Waste Sampling and Characterization Facility

Department of Energy Voluntary Protection Program Review

Background

The Waste Sampling and Characterization Facility (WSCF) consists of an analytical laboratory and the required support facilities. The facility supports a variety of missions at the Fluor Hanford (FH) site. Characterized as a less than category 3 radiological facility, the laboratory is capable of performing a broad range of characterizations on air, soil, and water samples to ensure compliance with regulations, permits, and waste disposal requirements.

WSCF was originally included in the Department of Energy Voluntary Protection Program (DOE-VPP) with the FH Site Operations Division in 2002. Over the years, several reorganizations have resulted in the facility being moved to its current position within the Waste Stabilization and Disposition Division (WSD). The reorganizations have prevented WSCF from being included in any DOE-VPP recertification reviews. WSD was certified as a DOE-VPP star site in August 2006, and WSCF was reorganized into the WSD in November 2006. Due to the reorganization, and the fact that WSCF had not been included in the WSD DOE-VPP certification, or any previous recertification, the DOE Office of Health, Safety and Security (HSS) determined that a brief review to ensure the status of DOE-VPP at WSCF was in order.

A two-person team (Team) from the Office of Worker Safety and Health Assistance (HS-12) conducted a three day review from April 27-May 1, 2007. During that time, the Team interviewed over 30 workers, supervisors, and managers, and conducted a thorough walk-down of most of the laboratories and support facilities. This report documents the results of that review.

Results

Managers at the WSCF are dedicated to ensuring the safe performance of their mission. Their motivation is two-fold. First, it is a core value that each and every employee be able to perform their jobs without injury or illness. Second, the need to properly handle, store, analyze, and dispose of samples without contaminating the facility (either chemically or radiologically) is absolutely essential to ensure they remain capable of the precision, accuracy, and sensitivity of their analyses. The laboratory must also be capable of competing on a cost basis with outside analytical services. All these factors combine to make safety in the lab a key to success. The facility has been operating since 1994 without a single lost time injury, illness, or accident.

Workers, consisting of chemical technologists, chemists, maintenance crafts, and administrative personnel, considered WSCF a safe place to work and to be the safest place they have worked at the Hanford site. Workers were comfortable discussing the process in which they report safety and health concerns and knew who they needed to talk to for resolution. Repeatedly, employees felt their direct supervision and all other

levels of management were in full support of the DOE-VPP. Employees also indicated that they felt managers at all levels, from the facility director to lower tier managers, had an open door policy that allowed them to freely discuss any matters relating to the facility. Immediate supervisors, managers and the zero accident council usually address safety and health concerns in a timely manner. Safety and health issues remaining in the Safety Logbook Tracking system usually were high-cost items and/or required approval through the FH facility modification plan. For example, a concern had been raised in May 2006 that poor drainage during cold weather was causing dangerous icy conditions on a gas bottle storage pad. Employees and management have explored engineering controls to address the safety hazards brought about by inclement weather. Management has assured employees the best control to prevent potential corrosive damage to the gas bottles and slipping hazards (using ice-melting chemicals) is to enclose areas of the pad. Facility modifications are planned for the very near future.

Even though most employees and managers were knowledgeable of the DOE-VPP, many had difficulty discussing the program itself regarding the tenets and program philosophy. More specifically, if an employee was questioned, "What is VPP?" A typical response would include elements of several different health, safety and environmental programs. Employees were often confused about the relationship between VPP, Integrated Safety Management System (ISMS) and the new emphasis on Human Performance Improvement (HPI). During interviews employees often spoke of the tightly woven workforce and the family-like respect for each other's health and safety. In one case, the Team observed a contradiction between what employees often said and what was practiced. In this particular case, work was being performed in a ventilation mechanical room by an engineer and a craftsperson. The work area required hearing protection if an individual was to be in the area for more than two hours and the work required use of leather gloves. Initially, the craftsperson was wearing gloves but no hearing protection, and the engineer was wearing hearing protection and handling a steel cable without gloves. Later the craftsperson put on his hearing protection and both proceeded with the job. This however, contradicts what the Team repeatedly heard from employees about looking out for each other's safety. Both employees should have noticed that the other was not fully protecting himself and should have reminded each other about the use of proper personal protective equipment.

