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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 10, 1998

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

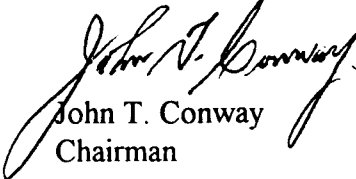
Dear Mr. Owendoff:

The Defense Nuclear Facilities Safety Board (Board) is concerned with delays in stabilizing americium/curium solutions stored in F-Canyon. In Recommendation 94-1, the Board recommended that stabilization of this material be expedited. The enclosed report on this subject, written by the Board's staff, is provided for your consideration. It includes the following observations:

- Stabilization does not appear to be proceeding as an urgent, fast-track activity.
- A detailed research and development plan and corresponding schedule need to be developed to support restarting of system design.
- The Department of Energy (DOE) needs to consider ways of improving project management to ensure that material stabilization is expedited.
- To ensure timely stabilization of this material, DOE needs to continue to pursue backup alternatives to the favored stabilization method.
- Decisions that might affect the stabilization and subsequent storage of this material need to be resolved quickly so that the project is not further delayed.
- Because of the delays in stabilizing this material, DOE needs to review the solution storage conditions to determine whether additional risk reduction actions are necessary.

Pursuant to 42 U.S.C. § 2286b(d), the Board requests that DOE prepare a report addressing these issues. This DOE report should be submitted within 45 days of receipt of this letter. If you need additional information on this matter, please do not hesitate to contact me.

Sincerely,



John T. Conway
Chairman

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

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

June 23, 1998

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: T. Davis

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

This report documents an issue reviewed by the staff of the Defense Nuclear Facilities Safety Board (Board) at the Savannah River Site (SRS) on June 10–12, 1998. Staff members T. Davis, K. Fortenberry, and J. Sanders participated in this review.

Background. Tank 17.1 in F-Canyon contains approximately 14,400 liters of solution that includes americium and curium (Am/Cm). This material represents over one-half of the F-Canyon source term. DOE's Implementation Plan for Recommendation 94-1 stated that vitrification appeared to be the best stabilization method for this material, and committed to complete stabilization by September 1998.

To meet an aggressive schedule and because the research and development (R&D) was considered straightforward, R&D and design proceeded in parallel. The development effort was delayed on several occasions because of test system failures and unexpected experimental results. In October 1997, DOE stopped the design effort because of these R&D problems and the increasing complexity of the system. Westinghouse Savannah River Company (WSRC) was requested to reevaluate the project and consider processing alternatives. Additionally, a WSRC Technical Advisory Panel (TAP) was formed to provide technical oversight. A DOE-sponsored Independent Review Team (IRT) was also formed to provide an independent review of the project.

Continued Storage of Am/Cm Solution. The Board recommended stabilizing the Am/Cm solution within 2 to 3 years because of the risk associated with continued storage. The commitment from DOE to complete stabilization was extended about a year past this recommended time frame because of the lack of stabilization capability and the need for process development. DOE has subsequently taken positive actions to reduce the risk of storing the Am/Cm solution and to compensate for additional storage time. Although the risk associated with storage of the Am/Cm solution has been reduced, it has not been eliminated. The projected date by which this material will be stabilized now appears likely to approach 7 or 8 years from the date of the 94-1 Recommendation. Because of the additional delays in stabilizing this material, it

would be prudent for DOE to determine whether additional actions need to be taken to further reduce the risk of storing this solution. It is not apparent that DOE is continuing to pursue stabilization of this material as an urgent, fast-track activity.

Research and Development (R&D). Three years after the Am/Cm vitrification project was authorized and 2 years after melter testing began, design and construction activities were suspended. This suspension was due to the unexpected complexity of the melter feeding, off-gas, and pouring systems, as well as problems with the melter structural integrity. WSRC later suspended R&D on the proposed bushing melter and began testing the new cylindrical induction melter (CIM) system. WSRC now expects to have sufficient confidence in the new CIM system to recommend restarting of design in September 1998. However, WSRC has not clearly established criteria for making this recommendation, nor have they identified what associated key technology issues need to be resolved.

Stabilization of the Am/Cm solution will be delayed by at least 3 years because of problems encountered during R&D. Nevertheless, 6 months after abandoning R&D on the bushing melter design, WSRC still has not defined what development questions need to be answered, and when, and what needs to be done to answer those questions. To support continued development of the CIM melter system and to expedite stabilization of the Am/Cm solution, it would be appropriate for the DOE-Savannah River Operations Office (SR) and WSRC to establish clear expectations with regard to technology development, and to generate a corresponding detailed R&D plan and schedule to support these expectations.

Project Management. The IRT interim report dated May 8, 1998, stated that the project suffered from insufficient detailed planning and a lack of strong technical oversight. Unfortunately, DOE's transmittal of the IRT interim report to WSRC was silent on this issue. The lack of technology development criteria and a detailed research schedule discussed above indicate that DOE needs to reconsider the significance of the IRT's comments and look for ways to improve project management.

Stabilization Alternatives. The IRT interim report recommended that "in-can" conversion to oxide and disposal through the Defense Waste Processing Facility be pursued in addition to vitrification, and requested that information be developed to allow comparison of this method with the vitrification alternative. This recommendation reflects the uncertainty that remains in the currently proposed CIM vitrification process. The DOE-SR forwarding letter for this report noted that it was important to pursue "more than one alternative in the event the technology chosen later this year is not ultimately successful." WSRC is to provide a path forward for evaluating alternatives over the next several months. At present, there do not appear to be substantial resources devoted to the pursuit of stabilization alternatives. To ensure timely stabilization of the Am/Cm material, it would be advisable for DOE-SR to continue to pursue backup alternatives until the favored method has been proven.

Ultimate Disposition. Am/Cm is used as feed material in the production of heavy elements at Oak Ridge National Laboratory (ORNL). Discussions between DOE-SR and ORNL representatives indicated that there is no storage available at ORNL for the stabilized Am/Cm material and that the material will have to remain at SRS until needed at ORNL. Additionally, because of the availability of other feed material, there are indications that this material may not be needed at ORNL in the near future. Uncertainties in the ultimate disposition of the Am/Cm material could cause further delays in stabilization. It would be prudent for DOE-SR to pursue aggressively those decisions and commitments required to provide a well-defined disposition path for the Am/Cm material.