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# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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April 29, 2008

The Honorable James A. Rispoli  
Assistant Secretary for Environmental Management  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-0113

Dear Mr. Rispoli:

As part of a series of reviews on the reinvigoration of Integrated Safety Management at Department of Energy sites, the staff of the Defense Nuclear Facilities Safety Board (Board) reviewed the activity-level craft work planning and control process and its implementation by CH2M Hill Hanford Group, Inc. (CH2M HILL). The Board's staff found that CH2M HILL has a formal and disciplined process for the planning and control of activity-level craft work, e.g., the cleanup of the Tank S-102 spill, and that this process has improved since the staff's last review on this subject. However, the implementation of these processes is still not as strong as it should be.

Despite the noted improvement in work control and planning processes, some key issues still remain. For example, the contractor has not adequately established the mechanisms for classification of work (minor, standard, or complex), which could result in improper analysis and control of hazards. In addition, the methods used for analyzing and controlling hazards do not fully implement accepted best practices, and there is a need for additional training of key personnel in performing hazards analysis.

The Office of River Protection personnel were knowledgeable concerning weaknesses in the contractor's work planning and control but need to be more focused on specific oversight activities including reviews of contractors work planning and control.

The enclosed report, prepared by the Board's staff, provides additional observations from the staff's review and is provided for your use in upgrading work planning and control at the Hanford Tank Farms.

Sincerely,

A handwritten signature in black ink, appearing to read "A. J. Eggenberger".

A. J. Eggenberger  
Chairman

c: Ms. Shirley Olinger  
Mr. Mark B. Whitaker, Jr.  
Mr. Robert J. McMorland

Enclosure

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Issue Report

February 25, 2008

**MEMORANDUM FOR:** J. K. Fortenberry, Technical Director

**COPIES:** Board Members

**FROM:** D. Burnfield

**SUBJECT:** Review of Activity-Level Work Planning and Control,  
Hanford Site Tank Farms

This report documents a review of work planning and control at the Hanford Site Tank Farms. The review focused on the methods used by the Tank Farms contractor to implement the principles and core functions of Integrated Safety Management (ISM) and quality assurance criteria so as to institute appropriate controls to protect workers from activity-level hazards. While this report addresses the work of craft personnel, work planning and control as discussed in this report is applicable to all types of work, including operations, maintenance, research and development, and surveillance. The review involved discussions with workers and responsible supervisors, review of documentation and directives, and tours of the work site associated with the cleanup of the Tank S-102 spill. The review was performed by members of the staff of the Defense Nuclear Facilities Safety Board (Board) D. Burnfield, S. Lewis, A. Gerlach, M. Dunlevy, and R. Quirk (Site Representative), assisted by outside expert D. Volgenau.

**Background.** The Hanford Tank Farms fall under the purview of the Department of Energy's (DOE) Office of River Protection (ORP). The CH2M HILL Hanford Group (CH2M HILL) is the Tank Farms contractor. A review of work planning and control by craft personnel at the Tank Farms conducted by the Board's staff approximately two years ago revealed that CH2M HILL had improved its ability to ensure safety for workers. The staff identified a number of areas that required significant improvement for CH2M HILL to achieve the desired level of performance. Since this review of work planning and control by the Board's staff, CH2M HILL has worked with the staff and the Energy Facility Contractors Group (EFCOG) to improve its processes.

On July 27, 2007, during waste retrieval operations at Tank S-102, a spill of mixed radioactive and chemical waste occurred. This event resulted in a Type A accident investigation, a disruption of retrieval and other mission-related work, and significant contamination of equipment and soil in the vicinity of the spill. ORP and CH2M HILL personnel were in the process of recovering from the spill and implementing corrective actions at the time of the staff's most recent review.

**Observations and Comments.** The observations and comments resulting from this review are organized below according to the five core functions of ISM.

*Overall*—CH2M HILL recently made a number of management and organizational changes and plans further changes in the near future. Several key management positions were filled temporarily. The potential impact of these changes on the contractor's ability to plan and conduct work safely was difficult to assess; some of the managers and supervisors responsible for work planning and control were affected by the turmoil and unsure as to their future positions, responsibilities, and authority.

