DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 19, 2003

TO: K. Fortenberry, Technical Director
FROM: D. Grover and M. Sautman, Hanford Site Representatives
SUBJ: Activity Report for the Week Ending December 19, 2003

Spent Nuclear Fuel Project (SNFP): Fluor Hanford (FH) briefed DOE-Richland and the Site Rep on the results of the causal analysis for the Sludge Water System Operational Readiness Review (ORR) failure in April 2003. This analysis evaluated the following programmatic areas: Executive Oversight, Project/Construction Management, Design Control/Testing, Procurement/ Specifications/ Subcontractor management, Integrated Safety Management/ Authorization Basis development and maintenance, and Readiness Verifications. Root and contributing failures for these areas primarily involved management failures, individual performance failures, inadequate resources, and inadequate training and qualification. In addition, the ORR and Unreviewed Safety Question procedures were determined to be inadequate. There is a concern that some corrective actions are identical to actions taken in response to SNFP engineering and project management issues several years ago. The need to evaluate the effectiveness and institutionalization of the corrective actions has been discussed with FH. (IV)

Waste Treatment Plant: The staff reviewed the latest hydrogen mitigation strategy and the design of the ultrafiltration and cesium ion exchange systems. Testing determined that the baseline pulse jet mixer (PJM) design did not provide adequate mixing. A modified PJM-only design was determined to work, but increased the air demand for non-Newtonian tanks by a factor of 3.5, which would result in major cost, schedule, and design impacts. Some of the alternatives the project is pursuing for reducing the number and size of required PJMs include: use sparging or recirculation pumps to assist PJMs, change the waste rheology by dilution or by changing the waste in much of the process from mildly caustic to acid, and operating the lag storage and blend vessels at lower levels. The project still needs to develop an adequate backup hydrogen control strategy for the non-Newtonian tanks that are equipped with agitators, which could lose power or need to be replaced. The staff has also been questioning other hazards introduced by the non-Newtonian rheology of some wastes. Bechtel has started investigating issues such as the effectiveness of overflows, the impacts of these overflows to receiver tanks which are not designed to mix non-Newtonian waste, and the impacts to cooling requirements due to the lower heat transfer coefficients of these wastes. However, it is not clear that Bechtel has systematically reviewed their design to identify all the new hazards that may be introduced by non-Newtonian waste. The staff is also concerned with the cesium ion exchange system. Although the staff has been told that the baseline design will not work, Bechtel has still not addressed the staff's concerns about the safety and operability of the proposed flooded design. Preliminary gas retention and release test data indicates that the assumption of an instantaneous gas release upon restarting PJMs is reasonable. In some tests, a large fraction of the retained gas has been found to be released with just the first few pulses of the PJMs. (III)

Tank Farms: The Site Rep reviewed the classroom training test questions and observed on-the-job training/evaluations that are being used to enhance the level of knowledge of tank S-112 retrieval operations staff and found them to be improved. Retrieval operations restarted this week. (IV)
cc: Board Members