

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 25, 2000

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director  
J. Kent Fortenberry, Deputy Technical Director  
**FROM:** C. H. Keilers / R. T. Davis  
**SUBJECT:** SRS Report for Week Ending February 25, 2000

**Spent Nuclear Fuel:** During the last 6 months, SRS has restarted development of the melt-and-dilute treatment process for aluminum-based spent fuel (site rep weekly, 8/27/99). DOE now plans to implement this process in Building 105-L by 2008. Last year, the Board and staff questioned the technical basis for installing this process in 105-L, as well as the need to pursue this now (TECH-22). DOE justifies the priority, in part, based on projected fuel receipts beyond 2010 that are highly uncertain. For example, DOE decided in November 1999 to permanently shutdown the Brookhaven High Flux Beam Reactor. This reduces the projections by nearly half. DOE was also pursuing high-risk parallel paths for technology development, waste form qualification, and facility design.

While the question of need remains open, the current plan is more deliberate than a year ago. It involves first constructing a demonstration pilot – the L-Area Experimental Facility (LEF) – in the 105-L purification wing. LEF would become operational in late 2001 and would treat single, irradiated, research reactor fuel assemblies with gradually increasing source term. Design and long-lead procurement are underway. The furnace is expected to be delivered next month. Construction and an ORR are planned in FY-01. DOE is considering increased funding to accelerate LEF construction and waste form qualification. However, that may be impacted by recent increased priority on Recommendation 94-1 activities (currently being discussed) and by loss of revenue this year since foreign fuel receipts are expected to be down. (3.a)

**F-Canyon:** Earlier this month, operators transferred spent wash solution with about 2 kg plutonium to a solvent recovery system tank (13.7) that had an alkaline heel instead of an acidic heel. The criticality controls in place assumed an acid heel to minimize the possibility of precipitation. When the operators realized what had occurred, they stopped the evolution and established appropriate controls to keep the tank static. Tank samples indicate that the plutonium is staying in solution. Analysis indicates that if the plutonium were to uniformly precipitate, no criticality would occur.

WSRC has since determined that the operators followed procedure. However, the procedure was in error and should have been verified first since it is infrequently used. The error might have been caught sooner during a periodic review required by the WSRC Conduct of Operations Manual, but the periodicity of such reviews has been increased from 2 years to 4 years, apparently to save cost.

In 1990, a process upset resulted in similar alkaline wash solution with about 4.5 kg plutonium that is now stored in tank 13.5. One difference is that tank 13.5 contains more solvent degradation products – mainly dibutyl phosphate, DBP. Weekly samples confirm that the tank 13.5 solution is static, but over the long-term the DBP is degrading, increasing the potential for precipitation. As a result, this tank is now getting more attention. Tests indicate that acidifying either tank 13.5 or 13.7 to recover the plutonium would cause precipitation. Therefore, WSRC is now considering transferring the contents of tank 13.7 to 13.5 and then transferring the solution in small batches to the tank farm after they are adjusted to meet waste acceptance criteria and criticality controls (e.g., 300 g Pu/batch). Disposal to the tank farm could begin in April but may take several months. (3.a)