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## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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99-0001061



April 27, 1999

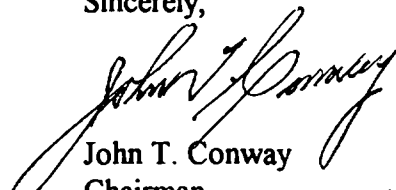
Mr. James M. Owendoff  
Acting Assistant Secretary for  
Environmental Management  
Department of Energy  
1000 Independence Avenue, SW  
Washington, D.C. 20585-0113

Dear Mr. Owendoff:

The staff of the Defense Nuclear Facilities Safety Board has been following various issues regarding the control of work at the Rocky Flats Environmental Technology Site (RFETS). During an on-site review in February 1999, the staff found that improvements in developing controls for protection of workers during decommissioning activities have been made or are under development. It is commendable that RFETS has embraced the goal of getting workers out of hazardous environments rather than relying on personal protective equipment. RFETS should continue its efforts to improve the work planning process, especially in the areas of systems engineering and integration of safety disciplines.

Staff observations related to this matter are presented for your consideration in the enclosed report. If you have comments or questions on this matter, please do not hesitate to contact me.

Sincerely,

  
John T. Conway  
Chairman

c: Mr. Mark B. Whitaker, Jr.  
Ms. Jesse Roberson  
Mr. Richard Crowe

Enclosure

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Staff Issue Report

March 5, 1999

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** J. Troan

**SUBJECT:** Radiological Engineering During Deactivation and Decommissioning Activities at Rocky Flats Environmental Technology Site

This report documents a review of radiological engineered controls used during deactivation and decommissioning (D&D) activities at the Rocky Flats Environmental Technology Site (RFETS). This review was conducted by D. Burnfield, T. Hunt, R. Kasdorf, M. Sautman, and J. Troan of the Defense Nuclear Facilities Safety Board's (Board) staff during February 24-25, 1999.

**Background.** The Board's staff has performed extensive oversight of decommissioning activities at RFETS's Buildings 771 and 779 to evaluate conduct of operations and radiological practices. Based on the staff's observations, two general concerns have arisen. First, there has been a tendency to rely on personal protective equipment, rather than engineered controls that could eliminate or mitigate the hazards. Second, some of the engineered controls in use (e.g., air movers) had not been analyzed to ensure that they would have the desired result.

In August 1998 the Kaiser-Hill (K-H) Executive Vice President and Chief Operating Officer appointed an investigation team to inquire into the circumstances surrounding selected radiological events at RFETS and a technical team to review high-risk radiological work at the site. This action was taken in response to a recognition that recent events indicated a potential problem in the ability to execute work involving high levels of contamination. In November 1998 the Board's staff held a televideo conference with RFETS personnel to discuss the site's radiological concerns and plans for the future.

**Current Activities.** Improvements to decommissioning operations have been made or are under development at RFETS. These improvements are based on experience gained during decommissioning operations in Building 779 and lessons learned following radiological occurrences at the site. The K-H Vice President for Closure Projects has identified deficiencies in these operations, and recognizes that although D&D activities began by using "accepted industry practices" with some improvement, they are still inadequate for activities involving removal of highly contaminated equipment. Corrective actions and improvements currently implemented or under development to eliminate the noted deficiencies include but are not limited to the following: use of improved soft-sided containments and hard-sided containments, both

incorporating a ventilation hood-like device referred to as a "greenhouse"; work from outside the containment; use of robotics; and mockup training and improved curriculum for D&D workers. A mockup of a greenhouse has been built, and smoke tests are being conducted to determine an appropriate design. Schedules for implementing some improvements are optimistic. For example, use of the greenhouse in a soft-sided containment during size-reduction cutting operations in Building 771 is planned for March 1999.

It is commendable that the goal of moving workers away from hazardous environments during D&D activities has been embraced at RFETS. Successful accomplishment of this top-level goal is intended to be achieved in part by use of engineered controls during D&D activities, and is dependent on effective systems engineering and implementation. Either because of the early stage of development of some of the engineered features or because of deficiencies in implementation, it appeared to the staff that further improvements are needed. In general, hazards need to be systematically identified, eliminated, or mitigated through the proper use of controls and/or tools, and the design criteria for the identified controls/tools need to be clearly defined. In some cases, RFETS had not yet arrived at clearly defined design criteria for the controls or tools that had been identified.

Although the RFETS enhanced work planning effort calls for the use of integrated teams and RFETS procedures adequately discuss the use of teams, the job hazard analysis that is performed specifically to protect the workforce is not integrated and frequently does not provide the necessary detail. This has been a recurring problem at Rocky Flats.

In September 1998, a new Integrated Work Control Procedure (IWCP) was issued for use at RFETS. While this is considered to be an enhanced procedure for work planning, its implementation needs improvement in the integration of safety disciplines during hazard analysis, in the rigor of hazard analysis, and in assurance that appropriate hazard analyses are completed before work is authorized.

Because of the above concerns, the staff held additional discussions with contractor engineering personnel concerning the engineering design process. Based on these discussions, the staff made the following observations:

- *Engineering for D&D*—The process for engineering projects lacks a systems engineering basis. Because the focus of the site has shifted to D&D, the site has revised their manuals and codes of practice and they no longer implement the requirements and guidelines for performing conceptual design. As a result, the conceptual design is done on an ad hoc basis, with inadequate controls on the process and an undefined interface with later design efforts. In addition, the site-wide manuals of engineering do not include a discussion of how engineering design for reliability and maintainability is to be accomplished. These deficiencies affect the quality of design for new-technology equipment needed to provide increased worker protection and efficiency.

- *Work Control*—While the IWCP is exemplary in many ways, some clarification may be necessary to define how work is to be completed when an engineered procedure is required. As interpreted by the engineer for Buildings 771 and 779, the procedure allows for work to be authorized to proceed without the completion of all required hazard analyses. While these hazard analyses are completed after the procedure has been authorized, this process is not conducive to the accomplishment of engineering changes that would require reauthorization. Therefore, either the procedure needs clarification, or further training is required to correctly implement the hazard analysis requirement. In addition, the IWCP calls for integrated teams, yet hazard identification, hazard analysis, and implementation of controls performed in the field are done in a stovepiped manner, with the control of hazards being addressed by individual safety professionals. This approach results in a loss of the synergy obtained by using integrated safety management concepts and often leads to a failure to optimize and resolve conflicts in controls. Consequently, work planning must often be repeated.

Additionally, the need for improved training of workers in support of D&D work is recognized by K-H personnel. K-H representatives stated that an immediate training program was needed to meet the rapid increase in D&D workers. Currently, improvements in the training program are under development. This is intended to be an integrated activity-level program. This concept, which involves the training of integrated teams to perform work, should benefit the site. Training course requirements are being developed with consideration of the composition of the D&D team, and the draft project profile for this team training includes foremen, workers, and radiological control technicians. The staff believes this approach could be improved if the training were to include engineers and safety personnel. The staff is concerned that Building 771 is understaffed with experienced radiological engineers who are familiar with past Building 771 operations and D&D hazards. Currently, two of the four positions in the building are vacant.

The challenge at RFETS will be to provide the appropriate number of adequately trained and motivated personnel to do the D&D work, and to influence changes in attitudes related to the use of engineered controls. The staff's concerns regarding the engineering process have been communicated to cognizant personnel at RFETS.

**Future Staff Actions.** The staff intends to periodically monitor the development and implementation of engineered controls and training during the execution of work in Building 771 at RFETS.