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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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January 22, 2009

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Mr. D'Agostino:

The Defense Nuclear Facilities Safety Board (Board) is conducting a series of reviews to evaluate the efforts of the Department of Energy/National Nuclear Security Administration (NNSA) to reinvigorate activity-level Integrated Safety Management (ISM). Recently, the Board's staff conducted a review of work planning and control processes and their execution by Babcock & Wilcox Technical Services Y-12 (B&W) at the Y-12 National Security Complex (Y-12). This review, which addressed maintenance and production work, found many deficiencies in the implementation of work planning and control processes.

Although B&W's work planning and control directives provide a solid framework for ensuring worker safety, deficiencies in implementation and coordination of these processes require improvement to achieve consistency with NNSA requirements. Many of these requirements can be found in the NNSA document *Activity Level Work Planning and Control Processes: Attributes, Best Practices, and Guidance for Effective Incorporation of Integrated Safety Management and Quality Assurance*. These deficiencies include (1) incomplete hazard analyses, (2) poor coordination of work management processes between maintenance, production, and health and safety organizations, (3) errors in pre-approved work packages used to perform repetitive but not necessarily simple or low-hazard tasks, and (4) outdated work packages that do not reflect current scope of work. These errors resulted in insufficient controls for authorized work. B&W placed some work activities on hold until work planning problems identified by the staff could be resolved and corrected.

The Board's staff found that YSO has an active program for monitoring and evaluating B&W's work planning and control. This program encompasses a wide spectrum of involvement in oversight activities and effective communications with B&W, and had correctly identified the broad need for improvement in work planning and control. However, the Board's staff discovered deficiencies in B&W work planning and control that YSO oversight had yet to identify. YSO management attributed their inability to provide more effective oversight of B&W work planning and control processes to insufficient resources. In addition to adequate

resourcing, DOE/NNSA Headquarters could offer considerable benefit to YSO's work planning and control oversight efforts by providing the impetus and tools necessary to identify problems and drive corrective actions. In particular, YSO efforts would improve with (1) issuance of a work planning and control technical standard in the DOE directives system, (2) issuance of a guide supporting DOE Order 226.1, *Implementation of Department of Energy Oversight Policy* that includes a criteria review and approach document for critical work activities, and (3) staffing NNSA headquarters to support activity-level work planning.

The Board believes that when the deficiencies in implementation and coordination are effectively corrected, the B&W work planning and control directives system will be much more effective. The enclosed report details the deficiencies identified by the Board's staff and provides observations from the staff's review for your use in improving work planning and control at Y-12.

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 "E".

A. J. Eggenberger
Chairman

Enclosure

c: The Honorable William C. Ostendorff
Mr. Theodore D. Sherry
Mr. Glenn S. Podonsky
Mr. Mark B. Whitaker, Jr.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

November 12, 2008

MEMORANDUM FOR: T. J. Dwyer, Technical Director

COPIES: Board Members

FROM: R. Verhaagen

SUBJECT: Activity-Level Work Planning, Y-12 National Security Complex

This report documents a review of activity-level work planning and control processes at the Y-12 National Security Complex (Y-12). Babcock & Wilcox Technical Services Y-12 (B&W) manages Y-12 for the National Nuclear Security Administration's (NNSA) Y-12 Site Office (YSO). This review examined how Integrated Safety Management (ISM) is used at Y-12 to protect workers from activity-level work hazards. The review was conducted by members of the staff of the Defense Nuclear Facilities Safety Board (Board) D. Burnfield, R. Verhaagen, D. Owen, and D. Kupferer, assisted by outside expert D. Volgenau.

Background. The Department of Energy (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 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. These requirements and guidance 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*. These requirements and guidance for planning and controlling work have not yet been published in the DOE directives system. However, their implementation was mandated at NNSA sites in a

January 23, 2006, memorandum from the Assistant Deputy Administrator for Program Integration to NNSA site office managers, entitled *Revitalizing Integrated Safety Management: Site Office Action Plans for Improving Activity Level Work Planning and Control Processes*.

B&W uses three distinct processes for activity-level work planning and control at Y-12. These processes are used for maintenance work, work associated with production operations, and design and construction work and are governed by their respective procedures: *Integrated Work Control Manual* (Y18-012); *Technical Procedure Process* (Y15-232); and *Engineering, Design, and Support During Construction* (Y17-001). Additionally, a *Job Hazard Analysis Manual* (Y73-045) has been developed for use in planning work in any of these areas. The staff's review addressed maintenance and production work.

