

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 15, 2006

TO: J. Kent Fortenberry, Technical Director
FROM: R. Todd Davis/Donald Owen, Oak Ridge Site Representatives
SUBJECT: Activity Report for Week Ending September 15, 2006

A. Conduct of Engineering/Feedback and Improvement. As reported on August 18th, BWXT engineering personnel had identified last October that the equipment design and approach to loading a new vessel for blending enriched uranium materials would not prevent a criticality in an unlikely water intrusion event. In response, a design change was necessary to ensure double contingency. This change reduced internal volume of the blending vessel (internal spacer added to vessel leg end caps). The site rep. inquired in August on BWXT's investigation of the prior engineering and design review of the blending equipment. BWXT management noted that the investigation and determination of corrective actions had not been completed, but that prior investigative information would be gathered, evaluated and a report developed.

The blending vessel is V-shaped with one leg shorter than the other. In similar blending operations at Y-12, such vessels are normally loaded (from above) with the "V" in an upright orientation. For this new blending glovebox, the vessel is loaded with the "V" inverted. In an unlikely water intrusion event, the entire volume of the inverted vessel could fill, whereas in other applications water would only fill to the level of the shorter leg. This extra water had not been accounted for in the criticality safety evaluation.

This week, BWXT management discussed investigation results with the site rep. BWXT noted that this new equipment had been obtained from a prior project in the late 1990's that was never completed. The criticality safety evaluation performed in early 2005 assumed that the vessel was loaded in an upright orientation, without having verified this assumption and without benefit of an existing glovebox assembly drawing that clearly depicted the orientation. Such information had not been distributed to project team members, including criticality safety engineering personnel. Although BWXT has completed a report of the investigation, specific corrective actions are yet to be determined. Not explicitly addressed by BWXT's investigation was the apparent lack of any formal (integrated) design review for this project. Evaluation of applicable BWXT requirements/protocols and of the need for such design review for such projects appears warranted. The site rep. discussed this observation with BWXT and YSO personnel.

B. Special Processing Activity. On Thursday, BWXT started their Readiness Assessment (RA) for a campaign to dissolve and convert machining chips to a uranyl-nitrate solution (beaker leaching). The uranyl-nitrate solution will then be converted to an oxide using existing equipment and packaged for off-site shipment. The machining chips date back to a special program in 1987 (see the 6/3/05, 7/1/05 and 8/18/06 site rep. reports) and had been stored in containers not intended for long-term storage. On Friday, the site rep. observed the main demonstration of the dissolution and filtration tasks. The site rep. noted that for some procedure steps that the operator either did not read the step or did not have the step precisely read to him (a second operator was to either read or show the step to the primary performer). The second operator would sometimes either paraphrase and/or truncate the step. The RA team noted some observations involving radiological controls. The RA team expects to complete their review by early next week.