

A.J. Eggenberger, Chairman  
John E. Mansfield, Vice Chairman  
Joseph F. Bader  
Larry W. Brown  
Peter S. Winokur

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901  
(202) 694-7000



March 23, 2009

Dr. Inés R. Triay  
Acting Assistant Secretary for Environmental Management  
U.S. Department of Energy  
1000 Independence Avenue SW  
Washington, DC 20585-0113

Dear Dr. Triay:

The Defense Nuclear Facilities Safety Board (Board) is conducting a series of reviews to evaluate the efforts of the Department of Energy (DOE)/National Nuclear Security Administration to reinvigorate activity-level Integrated Safety Management. Recently, the Board's staff conducted a review of work planning and control processes and their execution by CH2M-WG Idaho, LLC (CWI) at the Idaho Cleanup Project of the Idaho National Laboratory (INL). This review addressed maintenance and production work conducted within the Idaho Nuclear Technology and Engineering Center Cleanup Project. The staff found that the processes CWI uses for planning and controlling work are not always consistent with expectations cited in DOE Guide 440.1-8, *Implementation Guide for Use with 10 CFR Part 851, Worker Safety and Health Programs*. As a result, work planning and control processes and procedures fail to provide the workforce with the necessary structured approach for ensuring worker safety.

The Board's staff noted the following deficiencies, details of which are provided in the enclosed report: (1) incomplete hazard analyses, (2) complex and confusing work planning directives, (3) errors in the development of work packages for routine but not necessarily simple or low-hazard tasks, and (4) inappropriately modified hazard controls. These errors result in insufficient controls for authorized work. To compensate for these deficiencies, management relies heavily on a highly skilled and involved workforce that has been able to provide a strong last line of defense. This workforce is adequately trained and deeply involved in all other aspects of safety at INL.

The DOE Idaho Operations Office (DOE-ID) is not sufficiently involved in the oversight of work planning and control at INL. Although the Facility Representatives are active in oversight of daily work activities, DOE-ID has provided little oversight by subject matter experts in this area. During a presentation to the Board's staff, DOE-ID was unable to cite any audits or surveillances it had completed of CWI work planning and control activities. The recent assignment of one person to oversee all INL work planning and control as an addition to other responsibilities will not provide the driving force required to improve CWI's work planning and control efforts. DOE Headquarters could considerably enhance DOE-ID's oversight of work planning and control by providing the tools necessary to identify problems and drive corrective

actions. In particular, DOE-ID oversight would benefit from the issuance in the DOE directives system of a technical standard for work planning and control and a guide supporting DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*, that includes a criteria and review approach document for critical work activities.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests a report within 90 days of receipt of this letter outlining actions taken or planned by DOE-ID and CWI to address the work planning and control deficiencies detailed in the enclosed report.

Sincerely,

A handwritten signature in black ink, appearing to read "A. J. Eggenberger". The signature is fluid and cursive, with a large initial "A" and a long, sweeping underline.

A. J. Eggenberger  
Chairman

Enclosure

c: Mr. Glenn S. Podonsky  
Mr. Dennis Miotla  
Mr. Mark B. Whitaker, Jr.

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Issue Report

February 2, 2009

**MEMORANDUM FOR:** T. J. Dwyer, Technical Director

**COPIES:** Board Members

**FROM:** R. Verhaagen

**SUBJECT:** Activity-Level Work Planning, Idaho Cleanup Project

This report documents a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the activity-level work planning and control processes at the Idaho Cleanup Project (ICP) of the Idaho National Laboratory (INL). CH2M-WG Idaho, LLC (CWI) is the environmental management cleanup contractor for the Department of Energy (DOE) Idaho Operations Office (DOE-ID). This review examined how Integrated Safety Management (ISM) is used at INL to protect workers from activity-level work hazards. The review was conducted by members of the Board's staff D. Burnfield, P. Foster, and R. Verhaagen, assisted by outside expert D. Volgenau.

