



Fluor Hanford Fast Flux Test Facility Recertification

**Report from the DOE
Voluntary Protection Program
On-site Review
October 1-5, 2007**



**U.S. Department of Energy
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Office of Worker Safety and Health Assistance
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Foreword

THE DEPARTMENT OF ENERGY (DOE) recognizes that true excellence can be encouraged and guided but not standardized. For this reason, on January 26, 1994, DOE 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.

DOE-VPP consists of three programs, which are based on and similar to those in OSHA’s VPP. These programs are Star, Merit, and Demonstration. The Star program is the core of DOE-VPP, and its achievement indicates truly outstanding protectors of employee safety and health. The Merit program 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 program 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 program.

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., VPP Star flag for sites with Star status). The participant may also choose to use the DOE-VPP logo on letterhead and 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.

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ABBREVIATIONS AND ACRONYMS

AJHA	Automated Job Hazard Analysis
AMH	Advance Medical Hanford
BLS	Bureau of Labor Statistics
FFTF	Fast Flux Test Facility
DART	Days Away, Restricted, or Transferred
DOE	U.S. Department of Energy
DOE-VPP	U.S. Department of Energy Voluntary Protection Program
FFTF	Fast Flux Test Facility
FH	Fluor Hanford, Inc.
HAMTC	Hanford Atomic Metal Trades Council
HGET	Hanford General Employee Training
HSS	Office of Health, Safety and Security
IH	Industrial Hygienist
IEM	Interim Examination and Maintenance
JHA	Job Hazard Analysis
MASF	Maintenance and Storage Facility
NAICS	North American Industry Classification System
OSH	Occupational Safety and Health
OSHA	U.S. Department of Labor's Occupational Safety and Health Administration
PPE	Personal Protective Equipment
SAC	Safety Awareness Council
TRC	Total Recordable Case
TSR	Technical Safety Requirement
VPP	Voluntary Protection Program

EXECUTIVE SUMMARY

The Department of Energy's Fast Flux Test Facility (FFTF) was formerly used as a test reactor and is now in the process of decontamination and decommissioning. The project, managed by Fluor Hanford Incorporated (FH) was awarded the U.S. Department of Energy Voluntary Protection Program (DOE-VPP) Star status in 2002 and recertified in 2005.

Continuation of Star status in the DOE-VPP requires an on-site review by the DOE Office of Health, Safety and Security (HSS) DOE-VPP team (Team) every three years. The Team conducted its review during October 1-5, 2007 to determine whether the FFTF project 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's review and provide the Chief Health, Safety and Security Officer with the necessary information to make the final decision about the FFTF project's DOE-VPP status.

All personnel expressed a clear commitment to the safety and health of every member of the project. Most personnel assigned have extensive experience at the FFTF project, many having been there for 20 years or more. The workers at the FFTF project have long fostered a strong procedural compliance culture, and this culture remains intact. The decision to defuel and permanently shutdown FFTF reactor has had a major affect on the workforce. Managers and workers alike recognize that the time remaining on the project is very short (as little as 12-18 months). The effect of this decision on the workforce creates a significant challenge to maintaining the pursuit of safety excellence expected of a VPP Star site. Schedule and budget pressures, combined with the realization that the plant will not be returned to operation, have resulted in significantly reduced demonstration of that pursuit of excellence. Programs and activities previously used to foster excellence in safety and complimented in previous DOE-VPP reports have been dropped or fallen into disuse. Resources for health and safety incentives, as well as necessary expertise, have been sharply reduced.

The stresses associated with these changes are forcing decisions that at times seem at odds with the expectations that a DOE-VPP Star site pursue excellence and continual improvement. Faced with aggressive schedules to close the facility and drastically reduced resources, the project's efforts to go beyond compliance have faltered. Work continues to be performed safely in accordance with DOE orders and regulations, but the additional actions to further raise worker awareness, implement programs that go above and beyond basic requirements, and ensure a culture that pursues safety excellence, are not evident. The FFTF project accident and injury rates are well below the average for their comparison industry, but they are significantly higher than the FH goal, and are the highest of the FH projects. This statistic can be closely correlated to the reduced focus on pursuing safety excellence.

The Team is recommending that the FFTF project be placed in a Conditional Star status. As such, the FFTF project must address improvements in Management Leadership and Employee Involvement. As part of this recommendation, HSS is committed to providing whatever assistance is feasible, as well as conducting another site visit within the next twelve months to gauge improvements. Alternatively, if FH is unwilling to commit the necessary resources to make the improvements, they must make a determination as to whether the FFTF project will continue as an independent VPP participant.

