DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Washington, DC 20004-2901

April 13, 2012

Mr. David Huizenga
Senior Advisor for Environmental Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Mr. Huizenga:

The staff of the Defense Nuclear Facilities Safety Board (Board) has conducted a series of reviews to evaluate the implementation of Integrated Safety Management at the activity level at Department of Energy (DOE) sites. Most recently, in November 2011, the staff reviewed the activity-level work planning processes and procedures used by Savannah River Nuclear Solutions (SRNS) at the Savannah River Site. The staff's review identified weaknesses in hazard analysis and identification of controls, as well as in DOE oversight.

The Board's staff found that SRNS's processes and procedures have on occasion led to an incomplete set of hazard controls necessary to ensure that activity-level work is accomplished safely. SRNS's hazard analysis process does not readily accommodate breaking down of work into tasks and subtasks that allow for the effective identification of hazards and development of controls. As a result, the hazard analysis process does not consistently identify or specify a complete set of controls for task-specific hazards.

The staff also reviewed the oversight of activity-level work planning provided by the DOE Savannah River Operations Office (DOE-SR). The review revealed that DOE-SR had not been performing meaningful programmatic oversight of work planning and control. Of note, neither DOE-SR nor SRNS had performed a thorough review of work planning and control using the guidelines issued by DOE's Office of Environmental Management in April 2010.

At the time of the staff's review, both DOE-SR and SRNS were engaged in revising the procedures and improving the processes for activity-level work planning, including DOE-SR oversight in this area. The enclosed report is intended to assist DOE-SR and SRNS in this important and ongoing effort to strengthen worker safety.

Sincerely,

Peter S. Winokur, Ph.D.
Chairman

Enclosure

c: Mr. Glenn S. Podonsky
Dr. David C. Moody
Mrs. Mari-Jo Campagnone

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

March 9, 2012

MEMORANDUM FOR: T. J. Dwyer, Technical Director

COPIES: Board Members

FROM: Z. McCabe, R. Verhaagen

SUBJECT: Activity-Level Work Planning and Control, Savannah River Nuclear Solutions

This report documents a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the implementation of Integrated Safety Management (ISM) in the activity-level work planning and control processes and procedures used by Savannah River Nuclear Solutions (SRNS) at the Savannah River Site (SRS). The staff also evaluated the oversight of work planning and control by the Department of Energy (DOE) Savannah River Operations Office (DOE-SR). The review was performed by members of the Board's staff, D. Gutowski, Z. McCabe, D. Owen, R. Raabe, and R. Verhaagen, during the week of November 14, 2011. The Board's SRS site representatives, D. Burnfield and M. Sautman, also participated in the review.

Background. SRNS is the management and operating contractor at SRS. SRNS develops and maintains the manuals and codes of practice used by SRNS and the high-level waste contractor, Savannah River Remediation (SRR). The staff's review focused on SRNS's procedures and processes for planning and controlling production and maintenance at the activity level, including three key institutional procedures: 1Y-8.20Q, *Conduct of Maintenance*; 2S-1.1, *Procedure Administration*; and 8Q-122, *Task Level Hazard Analysis*. The Board's staff evaluated the effectiveness of these procedures in directing work planners to identify and analyze hazards, to identify controls, and to implement appropriate controls in work packages and procedures. The staff also evaluated the implementation of these procedures through interviews with SRNS personnel and observations of operations in E and L Areas.

At the time of the review, SRNS was formulating revisions to its processes and procedures for planning and controlling work. For example, the hazard analysis procedure was being revised to state more clearly the requirements for using a team approach (versus serial input and review) to performing hazard analyses and identifying hazard controls. The number of different processes used by various SRNS organizations for work planning and control was being reduced from seven to four. This involved combining the construction, maintenance, and production operations processes into a single set of directives and eliminating the separate process currently used by the radiological controls group.

More recent developments include a combined effort by SRNS and SRR to further revise the SRNS procedures for work planning, using a recently developed URS Corporation work planning and control standard. The Board's staff believes this project is warranted and prepared this report to support the revision effort.

Observations. The procedures required to plan maintenance and operations work at SRS are numerous and complex. Simplification of these procedures would aid greatly in the work planning effort, particularly as those personnel more experienced with the current processes leave the workforce. In addition to being complicated, SRNS's work planning procedures frequently use vague terms—for example, "as needed" and "when necessary"—and as a result do not always specify requirements for how or when to perform necessary work planning processes. The Assisted Hazard Analysis (AHA) software application does not readily accommodate breaking the work down into tasks and subtasks and subsequently identifying task-level hazards. As a result, the AHA application and process fail to consistently identify or specify controls for task-specific hazards. These weaknesses in SRNS's processes and procedures can lead to inadequate hazard analyses and a potentially incomplete set of identified controls. Details supporting these conclusions are organized below with respect to the core functions of ISM.

Define the Scope of Work—The Board's staff observed that work often is not broken down into tasks and subtasks as necessary for subsequent hazard identification and selection of controls. As a result, hazards that may be associated with a particular subtask may not be identified. Additionally, work instructions, AHAs, and radiological work permits (RWPs) for a given job often identify different controls and are not well integrated. SRNS does not always analyze the controls specified by each of these documents collectively to ensure that they do not conflict.