**Background.** DOE has few formal requirements and limited guidance for planning and controlling work that are scattered among the following documents:

- Title 10 Code of Federal Regulations (CFR) Part 851, *Worker Safety and Health Programs*
- DOE Guide 440.1-8, *Implementation Guide for Use with 10 CFR Part 851, Worker Safety and Health Programs*
- The National Nuclear Security Administration (NNSA) document entitled *Activity Level Work Planning and Control Processes: Attributes, Best Practices, and Guidance for Effective Incorporation of Integrated Safety Management and Quality Assurance*

The NNSA document provides sound requirements and guidance for implementing a best-in-class activity-level work planning program and assessment tools for evaluating field implementation, but has not yet been published in the DOE directives system. Additionally, this document is referenced in DOE Guide 440.1-8 as a particularly useful tool for activity-level work planning of complex and/or hazardous tasks. These requirements and guidance for planning and controlling work were derived from the ISM core functions and guiding principles;

the ten criteria of DOE Order 414.1C, *Quality Assurance*; and DOE Order 433.1A, *Maintenance Management Program for DOE Nuclear Facilities*.

CWI manages ICP through four subprojects. This review focused on work planning for maintenance and operations taking place under the Idaho Nuclear Technology and Engineering Center subproject. CWI uses its standard STD-101, *Integrated Work Control Process*, as the basis for all maintenance work. In conjunction with STD-101, a hazard identification and mitigation process is used to identify the hazards and controls for such activities using a graded approach. For operations, work is planned using a management control procedure, MCP-3562, *Hazard Identification, Analysis, and Control of Operational Activities*. In planning for complex work related to both maintenance and operations, a Hazard Profile Screening Checklist (HPSC) is used to identify (1) hazards and their approved controls, (2) required worker training, and (3) suggested involvement of subject matter experts (SMEs).

**Observations and Comments.** CWI has established a working environment and safety culture that emphasizes safety and performance in the execution of work. Managers do an excellent job in promoting individual ownership, accountability, teamwork, and continuous improvement to prevent and resolve issues before they impact safety. Additionally, a strong behavior-based safety program and certain elements of a human performance improvement initiative have been implemented. This is well illustrated by the facility's program, *Changing Our Behavior Reduces Accidents (COBRA)*, which is functionally driven by site workers and is well-supported by management. As a result of COBRA, the entire ICP workforce is engaged and frequently makes thoughtful recommendations aimed at improving safety.

The staff believes that CWI management relies too heavily on this talented workforce instead of effective activity-level work planning to prevent mishaps. The result has been work planning processes and procedures that fail to perform their intended function of protecting workers. The following observations and comments on the application of ISM core functions and guiding principles support this observation.

*General Work Planning and Control*—The CWI manuals and codes of practice that are used to implement ISM for activity-level work planning and control are not well-written, contain complex and confusing language, and routinely rely on overly generalized instructions. These documents would benefit greatly from a review by a technical editor. The staff observed instances in which the complexity of these work planning documents resulted in planners not performing to management's expectations.

As an example, guide GDE-6210, *Work Order Planning Guide*, defines a "background" process to be used when the planner determines that work is to be performed "on the same equipment, with the same work instructions, hazards, and controls." This process allows the planner to make administrative changes to a previously approved package without requiring additional SME approval. In addition, GDE-6211, *Passport User's Guide*, identifies the process to be used by the work planner to use the background process to modify a work order. GDE-6211 does not identify what conditions must be met for this process to be used. As a result, and

contrary to GDE-6210, the background process had been used to make nonadministrative changes to one work package reviewed by the staff.

The training and qualification program for some positions responsible for work planning and control could also be improved. For example, the nuclear facility managers are ultimately responsible for hazard identification and control for operational activities, but their Qualification Checklist does not specifically require training in this area. The staff also observed that maintenance planners are not required to demonstrate knowledge of how to properly apply the background process to a previously developed work order to ensure that it can be used safely for current work. The staff identified numerous problems with the work package that was provided for review, which had been created using this background process.

*Define the Scope of Work*—The formal processes for ensuring that work is identified, requested, prioritized, planned, and scheduled are functioning effectively. For maintenance activities, work planners are assigned much of this responsibility; for operations activities, this responsibility resides with the operations/facility managers.

In both operations and maintenance organizations, some work is accomplished based on the training and/or qualification (skill-of-the-craft) of the individual performing the work. In most cases, the processes used for planning and assigning this work are adequate to ensure worker safety. However, the staff is concerned about the unusually high voltage limits allowed by STD-101 for expedited work on energized equipment.