Table 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
FFTF project managers need to ensure that their actions clearly demonstrate management leadership and encourage excellence beyond compliance at the FFTF project.	3
FFTF project managers should review current procedure use policies, and possibly require in-hand use of some procedures that were previously used as reference procedures to ensure all procedure requirements are completed.	4
The FFTF project team should ensure that the Safety Improvement Plan includes specific actions and target completion dates that address not just specific safety incidents, but identified contributing causes.	5
The FFTF project team should send additional personnel to the Human Performance Improvement training, and ensure that the HPI techniques are used to investigate accidents and incidents beginning with the fact finding efforts.	6
The FFTF project vice president should make attendance at the President's Zero Accident Council and the FFTF project Safety Awareness Council a high priority, and ensure that his participation reflects the corporate commitment to safety excellence.	6
The FFTF project should consider more frequent return- to-work meetings for the entire project, and use that as an opportunity to communicate management expectations, as well as listen to worker concerns.	7
The FFTF project team should explore ways to revitalize the SAC and improve its effectiveness in maintaining the Star-level quality at the facility. Effectively communicating to the work force the status and progress of ongoing corrective actions will enhance involvement and participation.	8
The FFTF project team should ensure the associated AJHA is reviewed and revised when procedures are reviewed or revised. Additionally, the AJHA should be reviewed when an infrequently used procedure is identified to accomplish a task to ensure current hazards and plant conditions have not exceeded the scope of the original hazard analysis.	11
The FFTF project team should examine options to revitalize and/or enhance the safety program to encourage employee interest and participation, and encourage the workforce to look for and self correct risky, especially during work evolutions.	14

I. INTRODUCTION

The U.S. Department of Energy Voluntary Protection Program (DOE-VPP) on-site review of the Fast Flux Test Facility (FFTF) project at the Hanford Site was conducted from October 1-5, 2007. Fluor Hanford Incorporated (FH) has been the prime contractor for the Management and Integration contract at the Hanford Site since 1996. The DOE Richland Operations Office provides direction to and oversight of FH.

The FFTF is a hazard category 2 nuclear facility. Originally completed in 1978, it operated as a demonstration and test reactor from 1982-1992. For the next 10 years, the reactor was maintained in a shutdown condition pending a final decision on the mission. In 2002, DOE decided to permanently defuel and decommission the reactor. Since then, the fuel has been removed from the reactor, and most of the fuel has been shipped offsite for interim storage pending a final disposition decision. Additionally, the metallic sodium used as a coolant has been drained from the vessel and is currently stored in a building specifically designed and built for that purpose.

Recognition in the DOE-VPP requires an on-site review by the Office of Health, Safety and Security (HSS) DOE-VPP team (Team) to determine whether the applicant is performing at a level deserving DOE-VPP recognition. The Team evaluated the FFTF project safety programs against the provisions of the DOE-VPP. During the site visit, the Team observed activities, evaluated relevant safety documents and procedures, and conducted interviews to assess the strength and effectiveness of the FFTF project health and safety programs.

The Team had contact with over 50 employees, managers, and supervisors, either formally or during observation of field activities. Hazards associated with the FFTF project activities included potential radiological contamination, potential chemical exposure associated with various activities, thermal stress and dehydration, noise, heavy equipment, electrical hazards (including high voltage distribution systems), elevated work, hoisting and rigging, fuel handling, and a multitude of other standard industrial hazards associated with site infrastructure maintenance and operation. The FFTF project workers may also be exposed to the range of other nuclear hazards associated with the remaining fuel and sodium. Work observed included fuel handling operations in the Interim Examination and Maintenance (IEM) hot cell, handling of shipping and disposal casks, high voltage electrical work, and maintenance and repair activities.

II. INJURY INCIDENCE / LOST WORKDAYS CASE RATE

The Team conducted a review of the Occupational Safety and Health Administration (OSHA) 300 logs. Tables 2.1 below summarizes the OSHA reportable data for employees at the FFTF project.

**Table 2.1 Fast Flux Test Facility Employees
INJURY INCIDENCE / LOST WORKDAYS CASE RATE**

Injury Incidence / Lost Workdays Case Rate					
Calendar Year	Hours Worked	Total Recordable Cases	Total Recordable Case Incidence Rate	Days Away, Restricted or Transferred (DART) Cases	DART Case Rate
2004	433,482	3	1.38	0	0.00
2005	377,275	2	1.06	1	0.53
2006	341,428	3	1.76	0	0.00
3-Year Total	1,152,185	8	1.39	1	0.17
Bureau of Labor Statistics (BLS-2005) average for NAICS Code # 562			6.5		3.9

Conclusions

The FFTF project injury rates, although high compared to the other Fluor Hanford facilities, are below the NAICS comparison industry average. The total recordable case rate for the FFTF project in 2007 was reported to be 2.9 as of this inspection, which is higher than the previous three years, and significantly higher than the Fluor Hanford average of .91. Nevertheless, the FFTF project injury rates are well below the averages for the comparable industry and meet the criteria for participation in the DOE-VPP program at the Star level. As of this report, FFTF reported having 1066 days since the last lost work day, 146 days since the last recordable injury, and 98 days since the last first aid case.

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 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.

During interviews and discussions with the managers, from the project vice president/plant manager down through the plant organization, all personnel expressed a clear commitment to the safety and health of every member of the project. Nearly all the FFTF project managers have extensive experience at the FFTF project, many having been there for 20 years or more. The FFTF project has long fostered a strong procedural compliance culture, and this culture remains intact.

