DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 25, 1999

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 June 25, 1999

Defense Waste Processing Facility (DWPF) Canister Welds - This week, WSRC began moving unwelded canisters containing vitrified high level waste to the Glass Waste Storage Building (GWSB). Prior to welding, all canisters are closed with temporary press-fit seals that must meet leak check requirements. Currently, the canister weld system is down due to a faulty load-cell. To continue glass production, WSRC is moving canisters out of DWPF to free up storage space. This is allowed since DWPF safety documents were revised last year, as a contingency, to permit unwelded canisters with leak tight temporary plugs to be moved to the GWSB. A site representative reviewed the safety basis change, the DOE-SR safety evaluation report, and discussed the impacts of this activity with WSRC and DOE-SR. A replacement load-cell is scheduled to arrive next week which should allow WSRC to resume welding within several weeks. Once the welder is repaired, unwelded canisters moved to the GWSB will be returned and welded. (III.A.2)

Recommendation 94-1 - DOE is pursuing restart of shipments of sand, slag, and crucible (SS&C) residues from RFETS to SRS by the end of September, 1999. Shipments were halted because of two issues with the 9975 shipping containers (site rep report 5/21/99). WSRC has updated drawings to address one issue, which involved differences from prototypes tested for transportation accidents. A purchase order was placed Thursday for containers of this type to ship and store metals and oxides in K-Area. Container delivery begins in November, 1999.

The second issue involves SS&C flammable gas generation, leading to a postulated detonation scenario. These containers can withstand internal deflagration pressures and are being evaluated for detonation impulses. This issue arose from a small number of one-week tests of RFETS SS&C that generated more hydrogen than predicted by the radiolysis model that forms the basis for the shipping certificate. The tests appear to indicate that hydrogen was released by chemical degradation in addition to radiolysis. Oxygen decreased in several cases, particularly with lower moisture content, due to scavenging and recombination. The gas release increased from some matrix materials (magnesium oxide) at the higher temperatures mandated by the regulator (i.e., 90 ^{o}C). Container pressure alone appears to be a poor indicator of gas mixture flammability.

SRS is pursuing multiple approaches that may be used in some combination to address this issue. Key factors are the moisture content and the adequacy of the RFETS moisture measurement technique (LOI at 210 ^{o}C). Higher moisture not only increases the hydrogen available but also may result in a hydrogen-oxygen-air atmosphere that is more conducive for supporting a detonation. Other approaches being pursued include inerting the containers (but not food pack cans), reducing internal container gaps below the size that would support a detonation for a given atmosphere, and analyzing whether the containers can withstand detonations. (III.A.1)