

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 13, 2003

**TO:** K. Fortenberry, Technical Director  
**FROM:** D. Grover and M. Sautman, Hanford Site Representatives  
**SUBJ:** Activity Report for the Week Ending June 13, 2003

Spent Nuclear Fuel Project (SNFP): Last month the project welded a cover cap on Multi-Canister Overpack (MCO) 224 which had an unreparable main seal leak. This week the SNFP welded a cover cap on MCO 63, which has been stored with a main seal leak since May 2002. All MCOs in storage now have mechanical or welded seals which have passed required tests. Any subsequent MCOs with main seal problems are expected to be welded promptly. (III-A)

The SNFP recently conducted testing to demonstrate the ability of the Safety Significant spray shield for the Sludge Water System to adequately perform its safety function. This was to address an issue identified by the Contractor Operational Readiness Review team. The testing involved pumping a simulated sludge water mixture through a section of hose containing a small hole and covered by the spray shield material. The testing determined that the sludge damaged the plastic to the point where it could not perform its safety function in approximately 18 minutes. The project is working to redesign the spray shield. (I-C)

Tank Farms: The Office of River Protection has proposed a flammable gas control strategy that does not require any ignition, process, ventilation, or any other controls if it can be reasonably demonstrated that without reliance on any combustibles, 100% of the lower flammability limit (LFL) cannot be achieved (i.e., hydrogen diffusion, insufficient retained gas). This "reasonable demonstration" can rely on past operating experience and measured gas concentrations. In addition, all tank farm waste containing facilities during any operational activity that rely on combustible gas concentration controls to prevent reaching 100% of the LFL, regardless of the time it takes to achieve the condition, would require controls. A variety of controls (active/passive ventilation, process controls, monitoring) could be used to stay < 25% of the LFL. Ignition controls would be required > 25% of the LFL and no discretionary work is permitted above 60% of the LFL. There would also be ventilation Limiting Conditions for Operation. (I-C)

Waste Treatment Plant (WTP): The Site Rep attended a 2-day meeting of the Pulsed Jet Mixer (PJM) Team which is developing a strategy for scaled testing of the performance of PJMs with non-Newtonian fluids. These fluids have been difficult to model because they act like solids until their shear strength is exceeded. During a demonstration of PJM operation with 250 gallons of simulant, a distinct interface layer between the stagnant (un-yielded) and flowing (yielded) regions was visible. While un-yielded, gelled material may move vertically in a bulk manner in response to the PJM cycles, it is critical that the material be fully sheared (i.e., flowing) and turbulent enough to release gas bubbles. There is a sizable amount of work that needs to be performed by December 1 to demonstrate that the PJMs will adequately mix the tanks with non-Newtonian waste, especially those with higher height/diameter ratios. The test strategy for addressing gas retention is in the very early stages of development. (I-C)

cc: Board Members