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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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May 10, 2001

The Honorable Carolyn L. Huntoon
Acting Assistant Secretary for
Environmental Management
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

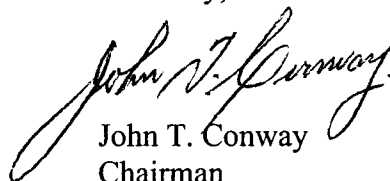
Dear Dr. Huntoon:

The staff of the Defense Nuclear Facilities Safety Board (Board) recently observed a final design review, sponsored by the Department of Energy (DOE), for the Melton Valley Transuranic Waste Treatment Project at Oak Ridge National Laboratory. This new facility will process liquid and solid transuranic and low-level radioactive wastes, including high-activity low-level wastes, for off-site disposal. Excavation for the facility began on February 9, 2001.

The principal issue identified by the Board's staff is that, although final design, component procurement, and construction for the project are under way, essential safety basis documentation has not been completed by the contractor or evaluated by DOE. Specifically, the final Preliminary Safety Analysis Report (PSAR) and Fire Hazard Analysis (FHA) remain incomplete, and a previous draft of the PSAR was found by various reviewers to lack adequate specificity. Moreover, the Board understands that the project contractor is proceeding with final design and construction based on the assumption that the facility will not require a fire suppression system, despite the lack of a final FHA. If the final PSAR and FHA do not support the current design, considerable rework may be required, and the end result could be a compromised safety posture. It would be prudent for DOE to reevaluate the present approach and identify any areas in which it would be appropriate to allow the safety basis to catch up with the design, procurement, and construction work before proceeding further.

The enclosed report on this matter prepared by the Board's staff is forwarded for your information and use as appropriate.

Sincerely,


John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Mr. Edward G. Cumesty

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

April 25, 2001

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: D. M. Winters

SUBJECT: Final Design Review of Melton Valley Transuranic Waste Treatment Project, Oak Ridge National Laboratory

This report documents issues reviewed by the staff of the Defense Nuclear Facilities Safety Board (Board) during a visit made to Oak Ridge National Laboratory on March 27–29, 2001, to observe the Department of Energy (DOE)-sponsored final design review of the Melton Valley Transuranic Waste Treatment Project (MVTWTP). The staff had previously observed design reviews held on December 9, 1999; July 13–14, 2000; and October 25–26, 2000.

Background. The mission of the MVTWTP is to process liquid and solid transuranic (TRU) and low-level radioactive wastes, including high-activity low-level wastes, for off-site disposal. The liquid waste, which originated from the old Hydrofracture tanks, Gunitite tanks, and Bethel Valley Storage tanks, is currently stored in the Melton Valley Storage Tanks (MVSTs). The majority of the solid waste is currently stored in bunkers near the MVSTs. Using gloveboxes and hot cells, the solid waste will be segregated based on activity and repackaged into remote- and contact-handled containers. The TRU waste is planned for disposal at the Waste Isolation Pilot Plant, and the low-level waste is planned for disposal at the Nevada Test Site. Waste will be processed in small batches, so the associated safety issues involve worker and operational safety, not off-site consequences.

DOE awarded Foster Wheeler Environmental Corporation (FWENC) a fixed-price privatization contract to design and build the treatment facility, process the waste, and deactivate and decommission the facility once waste treatment is complete. Site preparation began in December 2000 and excavation of the facility's foundation began on February 9, 2001. Construction is currently 3 weeks behind schedule because of weather delays. Treatment and packaging of waste is expected to begin in December 2002 and be completed by October 2007.

Like the October 2000 review, this DOE-sponsored final design review was attended by approximately 50 personnel, including FWENC employees and technical experts representing various companies with waste processing experience or other experience deemed useful for the review of this project. Although this meeting was referred to by FWENC and DOE as the "final design review," the staff estimates that the design of the MVTWTP ranges from 100 percent

complete for the structure to 60–80 percent complete for some of the systems. This status does, however, represent considerable progress since the October meeting.

Issues. The most immediate safety issue for the MVTWTP centers on the fact that facility construction is now under way even though neither the final Preliminary Safety Analysis Report (PSAR) nor the Fire Hazard Analysis (FHA) is complete. This situation is troubling for two reasons. First, the draft PSAR reviewed previously was found to lack specificity, and new requirements are likely to emerge as it becomes more detailed. Second, despite the lack of a completed FHA, FWENC officials have stated that the facility does not require, is not designed to accommodate, and will not feature any fire suppression systems. As a result, the staff is concerned that the safety basis for the facility is not sufficiently complete to support the ongoing design and construction efforts. If the final PSAR and FHA do not support the current design, considerable rework may be required, and the end result could be a compromised safety posture. For example, once walls have been poured, it may prove difficult to retrofit the facility should it be determined that FWENC's assessment of the need for fire suppression is incorrect. The continuation of final design, component procurement, and construction prior to review and approval of the final PSAR and FHA appears to pose a significant risk for the project.

The staff identified two additional issues associated with the MVTWTP design and construction efforts. First, the preliminary plan for installing waste transfer hoses in the MVST pump and valve vault appears to pose substantial hazards to workers. This operation will require workers to handle sections of 3-inch-diameter hose up to about 100 feet in length within a radiation and contamination area that is also a confined space. This activity will be similar to one previously accomplished for the Bethel Valley tanks. However, because of the radiological and other worker safety hazards associated with this operation, the planning and execution of this operation warrant close review by the staff.

Second, FWENC intends to construct and operate the waste processing lines in phases, so that one waste processing line will be in operation while another is being constructed. This approach could lead to added complexity and hazards due to the mutual impacts of collocated construction and radiological operations.