

A.J. Eggenberger, Chairman
John E. Mansfield, Vice Chairman
Joseph F. Bader
Larry W Brown
Peter S. Winokur

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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



January 12, 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) has completed its review of the final design documents for the Waste Solidification Building (WSB), to be constructed at the Savannah River Site (SRS). The Board understands that the National Nuclear Security Administration has approved Critical Decision (CD)-2/3, which formally establishes the project baseline and allows the start of facility construction. The enclosure to this letter summarizes the Board's understanding of the WSB project status and safety posture. The Board has no safety issues with the project that would preclude commencing construction. As the final design nears completion, three safety issues must be addressed early in the construction phase:

- The Mixed-Oxide Fuel Fabrication Facility (MFFF) and WSB projects previously estimated that low levels of organics would be received by WSB from MFFF. These low levels can no longer be assured and, as a result, the WSB project now considers red oil explosion to be a credible design basis accident. The Board understands that the project team has identified both a safety-class temperature control and a Technical Safety Requirement-level administrative control on organic contents to prevent a red oil explosion. The Board considers this approach consistent with the recommendations of DNFSB/TECH-33, *Control of Red Oil Explosions in Defense Nuclear Facilities*. However, the details of these controls and their implementation have yet to be developed. This needs to be done carefully, considering recent research on red oil formation. The Board will continue to monitor the implementation of the proposed controls with great interest.
- The safety basis identifies the need for a design feature to maintain hydrogen levels below 25 percent of the lower flammability limit in the headspace volume in process tanks. The current design does not perform this safety function. The project team needs to identify and document an alternative control strategy or modify the evaporator tank design to achieve this safety function and preclude a hydrogen deflagration/detonation.

- The Board's review of calculation T-CLC-F-00411 (referenced in the Department of Energy's (DOE) September 22, 2008, letter to the Board) revealed that design checks were performed inadequately and that the facility was not in compliance with national consensus codes and standards for the project's design basis settlement. The project team recognized this mistake, revised this calculation and associated drawings, and will add reinforcement to the building's structure. Since the calculation and drawings were only recently revised and released, the project team should confirm that all issues have been properly identified and closed prior to start of construction.

According to current SRS practice, the Consolidated Hazard Analysis is a reference cited in the safety basis of a facility and is not included in the Safety Basis List of documents covered by the requirements of the *Nuclear Safety Management* rule (Title 10 Code of Federal Regulations, Part 830, Subpart B). The Consolidated Hazard Analysis documents defense-in-depth and worker protection features identified to protect the public and workers that are in addition to the safety-related controls specified in the Documented Safety Analysis (DSA). The Board believes that a summary of the Consolidated Hazard Analysis controls that are identified as defense-in-depth or provide significant worker protection features should be identified in chapter 3 of the DSA. Alternatively, the Consolidated Hazard Analysis could be listed as part of the Safety Basis List. Either approach assures compliance with the *Nuclear Safety Management* rule and its safe harbor, DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

The Board looks forward to working with the WSB project team as the final design approaches completion and hopes that the productive interactions between its staff and project personnel continue.

Sincerely,



A. J. Eggenberger
Chairman

Enclosure

c: Mr. Jeffrey M. Allison
Mr. Mark B. Whitaker, Jr.