

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 18, 1998

MEMORANDUM FOR: G. W. Cunningham, Technical Director
FROM: J. Kent Fortenberry / Joe Sanders
SUBJECT: SRS Report for Week Ending September 18, 1998

Todd Davis and Jessica West were onsite this week reviewing the Americium/Curium Stabilization Program and preparations for starting up H-Canyon 2nd Cycle Solvent Extraction.

Overflow of F-Canyon Process Vessel Ventilation (PVV) Filter: The hot canyon PVV filter overflowed while performing a second flush to remove ammonium nitrate deposits. The flush liquid, weak nitric acid with a small amount of boric acid, was captured in the sump. This event was declared an off-normal occurrence and a critique ensued. There were several contributing factors to this occurrence. The dip tube for level detection only extends seven inches below the top of the vessel, providing ~1400 pounds of material freeboard before overflow. The rate of flush solution addition was ~600 pounds per minute. This allows only a very short operator response time. To exacerbate the problem, the pressure gauge which measures dip tube pressure (signalling the operator to isolate flush water addition) had a large scale which likely contributed to the slow response. This differed from the initial flush solution addition in which a more accurate pressure gauge was used. More rigorous technical evaluation in preparing for this non-routine activity would have likely caught these problems.

DWPF Slurry Mix Evaporator (SME) Steam/Cooling Coil Failure: The SME cooling coil developed another leak (approximately 80 gpm) this week. The last coil failure was in March of this year with the previous failure in March 1997. This vessel has proven to be particularly vulnerable to coil failures due to erosion from the glass frit. After the previous failures, Stellite coatings were applied to selected areas of the coil assembly. DOE and WSRC intend to reevaluate whether other improvements can be made to improve the durability of the coil assembly. Fortunately, WSRC was able to complete its FY98 performance milestone of pouring 250 containers and are entering a planned three week outage.

Americium/Curium Stabilization: WSRC appears to have significantly improved their approach to Research and Development (R&D) for this project. They expect to have enough confidence in the current design to resume project design work by early October 1998. WSRC used a systems engineering approach to develop a Functions and Requirements Document that identifies the key project requirements for the project functional areas. These requirements correspond to R&D activities identified in the Development Program Plan (also recently revised) and ultimately to an integrated schedule for R&D activities. This structure should allow project management to more effectively focus resources on resolving remaining technical issues.

WSRC also performed a project risk assessment to determine which potential issues may further delay the project. Based on this assessment, additional actions were taken to reduce the probability or impact of the higher risk issues. Several key technical issues are discussed below.

- *Melter Size* - While WSRC intends to use a 5-inch melter, R&D has only been performed on a 3-inch melter. A 5-inch melter will be tested starting in November 1998 to verify that there are no scale-up issues.
- *Precipitate Transfer* - Lab tests with surrogate material indicate that the precipitate

transfer to the melter vessel can be accomplished with only a small amount of flush water. However, the actual material will have a significant amount of self-heating that may cause different results than the lab tests.

- *Melter Volume Expansion* - Previously during melter heat-up, the melter contents were expanding and foaming. This volume expansion was eliminated by decreasing the melter temperature gradient; however, glass mixing is reduced without the thermal gradient. WSRC does not believe this will be a problem.

Assuming that project design restarts in October, the project schedule should be re-baselined in March 1999 when WSRC expects to have approximately 35% of the project design complete.