

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 24, 2002

TO: J. Kent Fortenberry, Technical Director
FROM: Matt Forsbacka, Oak Ridge Site Representative
SUBJ: Activity Report for Week Ending May 24, 2002

A. BWXT Y-12 Enriched Uranium Operations (EUO):

1. On Tuesday, BWXT personnel reported survey results of uranium holdup under the stainless steel flooring in C-1 Wing of Building 9212, EUO. The survey, which was conducted by performing non-destructive measurements and computer modeling to construct an assay, indicated that some highly enriched uranium is distributed under the flooring. The accumulation occurred over several decades, so it is difficult to ascertain the volume and acid concentrations of uranyl nitrate that might have leaked into the concrete slab footing. In discussions with plant personnel, they indicated that evidence from Rocky Flats showed shallow etching of concrete flooring is likely under these conditions. This survey was done as a follow-up action to the holdup previously found in B-1 Wing.
2. Processing of organic solutions in the out-of-service primary extraction columns in B-1 Wing has commenced. At this time, approximately two-thirds of the organic solutions have been transferred into safe bottles and will undergo organic treatment to strip off the uranium and allow for disposal of the organic compounds. No fuming or other evidence of instability had been observed. Bottle space is the limiting factor at this time.
3. On Thursday, facility personnel reported a noncompliance with a Fire Hazard Analysis (FHA) recommendation that valve handles be removed or fitted with locking devices prior to operations transporting organic liquids in the Secondary Extraction system located in the non-sprinkered portion of B-1 Wing. Previously, several valves were identified and had their handles removed/locked. A followup walkdown identified 4 additional valves which prompted the notification of noncompliance with the FHA. The FHA is key in developing the preconditions for adequate implementation of the administrative control suite currently relied upon for fire protection. This gives further indication that reliance on administrative controls requires continual vigilance by management and workers. (2-A)

B. BWXT Y-12 Enriched Uranium Reduction Vessel (RV): BWXT personnel met with the Site Representative to discuss progress in characterizing thermally induced stresses in the RV. Finite element calculations that couple mechanical and thermal models show that the dominant stress component is a compressive hoop stress at the weld joint at the base of the RV. Comparing this result to subsection NH of the ASME Boiler and Pressure Vessel Code© indicates that the stress intensity limit is exceeded by a factor of 4. This preliminary evaluation is, however, based on a simple linear-elastic material model, so alternate constitutive models may be considered. Of a more fundamental nature, the topic of developing a clear path forward to take full advantage of data gathered from future RV operations was discussed. The current computational efforts appear to provide additional insights into risks involved, but it is imperative that suitable instrumentation and post-test protocols be defined and codified in an experiment plan. Design-of-experiments techniques along with Bayesian analysis techniques may provide a technical basis for such a plan. (2-A)

cc: Board Members