However, the decision to defuel and permanently shutdown the FFTF project has had a major effect on the workforce. Managers and workers alike recognize that the time remaining on the project is very short (as little as 12-18 months). The effect of this decision on the workforce creates a significant challenge to maintaining the pursuit of safety excellence expected of a VPP Star site. Schedule and budget pressures, combined with the realization that the plant will not be returned to operation, have resulted in significantly reduced demonstration of the pursuit of excellence. Some programs and activities previously used to foster excellence in safety and complimented in previous DOE-VPP reports have been dropped or fallen into disuse. For example, the original certification report of August 2001 identified as a notable practice that “employees are involved in the reporting (formal and informal) of hazards, have stop work authority, and have input into systems and procedures for incentive programs, as well as disciplinary procedures as they relate to safety and health issues. Cash awards are given to employees who report hazards or develop innovative solutions.” In the August 2005 recertification report, areas for improvement indicated that these areas needed improvement. The areas for improvement identified in the August 2005 recertification report were not addressed in safety improvement plans, and cash awards for safety improvements and suggestions have been used, but infrequently. Resources for health and safety incentives, as well as necessary expertise, have been sharply reduced.

Opportunity for Improvement: FFTF project managers need to ensure that their actions clearly demonstrate management leadership and encourage excellence beyond compliance at the FFTF project.

Project Hanford Management procedures define how work is accomplished, and include the integration of safety into all work. The FH Project Execution Plan describes the FH approach to safely accomplish the mission and goals established in the Project Hanford Management

Contract. While some of the Project Hanford Management procedures are used directly, such as the hazard analysis procedures, the FFTF project relies primarily on procedures developed specifically for the FFTF project. These procedures cover the range of activities at the FFTF project, including site access, fuel handling, hoisting and rigging, maintenance and work control. 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 those processes and procedures.

In some cases observed by the Team, however, the processes and procedures were not always used to maximum benefit. For example, the Automated Job Hazard Analysis (AJHA) process is used for planned work but, in some cases, the major hazards associated with the work are not adequately addressed, while more minor hazards are addressed in great detail. Other examples included a recent Technical Safety Requirement (TSR) non-compliance, and a failure to perform a procedurally required swipe survey on a component being removed from the hot cell (see Section VI. Hazard Prevention and Control). In these cases, the FFTF project managers have not adequately identified or planned for changes in worker proficiency, considering that some procedures are not frequently used.

Opportunity for Improvement: FFTF managers should review current procedure use policies, and possibly require in-hand use of some procedures that were previously used as reference procedures to ensure all procedure requirements are completed.

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). The FFTF project has a safety policy that establishes the specific safety rules and expectations for safe conduct of work.

FH has established specific, aggressive goals for days away from work and recordable injury case rates that are well below industry averages. As of this assessment, the FFTF project injury rates were significantly higher than the FH average, and even further above the FH goal. Managers are aware of this situation, and have reacted to injuries with improvements that addressed the specific injuries. For example, a worker received a cut on his head while trying to look through the hot cell window when he stood up and bumped his head. The response was to purchase bump caps for the IEM hot cell operators. In another case, workers’ hands were injured when doors that had no windows were opened from the opposite side. The project held a contest for workers to submit designs for a door sign reminding workers to open the door slowly.

Managers have not taken effective actions to increase worker awareness of potentially risky behaviors, other than the traditional approaches of telling them to be careful. Managers have not effectively compensated for the distractions created by the FFTF project’s changed mission, a declining workforce, and the increased potential for safety incidents as a result of those distractions. During the assessment, the Team observed worker behaviors that demonstrated reduced safety awareness. Workers were observed standing on surfaces not designed as work surfaces and standing under suspended loads. Further, the other workers or supervisors in the

area did not call these behaviors to workers' attention or suggest safer ways to accomplish the work. Managers identified "situational awareness" as the primary contributor to the minor injuries that are driving the FFTF project injury statistics, but did not identify any specific initiatives or campaigns that were designed to improve that awareness.

FH senior managers have made prevention of accidents and injuries a very high priority. To demonstrate senior management commitment, the FH President personally interviews the members of the workforce involved in safety incidents. Although intended to demonstrate senior management commitment, these interviews are viewed by FFTF personnel as intimidating to individual workers and the FFTF project managers. The managers and workforce at the FFTF project have not fully accepted upper management efforts to promote a site-wide safety excellence culture.

The FFTF project has a Safety Improvement Plan, but that plan does not have specific actions identified, and has received only limited attention by managers. Statements in the plan are simply global statements that continue previous actions. The weaknesses of the Safety Improvement Plan were acknowledged by managers, and the Safety Awareness Council (SAC) is working to revise the plan and treat it as more of a living document.

Opportunity for Improvement: The FFTF project team should ensure that the Safety Improvement Plan includes specific actions and target completion dates that address not just specific safety incidents, but identified contributing causes.

