

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 18, 2011

**TO:** T. J. Dwyer, Technical Director  
**FROM:** W. Linzau and R. Quirk, Hanford Site Representatives  
**SUBJECT:** Hanford Activity Report for the Week Ending February 18, 2011

Board staff members D. Gutowski, S. Lewis, and S. Sircar were on-site reviewing Tank Farm projects and performed a walkdown of the Mobile Arm Retrieval System at the contractor's test facility. J. Abrefah, C. March, and S. Stokes were on-site reviewing the Waste Treatment Plant (WTP) Preliminary Fire Hazard Analysis (PFHA) and the fire safety design.

Report on Plutonium Solids in the Tank Farms: A report, commissioned by WTP and completed in June 2010, documents a review of the historical data on plutonium solids in aqueous waste that may have been transferred to Tank Farms and that could eventually be in the feed to WTP. The review was conducted to address a recommendation from the DOE Criticality Safety Support Group. The authors of the report researched data from the Plutonium Finishing Plant (PFP) and other available records to determine the amount, density, and particle size distribution of plutonium solids that could have been transferred with the aqueous waste. The report's findings include: the accountability strategies at PFP did not adequately account for plutonium solids in aqueous waste; plutonium oxide particle size distributions varied over a wide range; and most of the plutonium materials that could have been in the solids of aqueous wastes were initially larger than 20 microns. The report notes it is not known to what degree the size of solids were altered before they were sent to the Tank Farms.

The Office of River Protection directed the Tank Operations Contractor (TOC) to treat the information in the report as "new information" even though it has not been peer reviewed, and the TOC entered the potential inadequacy in the safety analysis (PISA) process. On Monday, the TOC Plant Review Committee concluded that there could be differential settling of the plutonium particles during some operations, e.g., waste retrieval. This could result in a higher plutonium concentration in aqueous solution, and a criticality event may not be incredible; therefore, they concluded the condition represents a PISA. The contractor prohibited mixer pump operations in and retrieval of sludge from selected tanks until a technical evaluation of the June 2010 report is completed and the impact on tank farm criticality safety is determined. The TOC is also evaluating if they should revise the criticality safety specification to include the operational restrictions because this issue will likely take significant time to resolve.

The WTP contractor's initial evaluation of the impacts of the report resulted in significant questions, including if a critical mass occurring in a single batch was now a credible event, and if design modifications are required to account for particle sizes greater than 10 microns. The implications of the June 2010 report were only recently presented to the project's upper management, who immediately commissioned a team to provide a plan to conduct a technical evaluation of the report. This week, the team produced a draft plan to determine the correctness and completeness of the report's data, the impacts, and a timeline for closure. The team recognized that the TOC has the most immediate need for more information and has coordinated its efforts with them. The draft plan has actions that will take weeks to months, but some actions, such as analysis of tank samples, could take longer than six months to complete.