

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

TO: Timothy Dwyer, Technical Director  
FROM: William Linzau and Rory Rauch, Site Representatives  
SUBJECT: Oak Ridge Activity Report for Week Ending January 25, 2013

**Uranium Processing Facility (UPF)/Microwave Casting:** In October 2012, UPF project management acknowledged emerging criticality safety issues that challenged the project's ability to meet throughput requirements for casting operations. Specifically, criticality safety experts had proposed a control scheme that relied on engineered geometry controls rather than administratively limiting the mass of the material to be cast. The experts had proposed to implement this new scheme by using solid blocks to fill the void volume of the furnace. Such a change would increase heating and cooling times and adversely impact throughput. Identified space/fit concerns (see 9/21/12 report) further complicated resolution of these issues.

In November, B&W formed an inter-disciplinary team of experts to evaluate these issues and recommend a path forward. The team recently issued its report, which supports the criticality safety experts' recommendation to change the control scheme for casting to one that relies primarily on geometry controls. To address resultant throughput challenges, the team recommended several modifications to the hardware and equipment layout for casting operations. The most significant of these recommendations involved increasing the number of furnaces from three to five and relocating the cooling chambers to positions adjacent to each furnace. The latter change would allow the stack to be transferred to the cooling chamber at a higher temperature and reduce the cooling time required in the furnace. The team also analyzed the equipment layout associated with the recommended path forward to ensure that it would be accommodated, given the project's space management issues. B&W and NNSA project personnel are currently considering the team's recommendations.

**UPF/Criticality Safety:** The site representative observed testing of a prototypic glovebox drain that is designed to be a criticality safety control in UPF. The testing, being conducted by a local vendor for B&W, is designed to collect data on the ability of the drain to prevent water accumulation inside the gloveboxes. The drain assembly is designed as a rectangular 14-inch<sup>2</sup> opening in a glovebox floor with a wire mesh debris guard around it and a loop seal attached on the underside of the box. The prototype assembly being tested was attached to a mock-up glovebox at the vendor's off-site test facility. The vendor tested various input flow rates of water and measured the steady-state fluid level in the box. Tested scenarios included simulated clogs that caused restricted flow conditions. The testing should be done this week and the results will be provided to B&W.

**Criticality Safety:** This week, NPO issued a letter to B&W expressing concern with the implementation of criticality safety requirements in Building 9204-2E. The letter requests that B&W review recent criticality safety infractions in Building 9204-2E (see 10/26/12 and 1/11/13 reports) and take actions to resolve the causes of these incidents.

**Fire Protection:** B&W recently issued a report documenting an evaluation of the causes of a break in a 10-inch underground water line that supplied potable and fire water. The break occurred in September 2012 (see 9/14/12 report) and repairs were completed in November 2012. The pipe did not show signs of significant internal or external corrosion and there were no anomalous pressure transients that day. The report noted that a concrete thrust block near the break was cracked and may have contributed to the failure. It appears that the most significant contributor to the failure was the age of the cast iron pipe, which was installed in the 1940s.