Resources for the FFTF project are tightly constrained. As of this assessment, the project was behind schedule and approximately \$1.5 million over budget. This situation sometimes places the project managers in a position where the cost of safety improvements and impacts on project schedules are over emphasized and the safety benefits are not sufficiently embraced. For example, the vice president expressed significant frustration with a recent safety concern that was raised at another FH project. Due to a National Institute of Occupational Safety and Health decision to remove the certification of the brand of 5-minute escape hoods in use at Hanford, the existing escape hoods were replaced with another model. This replacement required training of the entire workforce in use of the new escape hoods. A worker at another FH project raised a concern that the training did not include actually donning the escape hood. Consequently, FH committed to Hanford Atomic Metal Trades Council (HAMTC) that all workers would go through additional training that included donning the escape hood. Although a seemingly proactive decision from a safety and employee perception perspective, the FFTF project estimated costs to complete that training were approximately \$10,000. The project vice president was concerned that his budget and schedule would further suffer due to failures that were not within his control. Additionally, resource limitations on staffing have limited the availability of safety expertise such as radiological control and industrial hygiene technicians as experienced personnel transfer out of the project. The reduced availability of these disciplines results in a reliance on personnel that may not have the same level of experience and expertise with the FFTF project systems and procedures. This situation sometimes leads to additional delays in work planning that further strains the project schedule. While budget pressures are inherent at all DOE projects, significant budget pressures such as those at the FFTF project can

create a situation in which managers may not be able to support safety improvements that are not specifically mandated, focus improvement efforts on compliance, and/or place the highest priority on minimizing resource expenditures for environment, safety and health related efforts. Such situations are not conducive to the pursuit of safety excellence.

In at least one case, limited resources resulted in a maintenance decision that might have adversely impacted the safe working environment. A recent decision to defer and ultimately cancel preventative maintenance on a supply fan in the Maintenance and Storage Facility (MASF) resulted in failure of the fan. An alternative means of maintaining the ventilation system profile using only the exhaust fan was implemented to permit continued work, but the failure caused further strain on budget and schedule. Although the decision to cancel the maintenance was a considered risk by FFTF project managers, having to make that choice in the first place can be counterproductive to encouraging safety excellence.

FH has corporately committed to implementation and use of Human Performance Improvement (HPI) as a means to better analyze accidents and injuries. The FFTF project has sent four individuals to HPI investigator training, and has plans to send more people. They have not yet been able to commit to sending all workers at the project to an HPI training course. FFTF has begun to use HPI techniques to investigate recent occurrences, but much remains to be done to realize the full benefit from HPI initiatives. Other DOE-VPP participants have realized significant improvements in safety behaviors by promoting HPI training at all levels and FFTF could similarly benefit from more extensive training in HPI.

Opportunity for Improvement: The FFTF project team should send additional personnel to the Human Performance Improvement training, and ensure that the HPI techniques are used to investigate accidents and incidents beginning with the fact finding efforts.

Managers' participation in the FH President's Zero Accident Council has been limited, with managers generally only attending when they are required to present the results of an accident or injury investigation. In those cases, the managers perceive the attendance as punishment, rather than opportunities to share lessons learned and get additional insight or ideas for effective corrective action strategies. Managers participate in most but not all of the FFTF project SAC meetings. Some employees interviewed during the assessment expressed frustration that the FFTF projects' managers are not fully supporting the SAC.

Opportunity for Improvement: The FFTF project Vice President should make attendance at the Presidents Zero Accident Council and the FFTF project Safety Awareness Council a high priority, and ensure that his participation reflects the corporate commitment to safety excellence.

Although there are only approximate 125 workers assigned to the FFTF project, managers have only had a few all-hands meetings (1 or 2 per year). Managers instead rely on more traditional "chain of command" communications with workers. Other FH projects reviewed in the past year have used frequent all-hands meetings as an effective method of raising worker awareness and

demonstrating senior management commitment to working safely. For example the Soil and Groundwater Remediation Project Field Operations is similar in size to the FFTF project organization. The Soil and Ground Water Remediation project held an all-hands meeting for Field Operations every Monday morning before returning to work. A similar return-to-work meeting at the FFTF project could provide a good opportunity for managers to ensure the entire workforce hears a consistent message, understands managers' commitment to safety, as well as providing workers an opportunity to share their concerns with managers.

Opportunity for Improvement: The FFTF project should consider more frequent return-to-work meetings for the entire project, and use that as an opportunity to communicate management expectations, as well as listen to worker concerns.

The FFTF project managers rely upon electronic means for communicating with the workforce. This includes distribution of minutes from the bi-weekly SAC, which are posted on the facility's intranet. This mechanism has not been effective in communicating with the workforce. For example, decisions that addressed a safety concern with scaffolding ladder rungs raised in July 2007 had been documented in SAC minutes since August 2007, but were not known by members of the workforce as of the time of this assessment. More importantly, the individual that raised the concern was not aware of the planned actions, and subsequently took more drastic action on his own to "red-tag" the scaffolding ladders, thus stopping all work at the FFTF project that required scaffolds. Actions planned to address the concern were viewed by managers as beyond minimum compliance, and therefore were not given a high priority. The planned corrective action was not communicated specifically to the worker raising the concern. Managers did not agree that red-tagging was the appropriate action for the worker to take, but the lack of effective communication to the concerned worker created a situation where the worker felt it was the only recourse available. The lack of effective communication in this case resulted in delays of essential work, and a further degradation of workers perception of managers' safety commitment. All scaffolding reviewed by the Team during this assessment was maintained in accordance with requirements, and FH procedures for inspection and tagging of scaffolding for use were followed.

