

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 16, 2002

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
J. J. McConnell, Deputy Technical Director
FROM: R. T. Davis/ T. D. Burns
SUBJECT: SRS Report for Week Ending August 16, 2002

DNFSB Staff Activities: Staff members B. Yeniscavich, R. Robinson, and P. Mieszkowski were on-site to review how vapor-space corrosion concerns are being addressed in the HLW tank inspection program. Dr. Yeniscavich was also briefed on the status of the TEF project.

Cross-flow Filter Test: As part of the site initiative to restore Building 512-S (the former late wash facility) to an operable status as a generic waste treatment facility (site rep weekly 2/22/02), full-scale simulant testing of the cross-flow filter was performed this week. The preliminary results indicate that the filter performed well. Test requirements were to maintain a filtrate flow rate of greater than 5 gpm at a filter trans-membrane pressure differential of less than 40 psi. This filtrate flow rate is necessary to support the baseline flowsheet for the CSSX process and a pressure differential in excess of 40 psi indicates unacceptable filter pluggage. Under the highest simulated actinide loading (5 wt% solids), the filtrate flow rate remained in excess of 10 gpm and the filter trans-membrane pressure differential remained below 9 psi. Performance of the cross-flow filter has been one of the more significant technical risks associated with the actinide removal process.

Americium/Curium: The previously postponed cold run was commenced this week (site rep weekly 8/2/02). Problems maintaining an adequate flow rate out of F-Pump Tank-2 (FPT-2) persisted. An amended strategy calling for agitation of FPT-2 for 24 hours and then transferring without agitation allowed an adequate flow rate from FPT-2 to be maintained. Successful water transfer from FPT-2, through the inter-area line, to Tank 51 in H-Area was sustained for several hours. However, shortly after the simulant flow from F-Canyon was introduced, indication of low flow rate out of H-Pump Tank-7 (HPT-7) led to suspension of the cold run. As of Friday, troubleshooting is on-going to address HPT-7 issues. The problems encountered thus far illustrate the high degree of integration required to execute this transfer effectively.

Canyon Evaporator PISA: This week, WSRC declared a Potential Inadequacy in the Safety Analysis (PISA) based on recent failures of safety related temperature monitoring instruments for several canyon evaporators. Resistance Temperature Devices (RTDs) are used to monitor evaporator temperature and are part of a safety interlock to shutdown steam to the evaporator and prevent a red-oil accident scenario. On two separate occasions this year, WSRC identified erratic readings from RTDs associated with Low Activity Waste evaporators in H-Canyon. A similar event occurred in F-Canyon in March 2001. Investigation of these failures indicated that the RTD thermowell that extends into the evaporators had experienced significant degradation from the high temperature-acidic environment. Introduction of solution into the thermowell caused failure of the RTD and temperature indication to be less than the actual evaporator temperature. This failure mode prevents the interlock from activating at the correct set point.

In addition to the thermowell failures, the 7.6E LAW evaporator developed a through wall leak earlier this year. LAW feed drop and liquid level jumpers have also been identified with significant degradation in this environment. Samples of the failed jumpers and RTDs have been provided to SRTC for analysis. Feed stream samples are also being analyzed by SRTC to understand this problem. While investigation continues on these failures, WSRC is developing an engineering path forward that includes compensatory measures to monitor indicated evaporator temperature and specific gravity hourly to help identify RTD failures and prevent this accident scenario. An Unreviewed Safety Question (USQ) evaluation for operation of the facility with the RTDs will likely be complete early next week.