

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

July 3, 2020

**TO:** Christopher J. Roscetti, Technical Director  
**FROM:** Matthew Duncan and Brandon Weathers, Resident Inspectors  
**SUBJECT:** Oak Ridge Activity Report for Week Ending July 3, 2020

**DNFSB Staff Activity:** DNFSB staff had a teleconference with CNS and NPO personnel to discuss additional questions for a review of out-of-service systems and components in Building 9212 (see 10/25/19, 1/31/20, and 6/12/20 reports).

**Fire Protection:** On June 18, CNS completed the final 50 year safety-significant sprinkler head replacement project. Over approximately eight years, Y-12 personnel worked towards replacing all safety-significant sprinkler heads in 20 wet pipe systems. The replacements brought these systems into compliance with the National Fire Protection Association (NFPA) standard for inspection, testing, and maintenance of water-based fire protection systems (NFPA 25). The project teams replaced over 9,850 sprinkler heads.

**Building 9212:** CNS successfully completed an oxide conversion facility hydrofluorination bed (HFB) run, producing UF<sub>4</sub> for the first time since resuming operations after the COVID-19 pause. Several days after the HFB run, a hydrogen fluoride detector in the vaporizer enclosure alarmed during off-shift hours. The next morning, operators discovered the alarm and put the dock scrubber system into operation. CNS believes that only residual hydrogen fluoride remains in the vaporizer since operators drained the remaining heel from the vaporizer and purged the lines with nitrogen. Operators found green crystals on the outer surface of a valve that indicated a pinhole leak. CNS is developing a maintenance plan to address the issue.

**Development:** Last week, CNS held a fact finding meeting for an event where depleted uranium chips sparked and burned when operators unloaded the prototype direct chip melt furnace. The operators quickly put coke on the sparking chips, closed the hood sash, and moved away from the hood. Radiological control personnel did not detect any radiological contamination on the operators. During the preliminary investigation of the event, development personnel found that a portion of the chips did not melt during the furnace run. They noted that the unmelted chips were larger, coarser, and a different color than typically found in prior furnace runs and suspected that a hydride formed on the chips. They also found a can that surrounds the chip melt assembly had fractured into multiple pieces. As a result, the upper crucible stack was tilted to the front of the furnace. CNS plans to evaluate the incomplete chip melting and the can failure.

For several years, the development organization has been optimizing the process for recovering uranium from depleted uranium machining chips using the prototype direct chip melt furnace. CNS plans to install a production version of this furnace in Building 9215 that will recover enriched uranium as part of the strategy for ceasing enriched uranium programmatic operations in Building 9212. Radiological protection concerns and other issues resulted in project delays and NNSA's decision to develop a new furnace design that uses a glovebox (see 5/17/19 report). NNSA still plans to install one direct chip melt furnace based on the original design that is similar to the prototype furnace used by the Y-12 development organization.