Conclusions

Operations to remove existing fuel and permanently shutdown FFTF are being conducted safely and in accordance with DOE and FH requirements. The pressures of a rapidly decreasing workforce, declining material resources, and an aggressive deactivation and decommissioning schedule have resulted in a situation where some managers focus on maintaining minimum compliance with requirements rather than pursuing and encouraging safety excellence. To meet the requirements of the Management Leadership tenet, the FFTF project managers must return to their prior commitment to go beyond compliance and promote safety excellence.

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 participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices. The information gathered by the Team from field observations and formal and informal interviews indicate the FFTF project workers remain committed to their personal safety as well as the safety of their coworkers and plant visitors.

Employee involvement continues to be demonstrated at the FFTF project by active participation in pre-jobs, job walk downs, preparation of AJHA, as well as the opportunity to participate in the SAC and related programs/campaigns. However, since the last recertification, the SAC, which had been regarded as the “Cadillac safety council” among the FH facilities, has experienced a decline in employee participation and the promotion of safety excellence expected at a Star site. Although all employees have the opportunity to participate in the SAC, most employees indicated they do not actively participate in the twice monthly meetings either because of scheduling or because they do not have the interest to attend.

The one notable exception to the decline in employee involvement was the “Open Door Slowly” campaign, which was considered a safety success throughout the workforce. As a result of the “Open Door Slowly” campaign the SAC has decided to build on its success and continue to explore ways to keep employees involved in bringing awareness of other issues that may affect them at work and home. However, this success did not appear to have been shared with other FH safety committees.

With respect to internal communications, most employees appeared to be content with receiving SAC meeting minutes by email and by other means of communications (bulletin board postings, verbally, etc.). The reliance on electronic and informal communication means was not always effective. As previously discussed, the lack of effective communication regarding the scaffolding issue, although being addressed, resulted in much broader work stoppage. Effective communications would have notified employees of management’s concern, and its decision to address this issue, in a timelier manner. This action would have served to encourage further participation among employees in the future.

Opportunity for Improvement: The FFTF project team should explore ways to revitalize the SAC and improve its effectiveness in maintaining the Star-level quality at the facility. Effectively communicating to the workforce the status and progress of ongoing corrective actions will enhance involvement and participation.

Interviewed employees were candid and spoke freely with Team members. They were knowledgeable of their stop work authority and felt they could exercise their rights without any fear of retaliation from their supervisors and/or management.

Since the previous recertification visit, the FFTF project has implemented the use of safety suggestion/concern boxes located throughout the complex. Employees have the opportunity to fill out a questionnaire/form that describes a safety concern, issue, or suggestion. A SAC

member collects the forms and then brings them to the attention of the SAC. The SAC discusses and addresses the concern, issue or suggestion as necessary and provides feedback to the originator verbally and/or via email and through appropriate supervision. While employees agree the safety concern boxes provide a good vehicle to raise concerns, they indicated they do not normally use them because supervisors devote immediate attention to any concerns raised verbally. Most workers believed that the combination of using the safety concern boxes and the responsiveness of immediate supervisors to their concerns is a satisfactory situation.

The FFTF project has a recognition and award system intended to promote employee involvement. The FFTF project has committed to providing “safety feeds” (a company provided catered lunch) for achieving safety milestones and has implemented the Spot Award Program for on-the-spot observations. Both programs are funded through the FFTF project vice president. Employees can nominate other FFTF project employees for a spot award (the award is a gift card valued at \$25) for a safe act or a suggestion that improves the safety of a job and or employees. Employees are given a choice of gift cards to a variety of local stores and restaurants and feel the program helps them keep safety on their minds whether at work or home.

The Team observed that the FFTF project employees continue to be involved in the work planning process as needed. When the need for a “planned” job is identified, all crafts that are involved in the job are included in the work package or work procedure planning. Employees are also involved in the meetings where jobs they are involved in are discussed. Employees indicated they are given the opportunity to provide recommendations and suggestions if and when they see appropriate.

The FFTF project programs remain in place that help encourage employee involvement in the safety and health program. The SAC provides information to the FH President’s Zero Accident Council. These councils serve as an avenue for workers to raise safety issues and for managers and employees to work together to seek appropriate and timely solutions. FH senior managers also use these councils as an effective means to disseminate pertinent safety information to the entire organization, and to discuss ways of preventing future accidents.

A significant observation by the Team was the sporadic attendance of the HAMTC Safety Representative at the SAC meetings. There are multiple reasons for this situation including, FH site-wide and organizational commitments by the HAMTC Safety Representative. However, the lack of attendance can eventually lead to a breakdown in communications between management and labor union workers and hinder timely resolution of potential safety concerns.

Conclusions

Employees continue to be involved in the safety and health program at the FFTF project. However, for reasons discussed in earlier sections, the FFTF project managers have not effectively maintained and demonstrated their commitment to continued improvement and safety excellence. This situation has lessened the employees’ enthusiasm to continuously improve and achieve safety excellence. Managers, supervisors, and workers must work to reestablish their partnership and ensure that the entire workforce understands and is working toward safety excellence and enhancing employee involvement.

