

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 4, 1998

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director  
**FROM:** J. Kent Fortenberry / Joe Sanders  
**SUBJECT:** SRS Report for Week Ending September 4, 1998

**H-Canyon Potential Inadequacy in the Safety Analysis (PISA)** - Pu-239 was introduced into HB-Line Phase I operations this spring. During recent reviews and preparations for restarting Phase II HB-Line operations with Pu-239 material, WSRC identified a scenario through which the acidity of an H-Canyon waste tank could be lost, providing conditions for polymerization of any plutonium in that tank. The H-Canyon Double Contingency Analysis (DCA) credits HB-Line control of the feed streams in demonstrating criticality control for H-Canyon Tank 8.8. Tank 8.8 is aligned for four potential inputs: (1) an acid waste stream from HB-Line Phase II and Phase III operations which could contain trace quantities of Pu-239 following the proposed restart of these operations for Pu-239 stabilization, (2) an acid waste stream (flush solution) from HB-Line Phase I which could contain trace quantities of Pu-239, but which is currently blanked off with a Nuclear Safety Blank, (3) a water feed providing backup receipt capability for an HB-Line closed loop cooling water system, and (4) a water feed from the HB-Line vessel vent scrubber tank. Tank 8.8 currently contains about 0.124 g/l of Pu-239, for a total of about 99 grams. The two acid streams that might contain plutonium have controls on plutonium concentration, plutonium solids, and the minimum acid concentration. However, the phenomenon of concern is that (1) a significant amount of plutonium is introduced into Tank 8.8, and (2) the two water streams reduce the acidity of the tank to conditions conducive to polymerization of the plutonium. The two water streams have been locked out while controls are being developed to ensure minimum acid concentration in Tank 8.8.

**Storage of Americium/Curium Solution (Am/Cm) in F-Canyon** - In response to the Board Reporting Requirement of July 10, 1998, DOE and WSRC evaluated whether additional risk reduction actions were needed for storage of Am/Cm, given the multi-year delay in stabilization. Three items were recommended from this evaluation:

- Designate the Tank 17.1 (containing ~11,000 liters of Am/Cm solution) 'Low Level Alarm' as safety class. This would prevent concentration (due to evaporation) of the solution above 11.6 Ci/lb, the current BIO limit.
- Proceduralize the actions required to transfer the contents of Tank 17.1 to Tank 16.2, in the event Tank 17.1 begins to leak. This is currently covered by a Standing Order.
- Put in place compensatory actions in the event the Process Vessel Ventilation (PVV) and Instrument Air (IA) Systems are unable to adequately purge the Tank 17.1 vapor space.

Hydrogen buildup to the lower flammability limit (LFL of 4 vol%) can occur in 5.6 hours, due to the high source term, if purge is lost. This puts a premium on ensuring purge is available and rapid response actions are taken if purge is lost. The PVV System is safety significant; however, this system can be unavailable for weeks at a time during certain activities such as filter flushing. The on-line backup IA purge is not safety-related, nor is the flow monitoring device used to ensure it is delivering at least 3.1 cfm to maintain vapor space below 25% of LFL. DOE and WSRC should consider upgrading the functional classification of the system in order to enhance its reliability and reduce the risk of a vessel explosion.