

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 19, 2016

TO: S. A. Stokes, Technical Director
FROM: M. T. Sautman, D. L. Burnfield, and Z. C. McCabe Site Representatives
SUBJECT: Savannah River Site Weekly Report for Week Ending February 19, 2016

H-Canyon Criticality Safety: Last week H-Canyon personnel completed a run of the second uranium cycle solvent extraction process (2^{nd} U) with fissile material. A criticality safety analysis for 2^{nd} U relies on three independent controls to prevent an inadvertent criticality in a mixer-settler tank. Starting-up 2^{nd} U requires canyon operators to establish the feed of fissile material to a vessel by manually controlling the flow with a steam jet. The nature of the controls can make it difficult to establish a steady flow of fissile material, therefore the procedure allows operators to adjust the steam jet as needed in order to establish a steady flow. The procedure allows the operators to attempt to stabilize the flow indefinitely. In accordance with the procedure, while flow was being established two of the three criticality safety controls were being utilized. The procedure does not direct H-Canyon personnel to implement the third control, verification that the feed tank depletion rate is below a maximum value, until after fissile feed is stabilized despite it being credited in the criticality safety analysis for this operation. The 2^{nd} U process ran for roughly 20 hours and depleted all of the fissile material in the feed tank without H-Canyon personnel stabilizing the feed, which left the third criticality safety control unimplemented. Review of the feed tank depletion data revealed that the maximum depletion rate was exceeded, which would have led H-Canyon personnel to immediately stop the hot feed into the mixer-settler had it been discovered in real-time. The site representative attended an issue review concerning these findings. The corrective actions identified include revising the procedure to begin the depletion rate verification when fissile feed is started, and reviews to ensure that other criticality safety controls in H-Canyon are being implemented prior to introducing the hazard. Additionally, a lessons learned document will be developed and distributed site-wide.

Tank Farms: Tank farms personnel reported that the sump in the process cell of the 3-H Evaporator alarmed indicating a leak had occurred while processing tank waste. The operators performed a visual examination of the evaporator and the associated piping and found evidence that the leak was tank waste and that it was probably concentrated waste and not feed from the tanks. Several inches of dried salt waste can be seen on the outside of the shell that surrounds the evaporator pot, and on the floor of the cell. At this time, there is no indication that the leak is associated with a leak from the nozzles or the associated piping. If the leak is caused by a defect in the evaporator pot, the replacement of the pot could take several years. The evaporator feed is linked to sludge washing operations, as well as the drop tank for canyon receipts. The canyon drop tank has more than enough space to accept canyon receipts, however should the evaporator be out of service for several years alternative operations will have to be evaluated if sludge batch washing is affected. Tank farms personnel flushed the evaporator pot and refilled it with water until reaching two inches above the normal operating level (+96 inches) without observing a leak. At the +96 inch level liquid was observed on the outside of the pot.

Defense Waste Processing Facility (DWPF): Radiological protection personnel who were performing a survey of a chill water pump prior to maintenance alertly found surface contamination ($\leq 40,000$ dpm/100cm² β/γ loose and $\leq 60,000$ dpm β/γ by direct probe) in the chill water room of the mezzanine in areas adjacent to the pump. This room is designated a radiological buffer area. There were several indications of leaks in the room including a contaminated mop draped across a cross bar and soiled/rusty areas of the floor.