

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 23, 2010

**TO:** T. J. Dwyer, Technical Director  
**FROM:** D. L. Burnfield and M. T. Sautman, Site Representatives  
**SUBJECT:** Savannah River Site Weekly Report for Week Ending April 23, 2010

**F-Canyon:** Last Friday, workers repacked a 40+ year old transuranic waste drum from Mound that contained nested food pack cans. When they punctured one of the inner cans, smoke began to emerge from the hole until the hole slowly plugged with a chemical deposit. For the next few days, the can would periodically smoke whenever a tiny hole in the chemical deposit formed until it slowly plugged up again. In addition, the shiny can rapidly degraded within a few hours as the can became covered with stains and flaking and the side of the can began to buckle inward. Plastic and metal near the can also degraded. The reaction was slow and infra-red cameras barely detected any increase in the can's temperature. On Sunday, workers sampled the chemical deposit and headspace gas before puncturing a second hole in the can. Subsequent chemical analysis identified the presence of titanium tetrachloride, which reacts with water vapor to form a dense white smoke consisting of particles of titanium oxychloride and droplets of hydrochloric acid. The initial SRNS response to this event was slow and unfocused. For example, the site rep questioned why the Fire Department's Hazardous Materials team had not been notified nearly 8 hours after the reaction began. The Board staff also challenged plans to add NaOH solution to the material when chemical literature indicated that the chemical reacts violently with water.

**L-Area:** L-Area stores spent fuel in buckets (containers designed specifically to store spent fuel underwater) in the spent fuel basin. Metal storage racks often surround these buckets. The buckets are made of steel and are approximately 18 inches on a side. A rack surrounds two buckets at a time during storage and is designed to maintain the fuel in a criticality safe configuration. A novice fuel handler, under instruction, engaged a bucket containing foreign research reactor fuel, and began to raise the bucket using a 1-ton chain fall. After lifting the bucket several inches, the operator questioned the difficulty required to operate the chain fall. The supervisor stopped the lifting and requested the crew to lower the bucket slightly. The crew then recognized that the rack was out of position. The crew called a time out and notified management about the raised rack. It appears that the operator had inadvertently caught the lip of the rack with the top edge of the bucket and then had lifted the bucket and the rack approximately 30 inches. While L-area personnel are maintaining the fuel in a safe configuration, the location of the storage rack does not comply with the analysis contained in the Nuclear Criticality Safety Evaluation. Facility personnel entered a Limiting Condition for Operation and restricted fuel handling within the bucket storage area to those operations necessary to correct the discrepant condition. L-Area personnel are determining recovery actions to lower the rack and move the fuel to a safe storage location. A potential inadequacy in the safety analysis has been declared.

**F-Tank Farms:** Personnel decided not to flush a submersible mixer pump that was being transferred from Tank 5 to Tank 6 because the camera did not indicate significant sludge build up. While the pump was being inserted into a Tank 6 riser, the rigging supervisor ordered the crane to stop. He was concerned because the video camera was not showing any downward movement, not realizing that the camera operator had accidentally frozen the screen image. This sudden stop caused the sleeved pump to sway and strike the side of the riser. Since workers had been cutting the sleeve as the pump was inserted, this allowed a contaminated dust cloud to escape from the cut sleeve into the plastic wind break. The Person-in-Charge did not call a Time Out because he was only aware of the quickly resolved camera/crane issue. The Radiological Control First Line Manager was aware of the increase in contamination, but not the contamination cloud. Because the pump's extremity dose rate was 200 R/hr, he also decided it was safer to continue inserting the pump rather than take time to decontaminate the pump as required by a procedure action step. No workers were overexposed or contaminated, but the wind break was later found to be highly contaminated (up to 3 million dpm  $\beta$ - $\gamma$ ). Workers later installed a roof on the wind break to allow them to continue extensive decontamination without having to worry about rain. SRR is currently developing corrective actions to improve contamination control and communications.