

May 3, 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:

In response to the Defense Nuclear Facilities Safety Board's (Board) Recommendation 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, the Department of Energy (DOE) is stabilizing and repackaging nonprogrammatic plutonium metal and oxide in accordance with DOE-STD-3013, *Stabilization, Packaging, and Storage of Plutonium-Bearing Materials*. To prevent overpressurization of containers during long-term storage, the standard requires limiting the moisture content of plutonium oxide materials to a very low level. The standard requires that the moisture content of each container of plutonium oxide be determined using loss-on-ignition measurements, but allows alternative methods when approved by DOE. Based on testing of certain plutonium forms at Los Alamos National Laboratory (LANL), the Office of Environmental Management, in a letter dated May 19, 2000, authorized use of the supercritical fluid extraction (SFE) process as an alternative means of measuring the moisture content of all oxide materials being packaged to DOE-STD-3013 for long-term storage.

The Board was recently informed of test results from moisture measurements using SFE at Hanford. These results indicate that the moisture content in plutonium oxides precipitated from solution using magnesium hydroxide is underestimated. The testing performed by LANL may not have been sufficiently representative to identify this problem with SFE being experienced by Hanford. The Board believes the authorization to use SFE is too broad, and needs to be temporarily rescinded pending DOE's further evaluation of the suitability of SFE for these measurements.

The Board notes that Hanford's moisture measurements using the approved loss-on-ignition method are also underreporting the moisture content for this hygroscopic material. This error appears to result from what may be a more fundamental problem. DOE-STD-3013 does not specifically control ambient glovebox conditions following stabilization of material. The humid glovebox environment at Hanford can allow plutonium oxide materials to quickly regain a significant amount of moisture following stabilization. For the loss-on-ignition method of moisture measurement, a humid glovebox environment could also contribute to moisture measurement errors, as observed at Hanford.

The Board requests to be briefed on the actions planned by DOE to resolve issues associated with the lack of requirements in the standard for glovebox ambient conditions and the use of SFE for moisture measurements. This briefing should include the results of any evaluations that have been performed to resolve these issues.

Sincerely,

John T. Conway  
Chairman

c: Mr. Mark B. Whitaker, Jr.