At the time of the staff's review, each Tank Farm organization had a Director of Work Planning. These managers were directly responsible for the planning and conduct of work in their areas of responsibility. Their direct involvement in the work planning and control appears to be effective in improving the safe performance of work. In addition, an overall senior technical advisor for work planning programs is responsible for providing technical policies and formulating site-wide directives. None of these individuals had an accurate position description, and their final positions following completion of the reorganization were not clear. Close integration of these positions is required if policy and direction are to be passed down appropriately to the workforce.

CH2M HILL is working to implement the basic tenets of human performance improvement (HPI) in the work planning process. As part of the Hanford Pilot HPI Project, the CH2M HILL effort is being used by DOE and EFCOG to develop formal guidance and best practices for the enhancement of HPI at CH2M HILL and throughout the DOE complex.

*Define the Scope of Work*—Much of the work in the Tank Farms is not complicated and is often repetitive, but may have to be accomplished in areas with significant radiological or chemical hazards. CH2M HILL's directives for the planning and control of work are well organized and encompass most of the aspects of a good work planning and control process. However, the staff found that the mechanisms for implementing these directives required improvement. An example is the lack of a clear definition for the various categories of work, such as minor (skill-of-craft), standard, or complex work, and for how the related requirements for each should be implemented. Failure to categorize work properly results in the improper approach to the analysis of hazards and identification of controls. CH2M HILL's failure to provide a viable process for categorizing work led to a failure to plan properly for complex work during the initial stages of the recovery from the Tank S-102 spill. This in turn resulted in an initial failure to apply the five core functions of ISM adequately to the work planning process. While this failure was corrected by contractor management and DOE's contractor oversight process, the initial failure led to some delay in taking corrective actions.

*Analyze the Hazards*—The degree of hazards analysis depended on the relative difficulty of the proposed work task(s). For minor work, the supervisor relied on the workers' skill and knowledge of the general hazards associated with the work. Work categorized as being more

complex (standard and/or complex) required a more formal hazards analysis process. The hazards analysis checklists used by CH2M HILL during the planning of more complex work are not a recognized hazard analysis tool found in DOE Guide 440.1-8, *Implementation Guide for Use with CFR Part 851, Worker Safety and Health Programs*. The analysis of hazards requires the planner and work team to identify “critical steps” for which the potential for hazards are then analyzed. A review of completed work procedures and discussion with supervisors and workers revealed that too few steps were identified as critical steps. Also, some radiological control and health and safety personnel, and some planners and workers responsible for work planning, had not received sufficient training and qualification to ensure that an adequate analysis of hazards was being completed for complex work.

*Develop and Implement Controls*—The staff’s review of several completed work packages revealed that an appropriate set of work controls were developed for the hazards that had been identified. While engineered controls were specified in the completed work procedures reviewed, CH2M HILL’s work control directives did not include a formalized process for considering a hierarchy of controls during work planning.

*Perform Work*—The process used for prioritizing, scheduling, and releasing work appeared to be well structured and effective. Discussions with planners, supervisors, and workers during the staff’s review of completed work packages revealed an interested, motivated, and professional work planning and execution team. It appeared that subject matter experts were involved in all stages of the work planning, as well as commonly being in the field during work execution. A Senior Supervisory Watch was typically assigned for complex work.

*Feedback and Continuous Improvement*—The contractor process is designed to incorporate lessons learned from previous work of a similar type into current work packages. However, few lessons were actually identified, which may reflect weaknesses in the process used to collect meaningful lessons learned. There were only a few lessons learned documented from work accomplished as part of the Tank S-102 spill recovery actions.

On the other hand, during the spill recovery process, the use of various mock-ups was employed. This feedback and improvement effort resulted in significantly improved procedures for cleanup operations. CH2M HILL personnel also used the Hanford ALARA Center as a resource to improve the radiological aspects of work planning.

*DOE’s Contractor Oversight*—Based on the Type A accident investigation of the Tank S-102 spill, ORP is taking corrective actions to address the identified weaknesses in their oversight of safety and health programs. ORP representatives appeared knowledgeable concerning weaknesses in the contractor’s work planning and control processes and expressed interest in improved oversight. While ORP managers stated that assessments of work planning and control were being performed as part of the daily oversight by the facility representatives, no focused reviews had been conducted within the past six months, and no focused reviews were scheduled until June 2008. This is an issue that needs to be remedied. ORP representatives need to be more focused on specific oversight activities including work planning and control.