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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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May 29, 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 Defense Nuclear Facilities Safety Board (Board) has been closely following plans to stabilize about 14,000 liters of americium and curium (Am/Cm) solution in F-Canyon at the Savannah River Site (SRS). In response to Board Recommendations 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, and 2000-1, *Prioritization for Stabilizing Nuclear Materials*, the Secretary of Energy made a commitment to vitrify this material in the F-Canyon Multi-Purpose Processing Facility (MPPF) by December 2005. The Board appreciates the recent briefings provided by the Department of Energy (DOE) on the evolving plans for stabilizing this material.

The Board continues to believe that expeditious reduction of the risks associated with this material is vitally important. We understand that DOE is now considering diluting this material and transferring it to the high-level waste (HLW) tank farms for vitrification in the Defense Waste Processing Facility (DWPF) as part of sludge batch 3. This potential course change has arisen because of the escalating cost of the first-of-a-kind vitrification project, as well as the decision by DOE last year that this material is excess. DOE's contractor at SRS has proposed immediately curtailing the vitrification project and using those project resources to develop the HLW option. DOE apparently plans to make a final decision on whether to proceed with this HLW option by early September.

The Board observes that DOE has considered the HLW option before but chose not to pursue it because of a perceived future need for the material and because it would create new tank farm safety and waste disposition issues. These latter issues resulted primarily from the sheer number of transfers proposed from the canyon to the tank farms, each providing an opportunity for a mishap, and the uncertainty of how much Am/Cm would remain in the supernate (i.e., the solubility question). The latest HLW proposal suggests utilizing the site's inter-area transfer line to make a single transfer from F-Canyon to the H-Area sludge washing tank, Tank 51. This single-transfer approach depends on the availability of two large tanks in F-Canyon that are currently required for materials stabilization operations in the plutonium-uranium extraction (PUREX) system. DOE believes that these tanks may become available as

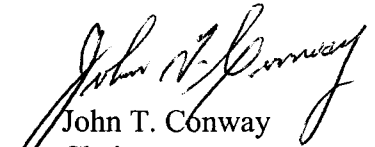
early as March 2002. In the near term, the contractor plans to develop a conceptual design for the canyon and HLW system upgrades required to implement the HLW option and to address the uncertainty in the solubility data by sampling and analyzing the Am/Cm solution and refining the process flowsheet.

It is possible that the proposed HLW option may reduce the Am/Cm safety risks more quickly and in a more straightforward fashion than the MPPF option. However, stabilization will be significantly delayed if DOE continues to curtail work on the MPPF option and then later finds that the HLW option is not feasible. The Board has several concerns that need to be addressed promptly to establish the feasibility of the HLW option:

- The consequences of potential tank farm accidents and the complexity of waste disposition via salt processing depend on how much Am/Cm remains in solution. It would be worthwhile for DOE to quickly evaluate what is known about solubility and process options and to make a science-based judgement on the likelihood of success.
- It would be appropriate to confirm as quickly as possible the likelihood that the Am/Cm stream leaving the canyon would meet the tank farm waste acceptance criteria and be acceptable for processing through DWPF (e.g., alpha-emitter source term, solids heat generation rate, hydrogen generation).
- DOE needs to develop a firm path forward for the Mark 18A targets at SRS. These targets were irradiated before 1979 and contain isotopes similar to those in the Am/Cm solution. The MPPF vitrification capability represents one of the principal alternatives identified in the *Excess Material Disposition Decision Memorandum* issued by DOE on January 18, 2001, for treatment of the Mark 18A targets. Without MPPF, DOE may need to crop and repackage these targets in a spent fuel basin at SRS for subsequent processing off-site. Such an operation poses significant-safety risks because of the possibly fragile condition of the highly-irradiated targets. Additionally, the details of off-site processing have not yet been defined.
- DOE is currently evaluating the use of F-Canyon to support future chemical processing needs at SRS, such as the needs of the fissile material disposition program. DOE would be well served to confirm that use of the canyon tanks to support the proposed HLW option does not preclude or complicate future operations in F-Canyon.
- The proposed single transfer from F-Canyon to Tank 51 in H-Area is expected to be a complex evolution that will need to be well engineered and well executed. It would be advisable to establish early the cold testing and readiness requirements for this evolution. Given the unique characteristics of the Am/Cm solution, the Board believes that a DOE Operational Readiness Review may be appropriate.

The Board requests that you consider these concerns and, pursuant to 42 U.S.C. § 2286b(d), provide a report to the Board within 45 days of receipt of this letter that includes: (1) an assessment of the safety risks and the likelihood of success of the HLW option, considering what is presently known about Am/Cm solubility; (2) an analysis of the potential for the Am/Cm solution to meet the tank farm waste acceptance criteria and to be acceptable for DWPF processing; (3) an assessment of the options, associated issues, and potential resolutions for disposition of the Mark 18A targets; (4) an analysis of the impacts of the HLW option on the future use of F-Canyon; and (5) a determination of the activities that would be conducted to demonstrate operational readiness prior to transferring the Am/Cm solution to the tank farms. Additionally, the Board wishes to reaffirm that if DOE concludes the HLW option is preferable, a revised Implementation Plan for Recommendation 2000-1 will be required before DOE makes a final decision. The revised implementation plan should include appropriate milestones and justification for the new course of action.

Sincerely,



John T. Conway
Chairman

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