*Analyze the Hazards, and Develop and Implement Controls*—CWI uses the HPSC as an automatic tool to generate controls based on hazards identified by the planner. The planner uses a computer program to select/deselect hazards as deemed appropriate, and the computer program generates generic controls for the identified hazards at the end of the analysis. This process is generally performed by a single person with little apparent synergy with workers or other individuals pertinent to the task being planned. For more complex or hazardous work/activities, a group of SMEs is formed on the basis of the HPSC's recommendations to address possible additional hazards associated with the task. One deficiency of the HPSC noted by the staff is that if the planner mistakenly overlooks a potential hazard, the HPSC will screen out the necessary controls and will not call for participation of the appropriate SME from the hazard analysis process.

DOE Guide 440.1-8 recognizes several methodologies for performing hazard analyses. CWI does not always use these or equivalent methodologies during the planning of complex and high-hazard work. The use of a systematic methodology to analyze hazards has been shown to improve engineered and administrative controls, thereby reducing the likelihood of an accident or event. The staff's review of planned work packages did not reveal the use of "what if" scenarios in the evaluation of hazards despite the recommendations to do so in the CWI manuals and codes of practice, such as MCP-3562.

In addition to generating generic controls, the HPSC outputs only administrative controls and personal protective equipment. Contrary to STD-101, there is no evidence that work planners are considering a hierarchy of controls by attempting to either remove hazards or identify engineered controls during the planning process. Beyond the work planning process, several examples exist of the effective use of worker knowledge and experience to develop engineered controls to mitigate hazards. However, worker input was not being solicited early enough in the work planning process to help work planners in hazard identification and analysis.

During this review, the Board's staff identified the following examples of failures of these processes:

- During the review of a maintenance work package, the staff determined that work controls were identified as late as the pre-job brief. This is another good example of how the workforce is providing a strong backstop.
- During the review of the work package created using the background process mentioned previously, the staff discovered that pertinent hazards and controls had not been analyzed. They had simply been added to the new package without carrying out the formal work planning process.
- Controls identified in Material Safety Data Sheets (MSDSs) had not been incorporated into work packages. Discussions with CWI Industrial Health personnel revealed that their practice is to identify the constituents of the material and then separately analyze the hazards and prescribe appropriate controls accordingly. For one work package the staff reviewed, the Industrial Health personnel had concluded that the controls identified in a hazardous material's MSDS were not needed. There was no indication in this work package what decisions had been made to allow the exclusion of controls identified by the MSDS or to adequately inform the workers why the MSDS controls were not being used.

*Perform the Work*—Formal processes exist within both the maintenance and operations organizations to ensure that appropriate preparations are completed before work is released for execution. Work in both areas is formally and explicitly authorized to proceed. However, workability walkdowns prior to job execution are left to the discretion of the work supervisor and workers.

While on site, the staff witnessed two pre-job briefings. Both were thorough and included good interaction with the workers. Line management was present and observing the work in progress during the review and the staff noted no significant deficiencies while witnessing work in the field. In both instances, the job foremen effectively relayed the appropriate safety information and asked pointed follow-up questions to ensure that workers understood their specific tasks.

*Feedback and Continuous Improvement*—The contractor has developed an effective system for feedback and continuous improvement. This system includes provisions for gathering information during post-job reviews for the lessons-learned program and for consideration during the preparation of work packages. Workers are encouraged to provide input for use in improving work processes and conditions. The staff noted a number of cases in which a worker's suggestion had resulted in a revised work package or development of a better way of performing a specific task.

*DOE Oversight*—The DOE-ID Facility Representatives are providing active daily oversight of work activities in their assigned facilities. However, DOE-ID had not recognized most of the deficiencies noted in this report, and admitted not providing adequate SME oversight of CWI's work planning and control processes. During discussions with the Board's staff, DOE-ID was unable to produce any written assessments of CWI's work planning and control efforts. DOE-ID is taking preliminary steps to improve this oversight; however, the Board's staff believes that designating a single SME to handle work planning as a collateral duty is inadequate to provide effective oversight. DOE-ID needs to evaluate the effectiveness of its oversight through periodic self-analysis in accordance with DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*.

DOE Headquarters could considerably enhance DOE-ID's oversight of work planning and control by providing the impetus and tools necessary to identify problems and drive corrective actions. Of particular benefit would be issuance in the DOE directives system of a technical standard for work planning and control and a guide supporting DOE Order 226.1A that includes a criteria and review approach document for critical work planning activities.