

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 27, 2015

TO: S. A. Stokes, Technical Director
FROM: M. T. Sautman and D. L. Burnfield, Site Representatives
SUBJECT: Savannah River Site Weekly Report for Week Ending March 27, 2015

Tank Farms: During a Tank 37 to 23 high-level waste (HLW) transfer on March 25, Operations staff noticed that the waste level in Tank 32 had increased more than 0.1” during the previous 3:20 hours. (Tank 32 was supposed to be isolated from the transfer route by a single safety class valve). Since this level increase was greater than the normal fluctuations seen with reel tapes, they requested a camera inspection inside Tank 32. Ripples on the waste surface in Tank 32 indicated that HLW was being inadvertently transferred so Operations shut down the transfer. Based on the measured level increase, ~560 gallons of the 24,000 gallons of HLW transferred ended up in Tank 32 during the six hours of the transfer (~1.5 gpm). This same valve also failed on March 11 and caused an earlier inadvertent transfer involving the same three tanks. In that case, the valve actuator was resting against the upper stop indicating that the ball valve was closed when the valve was actually partially open because there was a gap between the ball pin and the lower stop. After that earlier event, SRR replaced the upper valve actuator, closed the valve using a T-handle wrench, and verified the valve’s actual position using a remote camera. A camera inspection after this week’s inadvertent transfer showed that the failure mechanism this time was different because the valve was in the correct position. Engineers suspect that the HLW leaked past the valve due to a seat failure. This failure may have occurred during the March 25 transfer when the flow rate was increased from 30 to 100 gpm. SRR also went back and reviewed the data from a March 20 transfer. They did not see any obvious indications of valve leakage then, but there was also a much higher transfer rate (~25 gpm) into Tank 32 due to a concurrent evaporator run which could have obscured a small inadvertent transfer. SRR has put all waste transfers on hold while they vent and drain/flush the transfer route, prepare to remove the valve for autopsy, and develop criteria for releasing future HLW transfers.

SRR conducted a readiness assessment of the preparations to rewet Tank 15 and a facility self-assessment of the activities associated with grouting Tank 16. These tanks have both leaked in the past and these activities help prepare the tanks for final closure.

HB-Line: SRNS completed an extent of condition review of all Phase II/III procedures to see if there were any other criticality control steps that relied on the user’s interpretation rather than quantitative criteria (see 2/20 – 3/6/15 reports). The review identified a couple steps (e.g., visually verify a glovebox contains no fissile material) that are being clarified. SRNS has also drafted a recovery plan outlining the actions 1) required to establish a safe configuration, 2) required to restore systems to operable status, and 3) that can be performed in the interim. Meanwhile, SRNS is evaluating whether they could confirm an agitator is operating by adding concentrated acid and then comparing the measured molarity after mixing with the calculated one. DOE also informed SRNS that they want 1) the transfer specific administrative control to clearly describe the functional requirements and that 2) the root cause analysis should review the H-Canyon and HB-Line criticality safety strategy to identify all scenarios where the control strategy lacks diversification. For these scenarios, DOE wants SRNS to identify what would be necessary to implement a control strategy that minimizes the potential for common mode failures.

Savannah River Tritium Enterprise (SRTE): SRTE management briefed the site reps on the corrective actions to the puncture wound event (see 1/30/15 report). SRTE had previously conducted a causal analysis and identified six apparent causes. The SRNS Independent Investigation Team later released a thorough report on this event, which identified five causes for the event (see 3/13/15 report). Together there were six causes reported including inaccurate risk perception, the lack of effective management, and incomplete execution of the hazard analysis process. The corrective actions involve a mixture of items clearly linked to the event (e.g., sharps control program, more use of mock-ups) and more generic corrective actions (e.g., conduct of operations training, management field observations) that seem to regularly show up in corrective action plans.