V. WORKSITE ANALYSIS

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

Hazard analysis processes that are in place at the FFTF project include a DOE approved Safety Analysis Report (SAR) and the FH Job Hazard Analysis (JHA) process. These processes are structured and formally documented to protect the workers, public, and environment from the hazards associated with the operation of the facility. Personnel interviewed during this assessment were aware of the processes and mechanisms for their use, and fully supported the concept of hazard prevention and control. Older procedures contained evaluations of work evolutions based upon risk using a graded approach. Newer work evolutions contained documented evaluations using the current FH JHA process.

The FFTF project has one regularly assigned industrial hygienist who conducts worksite hazard analysis as part of the AJHA process. **HNF-PRO-17916, “Industrial Hygiene Baseline Hazard Assessments,” Revision 2** was published in May 2007 with an effective date of September 4, 2007. To meet the requirements of the procedure, an additional industrial hygienist was assigned to the facility for a three month term. This individual was in the process of updating/conducting the baseline hazard assessments throughout the facility. At the time of the review, baseline assessments of the MASF and the Reactor Containment Building had been completed. The remaining assessments were scheduled to be complete by the end of October 2007.

In addition to the on-site industrial hygiene expertise, the FFTF project has on-site radiation protection technologists that constantly monitor for changes in the workplace. They focus on establishing the necessary radiological controls in accordance with 10 CFR 835. On-site FFTF project technical expertise includes nuclear safety, engineering, industrial safety, fire protection, and electrical safety. The facility also has access to Hanford Site fire protection subject matter experts, certified safety professionals, certified industrial hygienists, medical support from Advanced Medical Hanford (AMH), the Hanford Fire Department, and other FH technical disciplines for additional assistance.

The FFTF project uses a very structured, procedurally driven process to perform work. Many of the formerly active procedures have been retired due to deactivation of systems and components required for operation. The facility utilizes a Field Change Notice if issues relating to procedural steps occur during use. The workforce is clearly involved in development of new work evolutions and revisions of older procedures. The Team observed numerous examples of knowledgeable workers involved in the planning of work.

The facility has a Final Safety Analysis Report that defines the overall safety envelope for the facility. Most of the radioactive inventory (i.e., fuel) has been removed from the facility and upon removal of the remaining inventory the facility will be re-categorized as less than Category 3 in accordance with 10 CFR 830 Subpart B. TSRs, which encompass those high-level controls that DOE depends upon for safe operation, are embedded in facility procedures. Prior to this review, the facility experienced a non-conformance to a technical safety requirement, which occurred when the facility did not meet the minimum requirement for two operators to remain on watch during specified operations.

The Team attended and observed the plan-of-the-week (POW) and plan-of-the-day (POD) meetings. The POW and POD meetings were conducted in a professional manner and interaction between the representatives was noteworthy. The FFTF project has limited resources with regard to specific trades (e.g., boiler makers, pipe fitters, millwrights) and in many cases those specific trades are provided by Hanford's central organization. The POW and POD meetings were used to most efficiently assign those limited resources to mission critical tasks.

Since the reactor is shut down with the fuel removed, most work is focusing on removal of remaining systems and performing necessary maintenance. Most of the procedures have been in place for an extended period of time. Those procedures were screened for risks several years ago using the FH JHA process as part of the FH Integrated Safety Management System implementation. Some of those plant procedures have since been further revised without review using the current FH JHA process.

Opportunity for Improvement: The FFTF project team should ensure the associated AJHA is reviewed and revised when procedures are reviewed or revised. Additionally, the AJHA should be reviewed when an infrequently used procedure is identified to accomplish a task to ensure current hazards and plant conditions have not exceeded the scope of the original hazard analysis.

Many work plans and packages reviewed by the Team appropriately identified hazards and required controls. Participation by workers and management in the process was evident.

Although most hazards were identified, many of the reviewed work packages and plans did not include sufficient analysis of the hazards. In some cases, the major hazards associated with the work were not adequately addressed in the AJHA, while more minor hazards were addressed in great detail. In other cases, the AJHA simply identified the hazard without further detail (e.g., location, quantity) or sufficient analysis to ensure the control set was adequate. In some cases, procedures existed and identified appropriate controls for the work, but those procedures were not identified in the work package. The procedures were typically used by personnel who knew the procedures existed, but since the procedures were not referenced in the work plan or package proper implementation of the controls relied solely on worker knowledge. As discussed later in section VI. Hazard Prevention and Control, in at least one case observed by the Team during the 6CVL transfer operation, a contamination control survey identified in a lower tier procedure was initially missed by the personnel conducting the operation. FFTF personnel were not sure if the surveys had been conducted during other recent transfer operations. Further, FFTF personnel

had difficulty determining the basis for performing those surveys. It was later determined that the survey was based on agreement and best practices between DOE hot-cell facilities to minimize transfer of contamination between hot-cells.

Accident investigations and reporting processes/procedures are in place at the FFTF project to ensure that accidents and injuries are appropriately reported, thoroughly investigated, and that necessary corrective actions are implemented. 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 FH for analysis and tracking per FH requirements.

Conclusion

Hazard analysis processes are in place at the FFTF project that include a DOE approved SAR, and the FH JHA process. Older procedures contained evaluations of work evolutions based upon risk using a graded approach. Newer work evolutions contained documentation using the current FH JHA process. The FFTF project has access, either through assigned on-site expertise or through the FFTF project support, to the necessary subject matter experts to evaluate the range of hazards encountered during the course of work. Work plans and packages reviewed by the Team identified hazards and required controls in many cases. However, the FFTF project needs to ensure the analysis of identified hazards is adequate to ensure the hazard controls are appropriate.

