DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 21, 2001

TO: K. Fortenberry, Technical Director

FROM: D. Grover and M. Sautman, Hanford Site Representatives

SUBJ: Activity Report for the Week Ending September 21, 2001

Mr. Sautman was on leave Tuesday through Friday.

Spent Nuclear Fuel Project (SNFP): Mr. Grover reviewed several aspects of the Fuel Transfer System (FTS) design this week. Two issues were identified with operational aspects of the transfer cask assembly used to ship fuel from the K-East to K-West basins. The first deals with controlling the potential for a hydrogen deflagration during the transfer. The hydrogen is produced from uranium corrosion reactions which accelerate as the fuel warms while it is removed from the active cooling in the basins. The design specifications for the transfer system require limiting hydrogen concentrations below 4 percent, the lower flammability limit of hydrogen in air. This is not consistent with National Fire Protection Association guidance to design systems to limit hydrogen concentrations to one fourth of the lower flammability limit or incorporate other design features to minimize the potential for a hydrogen deflagration. This guidance has commonly been used throughout the DOE complex, including the Multi-Canister Overpack Cask which limits the oxygen concentration to a level where it cannot support combustion because the hydrogen generation cannot reasonably be controlled.

The second issue concerns contamination control for the transfer cask assembly, which is comprised of a Shielded Transfer Cask (STC) and cask overpack. All loading and sealing of the STC is performed underwater in the basins. This results in a cask that is completely water filled with no gaseous head space. The water in the K-East Basin is typically kept in the 50 to 60 degree Fahrenheit range. Once the STC is removed from the basin the enclosed water will expand due to heating from the ambient environment and corrosion reactions. As there is no available space within the cask to expand, the water will be forced out of the cask's filters and into the annular space between the STC and its overpack. This is likely to lead to contamination control problems with the overpack and the spread of contamination to the surrounding work areas or require decontamination activities both pre and post shipment. This aspect of the STC design is contrary to the basic radiological good practice of controlling contamination at its source.

The site rep and Board's technical staff have also identified areas of the annex and cask design as well as the preliminary safety assessment that require further review. The design for the dummy elevator lift table and the straddle carrier used to move the STC inside the basin is expected to be delayed for a least a week while problems identified in the 60% design review are resolved. The staff will also review this design when it is available. (III-A)

cc: Board Members