DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 5, 2005

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
FROM: J. S. Contardi/M.T. Sautman, SRS Site Representatives
SUBJECT: SRS Report for Week Ending August 5, 2005

High-Level Waste Management, Processing, and Disposition: This week, the National Academies issued an interim report for on-site disposal of tank wastes at SRS. The report included four recommendations related to: 1) the risks and benefits of waste removal and near-term tank closure, 2) consideration for alternatives to the deliquification, dissolution, and adjustment process, 3) roles of the low-level waste Class C limits and the performance objectives in determining whether on-site disposal is acceptable, and 4) increased research and development to support waste removal and tank closure performance modeling. A final report will be issued following similar evaluations at the Hanford and the Idaho sites.

Facility Design: The site contractor review of the implications of the Salt Waste Processing Facility Independent Review Team findings concluded that their methodology was consistent with DOE directives, but recommended three areas of improvement. First, enhance clarity of requirements for safety system functionality for natural phenomena hazard events. Second, define the safety drivers that would lead to requiring Performance Category-3 demand loads for safety significant structures, systems, and components. Third, provide assurance that the assumption made for the surface roughness factor is protected (e.g., from forest service tree cutting).

Neptunium Processing: A calculation determined that the high moisture content in the first can of Np oxide processed could result in significant hydrogen concentrations (i.e., 15%) and cause the oxygen concentration to exceed the 9975 Safety Analysis Report for Packaging limit of 5 vol% 384 days after inerting. This corresponds to September 28, 2005. Although the high moisture content was measured a month ago (see 7/1/05 report), a Potential Inadequacy in the Safety Analysis was not declared until this week for the interim storage of this drum in K-Area. Engineers believe that excessive moisture was present during the stabilization of this material, but that later process flowsheet improvements resolved this issue. However, one of the moisture samples from a later can is also high (i.e., 0.97%). The staff has also been informed that there was a spill while filling a third can where there was an 8 g weight increase in the contents afterwards. This implies that some of this can's contents are glovebox sweepings, which may not have been calcined.

Modular Caustic Side Solvent Extraction Unit: A hazards analysis looking at tank hydrogen explosions determined that the radiological consequences of a deflagration were negligible and that the hydrogen generation rates made detonations incredible due to the multiple years it would take in an unventilated condition to reach detonable quantities. While analyzing a tank with a small heel maximizes the consequences by maximizing the volume of hydrogen present, it is not a conservative approach for determining the time to reach certain hydrogen concentrations. For example, increasing the waste volume from a heel to having the tank 90% full decreases the time to reach detonable quantities of hydrogen (i.e., 12%) from 3.94 years to 7.9 days - nearly a factor of 180. The contractor is currently updating their analysis to reflect design and flowsheet changes and has stated that this analysis will optimize waste and headspace volumes.