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 engineered controls, administrative controls, and/or personal protective equipment (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.

The primary mission of the FFTF project is hazard removal and reduction. The goal of the project is to reduce the hazard categorization of the facility from its current Category 2 Nuclear Facility to a less than Category 3 Radiological Facility. Eventually, the facility will be placed in a surveillance and maintenance mode.

The FFTF project maintains the facility and FH philosophy of controlling hazards through engineering controls, work practices, and PPE. The hazards at the facility are well characterized either through the SAR or the FH JHA process. New work evolutions clearly identified the hazards and controls necessary to perform work safely. Some weaknesses in the hazard analysis were discussed earlier in this report (see section V. Worksite Analysis).

Safety and health expectations are communicated and reinforced through HGET, SAC meetings, pre-job meetings, and participation in the President's Zero Accident Council. FH expects that personnel from the worker level up through management take ownership of safety, be knowledgeable of the safety requirements to perform their job, and follow those requirements. The Team found that most personnel observed and interviewed met that expectation.

FH provides the necessary PPE for workers to do their job (hard hats, safety glasses, work gloves, foot-wear, fire retardant clothing, arc-flash protective clothing, face shields, high voltage electrical gloves, hearing protection, and anti-contamination clothing). All work evolutions observed confirmed that the necessary PPE was being provided to the workforce and there were no instances of lack of PPE to perform a job function.

Due to the current mission of the FFTF project, normal preventative and predictive maintenance from past operations is subject to re-evaluation. As systems are being removed from service and retired, the project has revisited the maintenance of non-utilized or non-essential systems. The maintenance group has addressed the issue of discontinued systems and components by designating certain components' repair packages as "Stand by and Hold." This designation allows the maintenance group to maintain a comprehensive list of components and systems currently not in use at the FFTF project and not anticipated to be used before shut down. If mission needs change, the components are clearly identified as out of service and can be quickly reviewed to indicate repairs necessary to restart those systems if needed. This process also helps the maintenance group maintain a manageable backlog for the components that are still necessary for operations.

During this assessment two components that normally would have received preventative maintenance were in the process of being repaired due to component failure. Due to budget challenges the FFTF management team reviewed all calibrations and preventative maintenance procedures that were not regulatory driven, and made the decision to eliminate some, including preventive maintenance on the MASF ventilation supply fan. Failure of the bearing resulted in additional cost for the repairs to the fan, greatly exceeding the cost of performing the preventive maintenance, and resulted in further schedule and budget impact. As previously discussed, the additional schedule and budget pressure further complicate the FFTF management teams ability to promote safety excellence.

Activities observed by the team included two critical lifts and the removal of a component from the IEM cell. There were clear communication and control expectations during those work evolutions. Hazards appropriately discussed included slips, trips, falls, pinch points, and safety awareness. During these activities some practices were observed that demonstrated worker inattention to safety. For example, a worker was observed running down narrow stairwells, standing near or under the lifting mechanism, and standing between the load and the railing. These behaviors were not corrected by other workers or supervisors present for the work.

Opportunity for Improvement: The FFTF project team should examine options to revitalize and/or enhance the safety program to encourage employee interest and participation, and encourage the workforce to look for and self correct risky practices, especially during work evolutions.

As previously discussed, the FFTF project has a strong procedure base for performing work, but use and compliance with those procedures may not be meeting managers' expectations. For example, one work task observed was the removal of a shipping container liner from the IEM. During the evolution, there was confusion among the workers and the supervisor about a required work step in the procedure that was being used. Specifically, an operator requested confirmation that the required alpha smears had been performed on the item prior to removal from the cell. The operators conducting the work had not performed the smears, and were not aware that the smears were required by the procedure they were using. The work was halted to determine the technical basis for the alpha smear requirement. Further investigation by the project revealed that a similar item had already been shipped to the Idaho National Laboratory and no smears had been performed for that work cycle either. Eventually it was determined that the requirement to perform the smears was based on a "good practices" agreement between DOE hot cell operators to limit the amount of alpha contamination that could be transferred from one DOE hot cell to another. While no regulatory requirements were broken, the operators' knowledge of the procedures' requirements was not sufficient to ensure the requirements were met. In addition, a second procedure (which was not being used during this activity) was cited in the work plan for this specific operation. In that procedure the alpha smears were also required but they specified a different allowable alpha limit (220 dpm vs. 500 dpm). This discrepancy was not identified before the activity was performed. The procedures in these two cases were being used as reference procedures and had historically been frequently performed. Due to the change in mission, these processes are not as frequently performed and operators may not have the level of proficiency and knowledge that was previously assumed. Similarly, the TSR non-compliance previously discussed occurred in part due to reduced worker experience and

awareness of requirements. The FFTF project needs to carefully review policies for procedure use and ensure that operator knowledge and proficiency are sufficient, or alternatively require that procedures for handling of fuel or highly contaminated components be considered “in hand” use for the remaining project operations.