Observations and Comments. The Board's staff developed the following observations and comments:

General Work Planning and Control—The Board's staff found that B&W is working to establish a safety-conscious work environment that strives for excellence. Briefings and discussions revealed that managers, supervisors, and workers have a strong awareness of and focus on maintaining a safe workplace and work environment. B&W uses a program for improving work practices that is based on observation of workers' behaviors, and continues to implement elements of Human Performance Improvement (HPI). This initiative should reap benefits in work planning and control, particularly if the tools available in DOE's draft HPI handbook for planning work are employed.

However, the Board's staff also found that B&W's work management processes are not well coordinated. Maintenance and production organizations could benefit greatly from sharing their work planning and control processes. For example, the production organization plans and conducts maintenance activities (requiring qualified nuclear material handlers) on production equipment without taking advantage of existing, well-developed procedures and practices of the maintenance organization. The hazards analysis procedure (Y73-045) and process are not administered by either the maintenance or production organization; rather, B&W's health and safety organization is responsible for this procedure and process. During interviews with the Board's staff, B&W health and safety personnel demonstrated little understanding of the work planning and control procedures used by the maintenance and planning organizations. This lack of understanding has resulted in a job hazard analysis (JHA) tool that often identifies hazards and controls that are too generic to be beneficial. Additionally, the *Job Hazard Analysis Manual* (Y73-045) uses risk, hazard, and complexity terminology that differs from and in some cases conflicts with that used in the maintenance and production work control procedures.

DOE Policy 450.4, *Safety Management System Policy*, and acquisition regulations governing ISM state that the second core function is to "analyze the hazards." B&W's ISM system description expands this to "analyze hazards and risks." This emphasis on risk analysis has been translated into Y-12's directives for planning and controlling activity-level work. Risk analysis involves analyzing the probability and consequences of a given event. It is usually performed at the facility level through the creation of a Documented Safety Analysis. For the

widely varying tasks performed at the activity level for which probability and consequence data are frequently scarce, it is extremely difficult to determine risk. This inappropriate emphasis on risk analysis is inconsistent with the NNSA work planning guidance and requirements document.

The B&W maintenance organization uses the term “dispatched work” to define work performed by workers using existing skills or qualifications without specific work instructions (e.g., skill-of-the-craft). The work scope for these activities is published in an approved list. The term “minor work” is used to define work whose scope is bounded by written criteria, which permits the work to be performed using existing skills or qualifications with minimal work instructions. Use of these work categories has enhanced maintenance efforts at Y-12 as greater focus can be placed on more hazardous and/or complex work that is planned as “complex work” and requires detailed work instructions.

Define the Scope of Work—The scope of maintenance work conducted at Y-12 is generally well defined. One exception is the manner in which the contractor uses numerous “model work” packages for minor and complex tasks performed on a repetitive basis. These packages are preapproved and preverified to be adequate for the specific work scope. When released for work, however, these packages are not reevaluated to ensure that they adequately define the current scope of work or completely identify potential new hazards. This process eliminates the evaluation of changing conditions. A review of model work packages revealed deficiencies in defining the scope of work and identifying hazards that can be directly attributed to this “model work” package process.

For example, in the case of a model work package used to rebrick casting furnaces, the JHA had been performed in July 2006 and was not redone despite an identified change in referenced radiological controls. This package referenced four Radiological Work Permits (RWPs) that had been revised at least twice since the versions referenced in the JHA. These RWP revisions included changes that affected workers directly. When this and other deficiencies were observed, B&W management took appropriate corrective action by suspending the use of model work packages until they could be reviewed for adequacy.

The staff observed similar deficiencies in Y-12’s production organization. The *Technical Procedure Process* (Y15-232) employed is complex, confusing, and difficult to use. Discussions with B&W personnel revealed that the instruction was not being followed for this very reason. The staff reviewed one Job Performance Aid (JPA) for removing sludge/solids from horizontal tanks. The *Technical Procedure Process* defines a JPA as “a technical procedure that specifies how to accomplish a SINGLE task associated with starting up, operating, shutting down equipment and systems, small scale activities, and laboratory hardware.” The work controlled by this JPA was intended to be performed several different times and encompassed tank cleaning that involved multiple tasks, including a lock-out/tag-out. This work would have been planned and conducted more appropriately under a maintenance work category. During the work’s execution, workers encountered and documented problems, but no changes to the JPA were made on the basis of this information. B&W appropriately suspended further use of this procedure until the application of the JPA process could be reviewed.

