the typical method of resolving issues is for the industrial safety professional to send an e-mail to the responsible manager of the area in question and, when the issue is resolved, an e-mail is sent back to the industrial safety professional. Samples of this method of communication and issue resolution were reviewed. Based on this system, it is difficult to identify recurring hazards or reoccurring non-compliances. The only item repeatedly observed in the past several months was housekeeping in electrical/instrument and mechanical shops.

Additional safety inspections are routinely conducted by the senior supervisor watch (SSW), which consists of approximately 20 senior personnel who use a variety of checklists and conduct surveys on a monthly basis. A monthly Building Safety Checklist is completed for all trailers located outside the fence.

The facility Radiological Control group completes comprehensive surveys and trends results of monitoring activities in areas where employees perform work tasks. These include: air monitoring; contamination surveys; radiation surveys; personal dose monitoring; and a routine monitoring programs for shift, daily, monthly, quarterly, and annual scheduled surveys.

Periodic fire loading inspections are performed on a daily, weekly, and monthly basis. ZAP-000-029, *Periodic Fire Loading Inspections,* provides guides for these inspections, meeting the requirements found in HNF-15502, *Plutonium Finishing Plant Deactivation and Decommissioning Technical Safety Requirements*. Records reviewed indicate that this system is operating in compliance with the procedure.

Accident investigations and reporting processes/procedures are in place at PFP to ensure that accidents and injuries are appropriately reported and thoroughly investigated, and necessary corrective actions are implemented. An *Event Report* form (A-6001-714) must be completed within 72 hours of an event (including self-treats). Employees stated that the form is rarely completed within the 72 hour time frame, as it normally takes longer to gather accurate and complete information. This system is designed to include reporting of incidents where no injury was involved. Items listed on the form include but are not limited to: injury/illness, potential exposure, lock and tag, electrical, spill, fire, excavation radiation contamination, and operator of equipment/vehicle. Written requirements are documented in HNF-PRO-077, *Reporting, Investigating, and Managing Health, Safety and Property/Vehicle Events.* Event information is provided to the trending department at Fluor Hanford for analysis and tracking as well as to the Lessons Learned department. However, this reporting process is only being used for tracking and trending injuries, not other hazardous events.

Recognizing that the *Event Report* form (A-6001-714) is only being used for injury/illness reporting and that no other areas of the form, such as near misses, lock and tag issues, potential exposure issues, are being utilized, FH should reinstate the *Event Report* form as intended and report on all "Events" (not just injuries and illnesses) or revise the procedure and form to provide guidance for reporting only injuries and illnesses.

The ISPs at the PFP use Cause Codes from HNF-PRO-052 *Corrective Action Management* in their *Event Report* form (A-6001-714). However, the ISPs that assign these codes have not received formal training in accident investigation or root cause analysis or how to apply these codes in their injury and illness investigations.

Industrial Safety Professionals should receive training in root cause analysis and the use of cause codes.

The PFP also reports and tracks accidents, incidents, and near-misses through the DOE managed Occurrence Reporting and Processing System (ORPS). Root cause analysis of ORPS reports are conducted by trained and qualified personnel. Lessons learned are utilized by the facility to assist in improving future work planning activities and to prevent or significantly reduce the potential for recurrence. Formal critiques are performed as needed by trained and qualified support staff using written process and guidelines.

FH has a comprehensive corporate process of trend analysis that provides valuable data used in improving the safety and health of employees at the PFP. An FH employee wrote an article entitled *Charting SH&E Performance – Making the Number Work for Safety* that was published in the Journal of the American Society of Safety Engineers – May 2006 issue. The article described a method that combined the best technical features of Statistical Process Control (SPC) with the best presentation features of color coded dashboards. Through this process, ES&H professionals and managers are provided with a systematic and rational presentation of their data that can assist in making informed decisions. The author of this article has received numerous requests to visit other sites and give presentations on how to begin setting up this process.

The Team reviewed numerous charts, graphs, and statistical analysis reports including the *Fluor Hanford Dashboard: Safety and Health – OS&H*. This color coded summary (in addition to reviewed reports and data that are used to generate this summary) demonstrates that records about injuries, illnesses, and hazards are fully and accurately kept, analyzed, and used for the identification of potential programmatic weaknesses at the PFP.

Trending analysis is conducted on injury and illness data, reported incidents, inspection and self-assessment reports, and some employee reports of hazards on a monthly basis. For example, injury and illness data revealed three similar hand injuries that occurred from opening doors. This prompted a review that identified a hazardous condition; a corrective action plan was implemented and the hazard was mitigated.

Conclusion

PFP has demonstrated a good understanding of the facilities hazardous situations and conditions. Multiple worksite analysis programs and policies have been developed and deployed to recognize and mitigate existing and future hazards. The PFP adequately meets the requirements for the Worksite Analysis tenet of DOE-VPP.

VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (substitution or changing work methods) or addressed by the implementation of effective controls (engineered controls, administrative controls, and/or PPE). Equipment maintenance, PPE, 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, and followed by everyone in the workplace, to prevent mishaps or control their frequency and/or severity.

