

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 23, 2007

TO: K. Fortenberry, Technical Director
FROM: R. Quirk and W. Linzau, Hanford Site Representatives
SUBJECT: Activity Report for the Week Ending February 23, 2007

Plutonium Finishing Plant (PFP): The facility is operating under a Justification for Continued Operation (JCO) due to a positive Unreviewed Safety Question (USQ) involving the HEPA filters in the ventilation systems. A Fluor Hanford, Inc. (FHI) vital safety systems audit revealed that the analysis used to predict the soot-loading capacity for the HEPA filters may not be technically justified and that aerosol testing does not have an adequate technical basis. The justification given for continued operation for the filter loading finding includes the conservatism in the fire analysis and operational experience has demonstrated that differential pressure across the HEPA filters increases slowly. Richland Operations Office (RL) placed conditions of acceptance on this JCO, including restricting use of some filter rooms and requiring more frequent combustible loading inspections. Because the technical basis for aerosol testing is in question, the filter efficiency is non-determinate. The justification for allowing operations includes crediting the 291-Z-1 stack for providing an elevated release and crediting HEPA filters in the 2736-Z Complex with a leak path factor of 0.1. FHI is testing the ventilation system to gather data to validate a computer model of the system and to assist in developing a new technical basis for HEPA filter testing.

K Basins Closure (KBC): The Hose-in-Hose (HIH) system was restarted last Sunday night and operated for approximately nine hours. Sludge has not been transferred since then because of high axial vibration of the backup pump in booster station one. The pump still demonstrated high axial vibration after modifications were made to the supports, but the vibrations were within acceptable limits when variable frequency drive output was decreased by 1 hertz. The project is determining if the frequency of other pumps can be varied to compensate for the lower frequency in the booster station one pump, yet still maintain adequate flows in the system.

Finite element analysis of the impellers used in the HIH booster stations confirmed that recirculating flow eddies are probably the cause of material deposition near the tips of the impeller (see Hanford Activity Report 2/9/07) and could have been the cause of the blockage of flow near the eye of the impeller. Similar analysis of a new impeller design demonstrates that the problems should be resolved. The new impeller design has additional clearances to permit debris to pass between the pump impeller and housing as well as significant changes to the design of the impeller vanes. The project is developing plans to replace the impellers in the existing pumps upon completion of fabrication, estimated to take four to six weeks. The preliminary plans call for removing the contaminated pumps from the booster stations and completing the impeller replacement while the pump is submerged in a tub located in a building with a controlled environment as a means to minimize the spread of contamination.

Waste Treatment Plant (WTP): Last Friday, the site reps observed testing of a scale model of the pulse jet mixers (PJMs) that will be used to mix many of the WTP vessels. The purpose of the testing is to determine the stresses due to inadvertent discharge of air into the tank from multiple PJMs at the same time, known as a multiple overblow (MOB). The large turbulence from the MOB can cause excess stress to tank internals, which may require additional bracing. The testing is expected to be completed by June 2007.