

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

TO: Steven Stokes, Technical Director
FROM: William Linzau and Rory Rauch, Site Representatives
SUBJECT: Oak Ridge Activity Report for Week Ending October 17, 2014

Building 9212/Nuclear Criticality Safety (NCS): The Senior Technical Advisor (STA) for CNS Y-12 Engineering recently completed an investigation into the causes of last July's alloy consolidation casting failures (see 8/1/14 report). At the core of the investigation was an experiment in which the STA cast various combinations of pure metals and alloys in a gumdrop mold (depleted uranium was used in place of enriched uranium) in an attempt to replicate the incident. The experiment demonstrated potential compatibility issues between aluminum (a core constituent in the failed casting batches) and the crucible coating material. The STA concluded that the casting batch and furnace operating requirements for alloy consolidation were not adequately evaluated and defined prior to the incident. Specifically, compatibility of the crucible coating material with the alloys involved in the incident was not fully evaluated. The STA made several recommendations; most notably, that the roles and responsibilities for the evaluation and authorization of new casting types should be defined.

Building 9202 (Technology Development): On Monday morning, facility personnel noted a spill of uranyl nitrate solution (depleted uranium and nitric acid) in a room on the second floor of the building. Upon further investigation, facility personnel discovered that the spill had initiated in a third floor laboratory and leaked down through a floor opening. The leak occurred over the weekend when a motorized process stirrer malfunctioned causing the shaft and impeller to oscillate excessively, and splashing 2 gallons of solution out of the 33-gallon drum. The drum was resting on a catch pan inside a closed walk-in hood but the pan did not extend to the walls of the hood. The splashed solution dripped down the walls of the hood, seeped through an opening at the base of the hood, and leaked down to the second floor. The solution was prepared about a month ago and needed to be continuously stirred to prevent crystal growth. The CNS Y-12 Technology Development managers are developing a cleanup plan that includes neutralizing the leaked solution to prevent hazards associated with strong acidic waste.

Highly Enriched Uranium Materials Facility (HEUMF): Last August, the CNS Y-12 Site Manager assembled a team to investigate the accident in which a worker's leg was broken by a falling drum (see 8/29/14 report). The team recently released its report. Of note, the team concluded that one of the most probable causes of the accident was that the procedure revision process allowed the governing procedure to be revised to give the workers the option to move the drums manually. Further, the safety disciplines who observed operations subsequently failed to identify and remedy this at-risk work behavior. The report also documents the team's judgments of need, such as a recommendation to conduct a hazard assessment for container loading and transportation operations to ensure appropriate engineering and administrative controls are in place to protect the workforce. The Manager for Special Nuclear Material Operations assembled multi-discipline teams to perform detailed evaluations of similar drum movements and identify requirements to resume operations. The Y-12 Site Manager has approved resumption of suspended drum movement operations in most of the affected facilities.

Fire Protection: In February 2010, NNSA granted an exemption to 10CFR830, Subpart B, requirements for Buildings 9201-5N and 9201-5W. Per the terms of the exemption, the buildings' fire suppression systems were to be maintained to NFPA Codes and Standards. NPO recently questioned how the terms were being tracked. While researching the request, CNS discovered that the annual test of two backflow preventers had not been done. NPO directed CNS to provide within 30 days a corrective action plan, to include an extent-of-condition review.