PFP maintains a large cadre of safety professionals in support of their activities. Safety and health professional categories include industrial hygiene, fire protection engineers, nuclear safety, criticality safety, and industrial safety. PFP utilizes a matrix resource organization. While most of the expertise is in-house, PFP may utilize other FH sources to fulfill their needs. PFP also depends on services available at the Hanford Site to complement their expertise. In particular, Advance Med is Hanford's on-site medical resource and provides physician and physician assistant support for PFP needs.

Hazard prevention and control at the PFP is maintained through engineered controls, PPE, and administrative controls. Some examples of engineered controls include building ventilation maintaining negative pressures in the glovebox rooms and the gloveboxes themselves. PPE used at the facility varies but may include anti-contamination clothing, protective gloves, supplied air, and respirators. Administrative controls include postings, the setting of boundaries for contamination areas (CA), radiological boundary areas (RBA), and airborne radiological areas (ARA) to name a few. Although not observed by the Team, PFP often uses mock-ups in preparation for more hazardous activities. In addition, PFP uses FH’s procedures and design basis documents to envelope safe work practices within the facility.

Work planning and start work activities are well thought out in planning and pre-jobs briefs. Workers and supervisors conduct extensive tailgate meetings, safety meetings, and pre-job briefings as part of their daily activities. PFP work is primarily planned work activities that involve detailed planning, work authorization, and hazard identification. The Team observed extensive and well detailed pre-job briefs. In addition to detailed planning, worker participation and input into the day's activities was common. In addition, several noteworthy practices were observed by the Team such as supervisors interacting with workers during the pre-job briefs about appropriate emergency response and the use of detailed three dimensional schematics and drawings in support of glovebox removal activities. The glovebox drawings were very useful in the pre-job planning to describe in detail the components to be addressed during the day's activities. The drawings also were useful for briefing supervisors on the progress of each activity.

Because of the hazardous nature of the work performed at PFP, PPE is routinely used to protect the worker. As previously discussed, PFP uses engineered controls throughout the facility to provide protection to the workers, but due to historical contamination concerns, PPE is normally required. PPE requirements are evaluated during job planning and reinforced in the pre-job briefs. The Team observed extensive use of PPE throughout the review. From D&D activities to glovebox material removal, PFP workers demonstrated appropriate use and a thorough understanding of PPE.

The PFP facility has a strong preventive maintenance program. The PFP managers recognize that because of the age of the facility a strong preventive maintenance program is necessary. In most cases, the maintenance backlogs for the various maintenance divisions are appropriately managed. In 2006, PFP conducted a review of the main PFP fire protection system. This review identified 492 deficiencies in the PFP fire protection system. PFP's efforts resulted in a large maintenance backlog for the fire protection system. Since that review, PFP has aggressively addressed the fire protection issue by creating a multi-disciplined team to prioritize, monitor progress, and provide detailed reviews to close the necessary open issues. In addition, this team has been working actively with RL to obtain appropriate exemptions given the facilities "slab-on -grade" plans. PFP is currently scheduled to be slab-on-grade by 2009. However, due to the delay in removing plutonium, the PFP management recognizes the unofficial schedule will likely be extended to 2016. The bases for the exemptions will be supported by a code of record review and an interpretation clarification review currently in progress. FH intends to satisfy all the specified high-priority fire protection issues while avoiding unnecessary and possibly costly upgrades that would not significantly enhance safe operation of the facility.

The fire protection team has also been proactively examining the fire protection system and its components for trends regarding the reliability of system components. As a result of this trending, all of the heat detectors have been determined to be beyond their lifecycle. Rather than repair each detector as it fails, the team decided to procure and replace all the detectors.

The PFP D&D DSA identifies the need for using temporary power units in the course of the decontamination and decommissioning of the PFP facility. However, the DSA does not provide details regarding temporary power use or limitations. One temporary load center was observed in the duct level of the main facility that had not been inspected as required. Further review indicated that the temporary load center had initially been installed two years earlier in support of a 26 inch vacuum line D&D work package. That temporary load center has remained in use beyond the original D&D work package scope for the past few years without any periodic inspections (e.g., ground fault current interrupter inspections have not been performed every 30 days), was not integrated into the facilities permanent preventive maintenance or inspection system, and was operated outside the facilities configuration control processes. The PFP maintenance manager has an expectation that temporary load centers will only be used when specifically documented in a work package. That expectation has not been included in any policies or procedures.

As a result of this observation, FH indicated that it would address these issues immediately by taking the following actions.

- Ensure consistent postings and labels on all load centers.
- Install permanent welder outlet for LC connection in room 308.
- Develop appropriate preventive maintenance schedule for all temporary load centers as required based on manufacture recommendations.
- Ensure that LC-45-10 is disconnected and only activated for specific work packages to assure appropriate controls for temporary load center use in room 308.
- Develop a formal tracking system within the electrical maintenance center to ensure temporary load center carts' locations are tracked and appropriate preventive maintenance is scheduled and completed.

