DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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

March 7, 2003

The Honorable Jessie Hill Roberson
Assistant Secretary for Environmental Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Ms. Roberson:

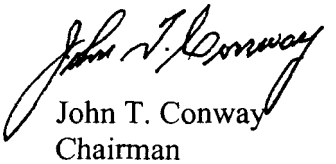
The Defense Nuclear Facilities Safety Board (Board) recognizes the recent success of the Department of Energy (DOE) and its contractor in initiating fuel removal from the K-East Basin at the Hanford Site and accomplishing the milestone in DOE's Implementation Plan for the Board's Recommendation 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, of packaging and removing approximately 957 metric tons of heavy metal from the K-West Basin. Your letters of December 27, 2002, and February 5, 2003, note the positive effect of improved equipment availability on achieving these important goals. Lessons learned from the operational readiness reviews (ORRs) recently performed for the K-Basins Fuel Transfer System may enable further improvements in efficient operations of Hanford's Spent Nuclear Fuel Project.

The Board's staff recently concluded a review of the DOE and contractor ORRs for the startup of the K-Basins Fuel Transfer System. Although the contractor's performance during the ORRs showed improvement compared to recent readiness reviews, DOE's Richland Operations Office (DOE-RL) still has not corrected the problem of the contractor declaring readiness prematurely. Additionally, modifications to the ORR process at Hanford have been made that reduce the independence of the DOE and contractor ORRs and are not consistent with the applicable DOE directive. The Board's staff observed that DOE-RL line management and the DOE ORR team had not received formal training on preparing for and performing ORRs. Improvements in the effectiveness of the ORR process could be achieved if appropriate training were performed, and if a senior advisor/mentor were used in instances when personnel assigned to lead ORRs possess limited ORR leadership experience.

Startup of the K-East Sludge Water System and shipment of the first sludge container to T-Plant represent two delayed milestones for the Spent Nuclear Fuel Project that will require readiness reviews. If the weaknesses in readiness preparation and determination at Hanford are not addressed in an effective and timely manner, continuing startup issues could further delay this vital project. The Board requests to be informed of any efforts to improve readiness preparations and the ORR process at Hanford.

The enclosed report prepared by the Board's staff discusses the above issues in detail, and is forwarded for your information and use as appropriate.

Sincerely,



John T. Conway
Chairman

c: Mr. Keith A. Klein
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

February 21, 2003

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: R. Rosen, D. Grover

SUBJECT: Operational Readiness Reviews for Fuel Transfer System, Hanford Spent Nuclear Fuel Project

This report documents the results of a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the operational readiness reviews (ORRs) for the K-Basins Fuel Transfer System (FTS) at the Hanford Spent Nuclear Fuel Project (SNFP). Reviews of the Fluor Hanford and Department of Energy (DOE) ORRs were performed during September 25–October 10, 2002, and November 6–14, 2002, respectively, by staff members R. Rosen and D. Grover, and outside experts D. Boyd and J. King. The staff reviewed the FTS ORR lessons learned report issued by the SNFP on December 19, 2002. Additionally, the staff discussed readiness planning for the upcoming contractor ORR for the Sludge Water System during a SNFP teleconference on February 20, 2003, to determine whether improvements are likely to be made to the Hanford ORR process.

Background. The FTS was designed to transfer fuel from K-East to K-West Basin for subsequent encapsulation and dry storage in multi-canister overpacks. The purpose of the FTS ORRs was to independently assess the readiness to perform FTS operations. DOE's Richland Operations Office (DOE-RL) performed a line management review (LMR) concurrently with the contractor ORR to assess the readiness of the contractor. DOE line management is responsible for documenting the contractor's actions to verify readiness to commence FTS operations at the K-Basins.

DOE Order 425.1B, *Startup and Restart of Nuclear Facilities*, establishes DOE's expectations with regard to the conduct of readiness reviews. The Order requires DOE and contractor line managers to develop a Plan of Action (POA) for their respective ORRs. The POA must be approved by the startup authorization authority. The POA identifies the breadth of the review and the ORR team leader. The team leader develops an implementation plan that is based on the core requirements in the POA. The team leader also develops the details of the ORR, including specific criteria concerning each core objective, and provides direction to the team on the approach to be used in evaluating the extent to which these criteria are met.

Contractor Line Management's Readiness Determination for FTS. Based on lessons learned from recent readiness reviews at Hanford, Fluor Hanford recently initiated several corrective actions to improve its process for preparing to declare readiness for new activities.

These corrective actions included development of management readiness self-assessment (RSA) forms detailing the criteria and requirements for evaluating readiness and specific actions that need to be accomplished prior to declaring readiness. A readiness mentor with experience in starting up new nuclear activities was assigned to the SNFP to assist in these self-assessments.

These initiatives could aid in project preparations for readiness, but they were not performed satisfactorily at the SNFP. The readiness mentor was not in place early enough in the process to be fully effective. Moreover, the quality of the RSA forms varied widely. The staff's review of these documents identified several cases of inadequate descriptions and evaluations of the extent to which criteria had been met. For example, field verification and validation of surveillance and maintenance procedures were required but not performed; instead the responsible organization relied on tabletop reviews of the procedures. During the contractor ORR, it was found that these procedures could not be performed as written. The result was numerous pre-start findings regarding the procedure development process at the SNFP. Some of the RSA forms had been signed off by management without having been validated.

