DEFENSE NUCLEAR FACILITIES SAFETY BOARD

MEMORANDUM FOR: G. W. Cunningham, Technical Director

FROM: J. Kent Fortenberry / Joe Sanders

SUBJECT: SRS Activity Report for Week Ending July 3, 1997

Foreign Research Reactor (FRR) Fuel - Almost half of the 18,000 FRR spent fuel elements to be received at SRS will not be coming. Some countries will reprocess the fuel, some plan to study alternatives, and for some the path forward is not yet known. This reduction impacts both the alternative Technology Project (evaluating treatment/disposal options for aluminum fuel) and the design of the planned spent fuel Transfer & Storage Facility (TSF) at SRS. About 5% (} 150 elements) of the FRR fuel formally inspected so far has been identified as having potential problems. DOE is developing criteria for shipping damaged elements to SRS, either as-is or dry- canned. Once at SRS, damaged elements would probably be processed through the canyons.

2H Evaporator - DOE-SR approved restart of the 2H Evaporator this week following modifications to address the potential for sludge carryover into the evaporator feed. The potential for sludge carryover provides an increase in the bounding source term for evaporator failures from the 3.1E07 rem/gal previously analyzed to 1E09 rem/gal. The height of the feed pump eductor above the feed tank sludge layer, the evaporator fill limit, the source term of material sent to the evaporator feed tank, and the operation of the evaporator cell ventilation are being controlled to reduce the potential consequence of an evaporator failure. A safety related automatic steam isolation valve and associated interlocks were added in-line with the existing steam flow temperature control valve to reduce the frequency of an evaporator overpressure failure. An evaporator failure represents one of the highest risk scenarios at SRS, with the analyzed consequence exceeding the evaluation guidelines for extremely unlikely events. Because of this high risk, the site representatives and technical staff plan further review of the evaporator failure frequency and consequence analyses.

Sludge Drying in HLW Tank Farms - Since five older HLW tanks no longer have liquid on top of the sludge, a Potential Inadequacy in the Safety Analysis (PISA) has been declared due to: (1) the potential for greater consequence of a HEPA filter fire, (2) the potential for new release fraction and mechanisms for the tank overheating scenario for dry as compared to wet sludge, and (3) the potential existence of explosive compounds within the dried sludge.

HEPA filters are changed out at a certain DP or after accumulating 3 curies (calculated based on external measurements of Cs-137). However, alpha-emitting dried sludge containing less Cs-137 could significantly increase the curie loading of a HEPA filter without being detected by external measurements. In 1970, popping noises heard when personnel stepped on dried waste deposits (attributed to silver nitrate formation) resulted in evaluations of explosive compounds in HLW tanks. As a result, the introduction of silver into the tank farms was eliminated. Other potentially explosive compounds (including ammonium compounds and derivatives, and organic compounds) are concluded to be in too low a concentration to be explosive upon waste drying.