DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 20, 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 February 20, 2015

HB-Line/H-Canyon: When power was lost January 7 (see 1/9/15 weekly report), the HB-Line diesel generator started, but most of the plutonium oxide production equipment went into an alarm/fault state since this equipment was not designated as an emergency load. The following week, SRNS had an abnormal plutonium precipitation/filtration run which necessitated a series of dissolution flushes of the precipitator in late January. HB-Line operators later conducted three transfers of this dissolution flush solution from the HB-Line filtrate tank (NT-51) to H-Canyon. While preparing for a fourth transfer, engineers noted that the plutonium concentration and acid molarity in the sample were higher than expected. The tank was agitated and sampled two more times with similar results. When mechanics opened the cover for the variable-frequency drive (VFD) for the tank agitators, the VFD display indicated "stopped" and 0 Hz. An investigation determined that when power was lost in January, the agitators went into a fault condition. Although the fault was cleared 12 hours later, the VFD was not reset in the field. The operators do not have a direct means to verify that the tank contents are actually being agitated, but indirectly determine this by looking for minor fluctuations in the tank liquid level using the charts displayed on the Distributive Control System (DCS). In this case, the operators reviewing the charts from the DCS determined that the that the NT-51 agitators were running, when in fact they were not actually spinning when the tank was being prepared for sampling or during transfers. The HB-Line Nuclear Criticality Safety Evaluation (NCSE) requires 1) agitation to assure that the tank sample is a representative sample and 2) that the NT-51 plutonium (Pu) concentration be less than 6 g/l. Thus the lack of agitation meant that all the defenses were violated and no other documented controls remained to protect the criticality safety limit. While the NCSE included a common mode failure (CMF) evaluation for this control set, it did not identify lack of agitation as a CMF. In addition, SRNS did not implement the H-Canyon criticality safety control that requires the NT-51 agitators to be running during transfers from HB-Line into the H-Canyon receipt tank to ensure solids remain suspended and the fissile material location is accurately tracked. The current inventory of fissile solids in the H-Canyon tank is below the criticality safety limit. SRNS has forbidden operation of the affected NT-51 agitators or movement of fissile solutions in NT-51 and have taken similar actions for NT-31, which also has the capability of transferring material to H-Canyon. They are developing a recovery plan.

Building 235-F: When SRNS implements their revised atmospheric dispersion parameters, the resulting increase in dose consequences may cause the 25 rem evaluation guideline to be exceeded. In order to offset this increase, SRNS is proposing that the respirable fraction for ball-milled Pu-238 under thermal stress be reduced from 1.0 to 0.1. Furthermore, SRNS is also proposing a change in the inhalation dose conversion factors by assuming the plutonium at Building 235-F and elsewhere is lung absorption Type S (insoluble, slow absorption) rather than type M (moderately soluble). The combined effect would be a reduction in the calculated dose consequences by a factor of ~30. DOE and the technical staff are reviewing the technical basis for these proposals.

The site rep observed a drill to evaluate the facility's and F-Area shift operations manager's (SOM) ability to respond to a continuous air monitor alarm. SRNS personnel conducted this drill as a part of line management's preparations for declaring readiness to start the removal of material at risk within Building 235-F. The drill team conducted the drill professionally and the F-Area SOM provided adequate command and control.

Solid Waste Management Facility (SWMF) SOM Oral Board: The site rep attended an oral board conducted by SWMF management for a new SOM. The oral board was conducted professionally and the candidate passed the examination.