SRNS's work planning would benefit greatly in this area from requiring that draft work instructions be developed to assist with definition of the scope of work and subsequent hazard analysis. These instructions would aid planners in facilitating planning walkdowns. They also would help ensure that subtasks are defined in sufficient detail so that hazards associated with each subtask can be evaluated, and that the work instructions, AHAs, and RWPs are integrated and their specified controls analyzed in aggregate. Additionally, the current requirements and guidance for performing walkdowns are scant, and training does not compensate for this lack of direction. Strengthening the walkdown tools by requiring draft work instructions would clearly improve performance in this area, and indeed is recommended in the work planning guidelines issued by DOE's Office of Environmental Management (EM) in April 2010.

SRNS authorizes "model work orders" for use in jobs of similar scope. Model work orders are pre-existing work packages intended for use with specified equipment in a specified location. If a similar scope of work is to be performed with a previously unanalyzed piece of equipment or in a different location, SRNS's process requires only that the model work order be routed for approval prior to use. This process does not require a formal evaluation of the scope of work and associated hazards to ensure that the model work order is appropriate for the new work and location; hence any new hazards introduced with this different work may not be recognized. A formal review to evaluate the planned use of the model work order and the applicability of existing hazards and controls would help ensure that all hazards are properly analyzed.

Analyze the Hazards and Implement Controls—SRNS uses the AHA software application for higher-hazard and more complex work planning. The application allows planners to associate hazards with either main tasks or subtasks. As a result of the identified weaknesses in defining the scope of work, the AHA process does not consistently identify or specify controls at the subtask level. One limitation of the AHA application is the inability of planners to quantify the identified hazards. This is an important step in hazard analysis as controls can vary depending on the magnitude of the hazard (e.g., noise, voltage, or pressure hazards). Additionally, controls for hazards identified in an AHA may not be specified in the AHA and/or in the procedure. For example:

- An AHA for work in E Area did not specify controls associated with each identified hazard. Many of the controls were marked "N/A—will be determined during mockup training" or "controls as specified in TWD [technical word document]." It was unclear what controls were identified during mockup training, and in many instances the TWD specified no controls for identified hazards.

- The control in an AHA for cask unloading in L Area was "containment and/or contamination controls are included in the technical work document." The TWD specified no containment or contamination controls.

The staff's review revealed weaknesses in the application of RWPs to control radiological hazards. In particular, SRNS is not using RWP suspension limits adequately to control hazards. RWPs for operations in both E and L Areas specified artificially high suspension limits that were not based on expected radiological conditions. Rather, the suspension limits were set high to provide latitude for performance of the work instead of being responsive to unanticipated hazardous conditions. DOE Standard 1098-2008, *Radiological Control*, provides guidance for selecting suspension limits so that workers are alerted to changing radiological conditions. In one case, an RWP specified different suspension limits depending on the selected personal protective equipment, rather than the anticipated radiological conditions. In another instance, a radiological parameter used as a suspension limit could not be measured until after the work had been completed. These are all indications that the selection and application of RWP suspension limits need to be improved.

Perform Work within Controls—The Board's staff observed the performance of operations in E and L Areas. In all cases, the pre-job briefs were interactive and thorough. The workers were clearly experienced and competent, and the majority of work observed was well performed. Supervisors were actively involved in observing the workers. The staff noted instances in which supervisors intervened to ensure that appropriate controls were in place. During the conduct of one operation, a pump was placed on top of a drum with its power cord stretched horizontally in the air. The work team knew the pump might have to be elevated and discussed this possibility at the pre-job brief, but they did not know that the proximity of electrical outlets and the length of the power cord would result in this newly introduced hazard. A more thorough job walkdown could have prevented this situation and could have been performed before workers donned their air-fed suits.

Feedback and Improvement—SRNS routinely seeks to improve its activity-level work

planning processes and procedures, as indicated by the ongoing improvement initiatives observed by the staff. SRNS actively solicits worker feedback and acts on worker input. However, SRNS has not used the work planning and control program guidelines issued by EM to conduct a focused and thorough assessment of its procedures or processes. The EM guidelines address many of the weaknesses identified by the staff during this review and could have been used previously to correct them.

It should be noted that the lead work planning manager for the site is an active member, and former chair, of the Energy Facility Contractors Group's project to develop a guideline document for work planning and control. This effort to improve work planning across the DOE complex is commendable.

DOE-SR Oversight. DOE-SR's oversight has not been effective in identifying and correcting the weaknesses noted above. As of the time of the staff's review, DOE-SR had not been performing meaningful oversight of work planning and control at the programmatic level, but instead had been relying solely on its facility representatives to provide oversight in this area as part of their daily duties. DOE-SR had not performed a dedicated work planning assessment using the April 2010 EM guidelines. Those DOE-SR assessments provided to the staff that identified work planning and control as a functional area lacked any substantive observations. These assessments generally were not focused on implementation of work planning and control processes and procedures, but related to project management.

DOE-SR management had recently identified the need to increase oversight of work planning and control. Improvement actions were in progress, not the least of which was the assignment of a subject matter expert to focus on this area. EM is requiring all of its sites to assess activity-level work planning and control as one of the focus areas for annual site ISM declarations for 2011. These are all moves in the right direction that should clearly improve the contractor's performance in this area.