In a similar fashion, the Team also observed an attitude shift in accepting potentially hazardous conditions in the laboratory areas. It appeared that in some cases if a potential hazard was identified and mitigated in one laboratory area, it was not always communicated effectively throughout the entire laboratory. The Team observed that several laboratories collect liquid chemical waste in bottles that sit in tubs on the floor. Considering the location of the tubs and the limited amount of walking area in the laboratory, a laboratory worker or visitor could accidentally walk into or kick a tub and cause a chemical spill. To prevent this from happening, a worker placed blue tape along the edges of the tub in the laboratory to increase its visibility. The tub is now more visible not only to the workers but to anyone entering the laboratory. This practice was not observed in any other laboratories, indicating safety suggestions may not always be

shared between labs. Despite recognizing the potential hazard for tripping or causing a chemical spill, no engineering solution for the waste collection bottles has been sought.

The acceptability of the potential tripping hazards caused by the bottles is in contrast to the reaction to similar hazards outside the laboratories. For example, to improve drainage away from the main building, there is a concrete pad poured around the perimeter of the building. The pad looks like a sidewalk, and is conveniently located under the building roof overhang. In one location there is a drainage pipe from the building roof that protrudes out from the building approximately 6-8 inches, and is about 6 inches high. At another location is a box with irrigation system controls that is approximately 2 feet square and about 6 inches high. These were identified during an inspection as tripping hazards. Stanchions were originally used to warn people of the potential tripping hazard, and when the stanchions did not hold up against the wind and weather, the area was painted with a warning "Not a Walkway." Even though the hazard was identified and determined to be unacceptable, only administrative controls, rather than hazard removal or engineering controls, were considered.

The overall hazard analysis processes in the lab are not robust. Although the analytical equipment being used is typically commercially procured, the review processes for new equipment rely on informal, undocumented safety reviews. WSCF uses a very brief procedure job hazard analysis, but does not use the FH corporate hazard analysis processes for anything other than maintenance tasks. Manufacturer's assumptions about equipment operating locations are not reviewed for validity, chemicals used for the processes may not be completely evaluated, and any analyses or assumptions being made during the approval process are not captured and validated. For example, one of the organic laboratories uses an Accelerated Solvent Extraction system. This system uses Acetone, Methylene Chloride (a known carcinogen), and Hexane. The solvents are stored in 2 liter bottles on top of the laboratory bench. The apparatus is not located inside a fume hood. An exhaust line from the apparatus has been rigged up to the ceiling and wired to a normal ventilation exhaust. The system was tied into a 150 psi nitrogen gas header. The system provided a small nitrogen blanket in the solvent storage bottles to prevent degradation of the solvents and to ensure sufficient suction pressure to the system pump. No systematic analysis had been performed on the equipment regarding the potential for over-pressurizing the solvent storage bottles. No one knew if the system contained an over-pressure protection for the bottles, or where the pressure would be vented to in the event of a failure. The decision to store the bottles on the lab bench rather than a fume hood could not be supported with any hazard analysis.

Another potential hazard is the presence of large numbers of gas bottles within the lab. The facility was originally designed with a gas distribution system, but that system has never been put into use due to quality control concerns. Subsequently, nearly every laboratory has one or more bottles of pressurized gas (typically nitrogen) stored or in use. The laboratory is unoccupied for 12-16 hours a day. Although an Unreviewed Safety Question review was performed in 1994 against the safety basis then in effect, there has been no documented analysis of the potential for an oxygen deficiency in the event of a bottle failure. Although such a failure might be a remote possibility with a single bottle,

the number of bottles stored and handled on a regular basis raises the risk. Subsequently, the need for an oxygen monitor in any of the laboratories has not been evaluated.

Conclusions

Overall, the Team concluded that work is being conducted safely at WSCF. Management commitment is evident; employees continue to receive adequate safety and health training and are aware of the hazards that exist in their work environment. Employees do participate in facility safety and health inspections on a rotating schedule and feel comfortable using the programs in place to report any unsafe concerns and issues. However, the Team felt employees at WSCF may not be fully engaged in the DOE-VPP process and are becoming complacent with their safety record, overlooking the need for continuous improvement and a commitment to safety and health excellence. Additionally, safety analysis processes for new equipment need to be more robust to ensure assumptions regarding equipment use, function, and location are valid and captured in procedures and instructions.

Opportunities for Improvement

The following are opportunities for improvement within the WSCF.

- Conduct additional training for all personnel on the tenets and principles of DOE-VPP. Ensure all personnel have a working knowledge of their responsibilities within the DOE-VPP framework.

- Implement a more robust, systematic, and documented hazard analysis process for all equipment and processes used in the laboratory. Consider adopting or modifying the FH Automated Job Hazard Analysis process. Ensure manufacturers assumptions and recommendations are evaluated, and all failure points are identified and analyzed.