The project also did not adequately manage the turnover of some operating systems from construction to operations. Continued delays in completing equipment acceptance testing, due to equipment malfunctions, severely delayed the turnover of equipment to the operations organization. As a result, operations personnel were not adequately aware of system status, preventive maintenance on some equipment was not current, and Technical Safety Requirement (TSR) surveillance procedures had not been performed. Subsequent testing of these systems revealed that two safety-class interlocks were not operable. The construction delays also contributed to problems with procedure development.

Contractor ORR for FTS. Fluor Hanford relied primarily on subcontractors to provide subject matter expertise for its ORR. The team members had appropriate levels of experience and skill and pursued lines of inquiry adequate to meet assessment objectives. The breadth of the review was sufficient to identify significant problems with preparations in areas outside the principal operating equipment and procedures. The appropriateness of the depth of the review conducted in problem areas is illustrated by the ORR findings involving the underlying administrative procedures at Fluor Hanford and the SNFP. However, the ORR team facilitated the practice of using the ORR as a method to prepare for readiness. For example, the team requested reperformance of the emergency preparedness drill after determining that the drill controllers had terminated the drill too early to adequately evaluate recovery actions. In addition, after maintenance procedures could not be performed as written, the ORR team allowed the project to verify and validate the procedures during a weekend and then demonstrate performance again.

The ORR team determined that project management had prematurely declared readiness, as evidenced by several ORR prerequisites that had not been completed. These included the procedure and preventive maintenance problems noted above. In addition, management's assessment of health and safety programs was determined to be inaccurate, the findings of recent reviews had not been effectively resolved, and deficiencies identified during the self-assessment

process had not been thoroughly corrected. The staff believes that the premature declaration of readiness was attributable to the failure of SNFP management to adequately understand the criteria for readiness.

DOE Line Management's Review for FTS. The DOE LMR team concluded that the FTS would be ready for safe operations once the actions outlined by the contractor ORR had been completed, in addition to pre-start findings identified by the LMR. The contractor ORR team and LMR team also agreed that several ancillary support organizations—including maintenance, emergency management, procedure development, and nuclear safety—were not at the same level of readiness as the operations and radiological control groups. One issue identified by the Board's staff and pursued by the LMR team near the end of the contractor ORR was the incorrect incorporation of TSRs into a process standard and the related operating procedure. The equipment used to perform this procedure was not capable of doing so in a manner consistent with the TSRs. The SNFP developed a change to the TSRs that allowed for more operational flexibility while remaining within the approved safety basis. DOE's LMR team followed the resolution of its findings and those of the contractor ORR sufficiently to provide reasonable confidence that the project was prepared prior to authorizing the start of the DOE ORR.

DOE ORR for FTS. The Board's staff observed the DOE ORR and determined that the team conducted an adequate review within the scope of the approved implementation plan. In particular, the DOE ORR identified one key finding involving the determination that the contractor had not established a staffing plan detailing the minimum number of personnel required to support safe multi-shift operations. This deficiency turned out to be significant enough to prevent the SNFP from being able to transition into two-shift operations until long after startup was authorized.

Staff Observations on the ORR Process. The ORR process at Hanford has been modified by DOE-RL in response to the outcome of recent readiness reviews, including problematic startup activities at T-Plant. DOE-RL now uses the contractor's criteria and approach for those core requirements not specific to the DOE staff. This use of common implementation plans limits the DOE ORR team's ability to fully utilize its expertise. The result is a reduction in the independence of both ORR teams.

Lessons learned in the conduct of readiness reviews from throughout the DOE complex were not included in the POA or implementation plan process. During the FTS review, the Board's staff observed that there had been no formal training of the DOE-RL line managers or staff on the management of, preparation for, or conduct of an ORR. Similarly, the DOE ORR team leader and members had indicated they had received no formal training in the ORR process, although most of the team had participated in prior readiness reviews at Hanford. The team leader did not use the services of a senior advisor/mentor. Many of these issues would be resolved if the personnel assigned to lead and perform ORRs received training that captured complex-wide ORR lessons learned.

The ORR process at Hanford, as observed during the FTS ORRs, resulted in the DOE ORR team leader being constrained to use the implementation plan developed by the contractor. The Board's staff noted that the ORR team did use its own initiative in the evaluation process. However, doing so resulted in deviations from the implementation plan that were not discussed in the ORR team's report.

Lessons Learned from ORRs for FTS. The December 19, 2002, SNFP lessons learned report for the FTS ORRs acknowledged most of the deficiencies observed by the ORR review team and the Board's staff. However, the lessons learned report did not comment on the problem of contractor management signing deficient RSA forms without validation. In addition, recent discussions with DOE-RL indicate that the upcoming contractor ORR for the K-East Sludge Water System is scheduled to start before installation of all system equipment is complete. Under this approach, the system could not be tested in its final configuration until after the contractor ORR. These observations suggest that future readiness activities at Hanford may suffer from deficiencies similar to those seen with the FTS.