DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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August 18, 2000

The Honorable Carolyn L. Huntoon
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 reviewed the americium/curium (Am/Cm) solution stabilization project at the Savannah River Site. The Board initially identified the need for expeditious stabilization of the Am/Cm solution in Recommendation 94-1, *Improved Schedule for Remediation*, and reiterated the urgency of the task in Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*. The Board is pleased that many of the technical challenges responsible for slowing this project have been resolved and that steady progress now is being made. However, several safety-related issues identified during the staff's review merit attention.

The Board calls to your attention, especially, the contractor's practice relative to the selection and classification of systems relied upon to perform safety-related functions for the Am/Cm project. The Board's staff observed that the reliability and performance of some of these systems is not commensurate with the consequences of failing to perform their safety functions. This is particularly the case for existing F-Canyon systems and systems that protect assumptions made in the safety analysis. Additionally, it does not appear that the Am/Cm project is applying applicable industry standards in the design of safety-related instrumentation and control systems.

The Board's reviews of the authorization bases for the H-Canyon, the Replacement High-Level Waste Evaporator, and the mobilization of waste from Tank 8 at the F-Area Tank Farms—documented in letters to the Department of Energy (DOE) dated March 11, 1998, November 22, 1999, and June 29, 2000, respectively—revealed similar issues associated with the identification and implementation of safety controls. The Board encourages DOE to apply the lessons learned from these prior reviews to the Am/Cm project.

The enclosed report summarizes the observations of the Board's staff on these issues. The Board requests to be briefed and informed by DOE regarding how these issues will be resolved for the Am/Cm project, and how lessons learned regarding the identification and implementation of safety-related systems and controls will be institutionalized.

Sincerely,

John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Mr. Greg Rudy

Enclosure

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

July 25, 2000

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: D. Ralston

SUBJECT: Americium/Curium Solution Stabilization at the Savannah River Site

This report documents issues reviewed by the staff of the Defense Nuclear Facilities Safety Board (Board) regarding the stabilization of americium/curium (Am/Cm) solution at the Savannah River Site (SRS). Members of the Board's staff R. T. Davis, D. Ogg, D. Ralston, and R. Robinson performed this review during a visit to SRS on June 27–29, 2000.

Background. Tank 17.1 in the north end of F-Canyon contains approximately 14,000 liters of solution bearing several isotopes of americium and curium. In Recommendation 94-1, *Improved Schedule for Remediation*, the Board expressed concern about the continued storage of this material as a solution and requested the Department of Energy (DOE) to expedite its stabilization. The Board reaffirmed the importance of quickly stabilizing this material in Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*. Am/Cm solution stabilization has been delayed significantly beyond original expectations primarily because of unexpected research and development issues identified for this first-of-its-kind project. The SRS contractor, Westinghouse Savannah River Company (WSRC), has now completed conceptual design of a vitrification system, and detailed design and technology implementation are proceeding.

Project Status. The WSRC plan for stabilization of this material includes pretreatment in the F-Canyon and vitrification in the Multi-Purpose Processing Facility (MPPF), an F-Canyon hot cell area. WSRC has completed the detailed design for pretreatment, and DOE recently approved a critical decision to begin construction activities. Preparation of the MPPF to receive the vitrification system (e.g., rack removal and service connections) is nearing completion. WSRC recently awarded a contract to Teledyne-Brown Engineering (TBE) for detailed design, fabrication, and pre-installation testing of the in-cell vitrification system. The current schedule shows pretreatment operations beginning in 2004 and vitrification being completed in summer 2005. Delivery of the vitrification system by TBE is currently on the project critical path.

Hazard Analyses and Development of Controls. WSRC has completed preliminary hazard analysis and interim functional classification documents for both pretreatment and vitrification. WSRC is using functional classification as a design input for the development of new safety systems, as well as for verification of the adequacy of existing systems identified in the analyses. Controls will be incorporated into the existing F-Canyon Basis for Interim