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# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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November 15, 1995

The Honorable Hazel R. O'Leary  
Secretary of Energy  
Washington, D.C. 20585-1000

Dear Secretary O'Leary:

On May 6, 1994, the Defense Nuclear Facilities Safety Board (Board) issued its Recommendation 94-1, which you accepted on August 31, 1994. The central message of that Recommendation was stated at the outset: "The halt in production of nuclear weapons and materials to be used in nuclear weapons froze the manufacturing pipeline in a state that, for safety reasons, should not be allowed to persist unremediated." Particular recommendations were made concerning "specific liquids and solids containing fissile materials and other radioactive substances in spent fuel storage pools, reactor basins, reprocessing canyons, processing lines, and various buildings once used for processing and weapons manufacture."

The Board wishes to present in this letter further views with respect to the Mark 16 and Mark 22 fuel elements, that were included in the above list. These fuel elements were irradiated in Savannah River Reactors in past production campaigns and have been stored for some years in basins at the reactors and processing canyons, at the Savannah River Site. They are extensively corroded, particularly since almost all have been stored under water of poor quality. Much of the corrosion extends through the aluminum cladding into the irradiated fuel which is the "meat" of the "clad-meat-clad" sandwich. This has caused a steady release of radioactive fission products (particularly cesium and strontium) into the water pools of the reactor and canyon basins where the fuel is stored. The situation will continue to deteriorate as storage proceeds, even after improved water treatment is instituted as planned.

The Final Environmental Impact Statement (EIS) on Interim Management of Nuclear Materials has now been issued (October 1995). This analysis has led to a preferred choice of "Continuing Storage (no action)" for the present for these fuel elements. The reason given is that dry storage is being considered as an alternative to chemical treatment of the Mark 16/22 fuel, and it was thought to be desirable to "perform a further review of costs, schedules, and the technical uncertainty of dry storage techniques before making a decision on management alternatives."<sup>1</sup>

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<sup>1</sup> Page 2-99 of the Final Environmental Impact Statement, Interim Management of Nuclear Materials, Department of Energy, Savannah River Site, Aiken, South Carolina (October 1995).

The Board recognizes that it was believed necessary to conduct such a study to respond to views expressed by one of the parties commenting on the Interim EIS. Other comments directed to this problem, however, were preponderantly in favor of early processing of the corroding fuel. They expressed a common-sense wisdom that parallels the Board's views, that the sooner the material in question is converted to harmless form, the lesser will be the hazard and the ultimate cost of alleviation of the problems.

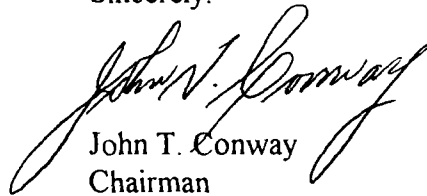
The Board has the following comments on dry storage as an alternative to chemical processing.

- (1) Dry storage of this kind of irradiated and corroded fuel is not a demonstrated technology. The technology probably could be developed, but technical problems requiring solution could be unacceptably costly or could invite rejection on other grounds.
- (2) Development of a method for dry storage would entail leaving corroding fuel in the basins for an extended period while funding for a storage facility is sought and research and development are conducted. As has been seen at the K-East Basin at Hanford, problems in storage of corroding fuel under water grow with time, and so does the cost and the difficulty of recovery.
- (3) The EIS cites plans to improve water quality during the extended wait period. This would be preferable to an alternative of no improvement in water quality, but it is not free of problems. Fuel elements that are already corroded will continue to corrode further, even in good quality water. Furthermore, it would be necessary to process and dispose of contaminated ion beds and filters, with additional waste disposal requirements and additional exposure of workers to radiation.
- (4) Dry storage would only pass on to a future generation the need to solve the problem of what to do with the radioactive fuel elements.

The Board believes that deferring the decision to chemically treat Mark 16/22 fuel and similar material while dry storage is investigated would be "following a will-of-the-wisp." The most likely consequence would be extended groping for a solution while the conditions prompting the 94-1 Recommendation continue to worsen. On the other hand, the problem can be solved now, for once and for all, by continuing to move decisively to chemically treat the material. When that process is completed, the corroded spent fuel will have been converted into components whose safe management is in hand, for instance, fission products treated in the Defense Waste Processing Facility, and enriched uranium suitable for blending. This is the logical and safer course to follow.

Enclosed is a DNFSB/TECH-7 Technical Report which supports these views. An earlier copy has been forwarded to Assistant Secretary Grumbly.

Sincerely,

A handwritten signature in black ink, appearing to read "John T. Conway". The signature is fluid and cursive, with a long, sweeping underline that extends to the right and loops back under the name.

John T. Conway  
Chairman

c: Mark Whitaker

Enclosure