

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 19, 2019

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending April 19, 2019

DNFSB Staff Activity: J. Abrefah, F. Bamdad, D. Shrestha, and S. Thangavelu were on site to conduct a review of hazards associated with materials in the Highly Enriched Uranium Materials Facility (HEUMF) and Building 9720-5. While on site, the staff review team and resident inspectors performed walkdowns of HEUMF and Building 9720-5.

Building 9212: On April 17, CNS reported a 3C-4 Occurrence related to the uranium-235 accumulation that was found in the Evaporator / Stripper and Vapor Body components of the ultrasonic chip cleaning system (see 4/12/19 report). The resident inspectors had noted similarities between this recent discovery and a previous 3C-4 Occurrence Report for uranium accumulation in other ultrasonic chip cleaning system equipment (see 6/4/18 report).

Calciner Project: The planned submittal date for Critical Decision-2/3, *Approve Performance Baseline and Start of Execution*, has been delayed for the rotary calciner that is being developed for use in Building 9212. This calciner is part of the Building 9212 exit strategy as many of the enriched uranium processing capabilities are transitioned to the Uranium Processing Facility. The calciner will process low-enrichment uranium feed solutions into a powder that is intended to be stable for storage and transportation. Process gases and vapors exit the calciner through an off-gas system that condenses and stores condensable vapors and discharges noncondensable gases. Performance issues were identified with a filter in the off-gas system that has necessitated developing a new strategy for filtering entrained particles from the process gases to meet nuclear criticality safety requirements.

Building 9212: CNS continues working to determine a recovery path for the leak of anhydrous hydrogen fluoride that occurred inside the cylinder enclosure (see 4/5/19 and 4/12/19 reports). When the event occurred on April 4, hydrogen fluoride had been transferred from the cylinder to the vaporizer. Hydrogen fluoride is currently in both the cylinder and the vaporizer. The cylinder and vaporizer each have separate enclosures surrounding them that serve as secondary confinement. In addition to the leak identified on a tubing line for a calibration valve in the cylinder enclosure, there were indications on April 10 that rupture discs within the vaporizer enclosure ruptured. This creates the potential for a leak within the vaporizer secondary confinement (vaporizer enclosure). On April 11, CNS entered the new information process since the safety basis for Building 9212 credits the secondary confinement (cylinder and vaporizer enclosures) in conjunction with operation of the scrubber (which removes hydrogen fluoride vapor from the enclosure exhaust). The scrubber had been turned off after the hydrogen fluoride alarms in the enclosure stopped and detectable levels reached a low threshold following the April 4 event. Dual pressure relief valves are downstream of the rupture discs to protect the vaporizer from over-pressurization. The rupture discs are meant to isolate the pressure relief valves from hydrogen fluoride during normal operations. CNS is preparing a justification for continued operations to submit for NPO's approval that will discuss the proposed actions to address the hydrogen fluoride that remains in the system.