Site emergency preparedness activities are the primary driver for alarm testing and emergency drills. Site-wide alarm tests are conducted. Drills may include evacuation, take-cover, or personal injury scenarios. All personnel were aware of their responsibilities and actions to be taken in the event of a site emergency.

The site medical services are performed by AMH. The services include physicals, baseline evaluations required for specific hazards such as lead, and medical screening. AMH is Hanford's on-site medical resource and provides physician and physician assistant support for site-wide medical needs.

Conclusions

The predominant hazards at the FFTF project are well controlled through the spectrum of elimination, engineering controls, administrative controls, and the use of PPE. Work is performed safely in accordance with approved procedures in most cases. However, in some cases observed by the Team, worker knowledge and proficiency related to procedures that are no longer frequently used may not be sufficient to ensure all identified controls are implemented. Additionally, workers were not sufficiently focused on identifying and eliminating riskier behaviors by themselves and/or co-workers. This situation could be contributing to the higher accident and injury rates at the FFTF project when compared to other FH sites. The FFTF project needs to find effective methods to lower the workers' threshold for acceptable risk, and ensure procedurally identified controls are not missed during the course of work.

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. In addition, managers, supervisors, and employees must understand their safety and health responsibilities, and know how to effectively carry them out.

The FFTF project workforce is generally very experienced, with many workers having been at the Hanford Site for more than 10 years. Several interviewed employees had been at the FFTF project for more than 20 years. New employees are taught to recognize hazards associated with their jobs primarily through the HGET. Annual refresher training serves to ensure workers are aware of any changes that may have occurred. This training covers general site access requirements, including alarm recognition and appropriate responses to those alarms. On-the-job training is used extensively within the FFTF project organization and is achieved by following the requirements of a qualification guide, or checklist, that documents "hands-on" training and mock-up training used to prepare for conducting potential high-hazard activities.

Each work group establishes its own routines for weekly or daily pre-job briefings. Where used, these meetings provide an effective means of communicating changes in site conditions to workers.

The FFTF project workers are provided with first aid, cardio-pulmonary resuscitation, and automated external defibrillator training when it is required by their job. However, an updated list of individuals was not available at the time of this assessment. First-aid kits are provided in facilities throughout the FFTF project complex.

The FFTF project employees are knowledgeable of appropriate responses to emergencies as a result of annual HGET, postings in all major facilities, and documentation such as Health and Safety Plans. When non-FFTF project employees are performing work within the FFTF project facility, the FFTF project personnel are required to inform these workers/planners of hazards within the facility. There is a procedure defining access and escort requirements to the FFTF project property protection area for both safety and security, but many of the personnel contacted during this review were not fully aware of all those requirements.

Conclusion

The safety and health training processes used by the FFTF project ensures a full awareness by managers, supervisors, and employees of the hazards associated with work at the FFTF project. The qualification programs used over the years, combined with a very experienced workforce, ensure personnel assigned to work in the facility are able to take appropriate actions to protect themselves and their peers in the event of an abnormal or accident condition. The FFTF project has a well established safety and health training program with adequate content and direction.

VIII. CONCLUSIONS

The FFTF project is undergoing significant changes to its mission, organization, and funding. Managers and workers are dealing with the stress of those changes on a daily basis. Oftentimes, those stresses are contributing to decisions that seem at odds with the expectations that a DOE-VPP Star site pursue excellence and continuous improvement. Faced with aggressive schedules to close the facility and drastically reduced resources, the project's efforts to go beyond compliance have faltered. Work continues to be performed safely in accordance with DOE orders and regulations in most cases, but the additional actions to further raise worker awareness, implement programs that go above and beyond basic requirements, and encourage pursuit of excellence are not evident. The FFTF project accident and injury rates are well below the average for their comparison industry, but they are significantly higher than the FH goal, and are the highest of the FH projects currently participating in the DOE-VPP. This statistic can be very closely correlated to the reduced emphasis in pursuing safety excellence.

The Team is recommending that the FFTF project be placed in a Conditional Star status until improvements to reinvigorate the FFTF safety program can be implemented. . As such, the FFTF project should address improvements in Management Leadership and Employee Involvement. As part of this recommendation, HSS is committed to providing whatever assistance is feasible, as well as conducting another site visit within the next 12 months to gauge improvements. Alternatively, if FH cannot commit the necessary resources to make the improvements, they should consider whether the FFTF project will continue as an independent VPP participant.

Appendix A

On-site VPP Audit Team Roster

Management

Glenn S. Podonsky, *Chief Health, Safety and Security Officer*
Michael A. Kilpatrick, *Deputy Director for Operations, Office of Health, Safety and Security*
Dr. Pat Worthington, *Director, Office of Worker Health and Safety*
Bradley K. Davy, *Director, Office of Worker Safety and Health Assistance*

Quality Review Board

Michael Kilpatrick Dr. Pat Worthington
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Review Team

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Carlos Coffman	DOE/HSS 301-903-6493	Employee Involvement/Safety Training
Mike Gilroy	DOE/HSS	Worksite Analysis/Hazard Prevention and Control
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John Locklair	DOE/HSS	Worksite Analysis/Hazard Prevention and Control