DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 22, 2004

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
J. J. McConnell, Deputy Technical Director
FROM: J. S. Contardi, SRS Site Representative
SUBJECT: SRS Report for Week Ending October 22, 2004

Staff member Todd Davis was onsite this week

Savannah River National Laboratory: During a recent review, the staff questioned the safety controls associated with a cobalt-60 source that is used at the laboratory for irradiation testing. Because of the significant direct ionizing radiation associated with this source (approximately 1MRad/hr), the Documented Safety Analysis (DSA) indicates that a safety significant control is required for worker protection. The current DSA credits the radiation protection program as the control that will prevent operator injury from this source. However, the source design includes appropriate shielding and engineered interlocks that prevent access to the chamber while the source is in the irradiation position (i.e., exposed). This week, the site representative had additional discussions with Westinghouse Savannah River Company (WSRC) and DOE-SR to understand the basis for not crediting the engineered control. Based on these discussions, WSRC management agreed to evaluate the reliability of the engineered interlocks as well as the potential impacts of crediting them as a safety control.

Benzene Generation in Saltstone Vaults: This week WSRC declared a Potential Inadequacy in the Safety Analysis (PISA) for the possible generation of benzene in the saltstone disposal vaults. While reviewing potential disposition paths for the waste in Tank 48, WSRC determined that some organic wastes could decompose at elevated temperatures and produce flammable vapors. The current safety analysis does not identify a deflagration in the vaults as a potential accident. Previous waste batches dispositioned through saltstone were limited in volume such that the heat of hydration did not generate temperatures capable of decomposing organic materials. Within the last three years, two different saltstone campaigns contained tetraphenylborate (TPB), which can decompose to benzene at elevated temperatures. These two campaigns involved the recovery of Tank 49 and TPB solids in Tank 50, neither of which contained high-level waste. Since the processing of these wastes did not involve large saltstone batches, the temperature in the vaults did not exceed 51°C and cooled within several days. The lack of high temperatures and previous benzene sampling in the vaults indicates that there is not an imminent hazard. Even though there are no indicators to suggest a hazardous condition exists, WSRC has physically locked the feed valve from Tank 50.

The PISA may have implications for the disposition of the Tank 48 waste which contains significant amounts of TPB. The disposition of Tank 48 could generate large batches of saltstone. Preliminary calculations have determined that large batches of saltstone could generate temperatures within the grout matrix up to 95°C for several months. At these temperatures, the TPB in the grout may decompose at a rate that could challenge the lower flammability limit within the saltstone vaults. Recovery of Tank 48 is a vital step towards alleviating the tank space issues in the tank farms and is scheduled to begin within this contract period.