Planning Work (Analyze the Hazards and Implement Controls)—It is not clear that the appropriate health and safety subject matter experts are adequately participating in work planning teams. Predetermined, general controls are inserted into work packages during the early planning stages by the automated JHA (AJHA) process. This effectively preempts the participation of these subject matter experts. Most sites have abandoned the use of the AJHA process since it is cumbersome and has many weaknesses. The staff observed one instance in which the planning team did not include an industrial hygienist because the AJHA process incorrectly screened out “hazardous materials” as a potential hazard. However, a material safety data sheet included with this package identified the solvent to be used as hazardous and as requiring the use of personal protective equipment (PPE). PPE was not specified in the work package steps controlling this task, and the JHA did not identify the hazardous material. When the Board’s staff brought this fact to B&W’s attention, work on this package was placed on hold until a new hazard analysis could be conducted with the appropriate personnel involved.

One negative impact of having personnel external to the maintenance and production organizations administer the hazard analysis tool is that work packages contain highly generic controls, such as avoid long reaches, lift within capability, and keep walking/working areas dry and free of debris. These controls are well within the scope of the training provided to the workforce. Other sites have stopped including such generic controls in work instructions because they provide little safety benefit. Some work packages included controls that were too general (e.g., “must be a qualified electrical worker to perform electrical work”), failing to provide the necessary specific controls that would allow for the integration and coordination of controls.

The revision process for RWPs requires improvement. The process must ensure that when an RWP is updated, it is reliably brought to the attention of those planning work and is updated in the associated work packages. The staff’s review identified more than one instance in which outdated and revised RWPs were referenced in currently authorized work packages and had been used in the pre-job brief to the workforce. Although B&W management asserted that workers see the most current version of the RWP at the entry points to controlled work areas, the staff observed workers entering a controlled work area without reading the RWP that was available at the entry point.

Perform Work—Part of the work planned and released for the three work packages reviewed by the staff had been completed previously. However, the work could not be continued because of deficiencies noted during the review and B&W’s decision to suspend use of the procedures pending further review. As a result, the Board’s staff was unable to observe the performance of work. The contractor work planning and control directives appeared to contain adequate guidance for the scheduling and performance of work. They consist of procedures for work area walkdowns and pre-job briefings prior to commencement of work and clear guidance on the actions to be taken by supervisors and workers should unexpected conditions arise during the performance of work.

The staff noted deficiencies during tours of work spaces. Some individuals were signed into a work area without having read the appropriate safety documentation. Material required to

be read by visitors before entering a facility was missing a page, and the posted instructions were confusing and perhaps inaccurate. The staff brought these deficiencies to the attention of contractor and YSO personnel.

Feedback and Continuous Improvement—The contractor appears to have developed an effective process for feedback and continuous improvement following the performance of work activities. This process includes provisions for gathering information during post-job reviews for the lessons learned program. The staff noted that feedback from the partial completion of one open work package had been used to improve the package.

NNSA Oversight—YSO has a program for the oversight and assessment of B&W's work planning and control processes and their execution. The contractor is promptly informed of issues and weaknesses and is required to undertake corrective actions as appropriate. Much of the oversight is provided by YSO's Operations Management and Engineering, Safety, and Environment groups. Site access records indicate that staff and management spend a significant amount of time in the field. Metrics developed and used by management to track contractor performance and to establish oversight priorities have identified work planning and control as the area requiring the most improvement.

However, the Board's staff discovered deficiencies in B&W work planning and control that YSO oversight had yet to identify. YSO management attributed their inability to provide more effective oversight of B&W work planning and control processes to insufficient resources. In addition to adequate resourcing, DOE/NNSA Headquarters could offer considerable benefit to YSO's work planning and control oversight efforts by providing the impetus and tools necessary to identify problems and drive corrective actions. In particular, YSO efforts would improve with (1) issuance of a work planning and control technical standard in the DOE directives system, (2) issuance of a guide supporting DOE Order 226.1, *Implementation of Department of Energy Oversight Policy* that includes a criteria review and approach document for critical work activities, and (3) staffing NNSA headquarters to support activity-level work planning.