PFP should develop and implement a PFP policy and procedure for the installation, tracking, use, maintenance, and removal of temporary load centers. Ensure the policy and procedure meet configuration management expectations for a Hazard Category 2 Nuclear Facility.

Conclusion

PFP demonstrated good hazard prevention and control through systematic processes, management leadership, employee involvement, work site analysis, and safety and health training. PFP's comprehensive efforts to ensure continued function of the Class 2 Nuclear Facilities infrastructure and associated safety systems have been well thought out and proactive. PFP management demonstrated the required levels of effort to meet the tenets of the DOE-VPP. While PFP does not have an adequate policy and procedure for the installation, tracking, use, maintenance, and removal of temporary load centers, PFP management has identified an appropriate set of corrective actions to address the issues with temporary load centers.

VII. SAFETY AND HEALTH TRAINING

Training is necessary to implement management's commitment to prevent exposure to hazards. Managers, supervisors, and employees must know and understand the policies, rules, and procedures established to prevent exposure to hazards.

The safety and health training processes used by PFP are structured and implemented by ISM core functions and guiding principles. These processes adequately train workers and employees in recognizing hazards and performing work safely. Statements of employees interviewed during this assessment, and observations made by the Team confirmed that these processes are used and understood by employees throughout PFP. The onsite review clearly demonstrated that the safety and health training process continues to be effective, communicated, implemented and self assessed to meet the expectations of a DOE-VPP Star site.

Although PFP continues to use the Integrated Training Education Matrix (ITEM) to maintain and track employee training, the site continues to look for innovative ways to improve class participation and retention of course materials. One such improvement recently implemented in some formal classroom courses is the use of a wireless response system call “Blue Clickers” that combines student/instructor interactions and assessment/ immediate feedback. Instructors who have used the “Blue Clickers” system have indicated that student class participation has increased. Immediate feedback during class instruction allows instructors to cover materials in a manner that addresses the class’ understanding of the topics covered, thus spending the right amount of time on each topic before moving on. Recently, PFP managers implemented the use of morning safety messages that are broadcast over the public announcement system as a reminder to look for hazards and each other’s safety. Each department is tasked to deliver a morning safety message on a rotating basis.

Employees are taught to recognize hazards associated with their jobs through several means. In addition to general new hire training including the Hanford General Employee Training, special technical groups receive discipline-specific professional skills training and operating staff personnel receive special qualifications training. Employees must go through months of classroom training on procedures and processes, and successfully complete a written examination before beginning on-the-job training (OJT). Programs covering fire and emergency systems, hazard communications, hazardous waste operations, radiation worker training, confined space entry, industrial truck operations, and electrical safety are also included in the training program, among others. General office and administrative support personnel receive adequate training to identify the hazards they are likely to encounter in their daily office activities.

OJT is used extensively across the site to ensure that each worker obtains the required skills to perform a specific function safely and effectively. OJT activities include following the requirements of a qualification guide or OJT checklist that documents hands-on training and mock-up training used to prepare for conducting potentially high hazard activities. This training documents the worker’s understanding and proficiency.

Daily pre-job briefings are performed and all meetings include a safety message regarding either on-the-job or off-the-job safety designed to enhance the worker’s overall attitude about safety. Several employees indicated that the safety messages often influence their attitudes about safety

at home and as a result, often lead to the sharing of safety lessons with family, friends, and neighbors.

Conclusion

The safety and health training processes used by PFP ensure a strong commitment from management, supervisors, and employees to work safely and in a safe environment. PFP has a well established safety and health training program with adequate content and direction.

VIII. CONCLUSIONS

Since the initial DOE-VPP Star certification in 2002, the PFP has undergone significant changes to its mission, staffing levels, and schedule. Participation in DOE-VPP has helped FH manage its safety program, and there have been significant reductions in the number of accidents and injuries related to PFP work. Employees are actively involved in the safety program, and are satisfied that the risks hazards are being adequately controlled. The hazards associated with the work are well analyzed, and controls are identified and implemented that minimize the risks. Workers receive appropriate training for their jobs. The project has implemented some innovative methods of controlling the hazards. There are some areas where PFP should concentrate efforts to reinvigorate the commitment to DOE-VPP, particularly in ensuring managers and workers recognize that DOE-VPP is more than simply complying with safety requirements, and ensuring personnel do not become complacent. Based on this review, the Team recommends that the PFP continue as a DOE-VPP Star site.

Appendix A

Onsite DOE-VPP Audit Team Roster

Name	**Affiliation/ Phone**	**Project/Review element**
Bradley Davy	DOE/HSS 301-903- 2473	Team Lead Management Leadership
Michael Gilroy	DOE/HSS 301-903-5326	Hazard Prevention and Control
Carlos Coffman	DOE/HSS 301-903-6493	Safety Training
Robert Nii	Battelle Energy Alliance – Idaho National Laboratory 208-526-5064	Worksite Analysis
Crystal Adolfson	Battelle Energy Alliance – Idaho National laboratory 208-526-5837	Employee Involvement
Rochelle Underwood	DOE Portsmouth Paducah Project Office 859-219-4019	Observer