

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 30, 2019

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending August 30, 2019

DNFSB Staff Activity: R. Eul, R. Jackson, J. Parham, and D. Owen were at Y-12 to perform a review of construction quality assurance at the Uranium Processing Facility. N. George was at ORNL to attend a DOE meeting for revising DOE Standard 5506, *Preparation of Safety Basis Documents for Transuranic Waste Facilities*. In March 2018, the Board transmitted Technical Report 43, *Deficiencies in DOE Standard 5506-2007* for DOE's information and use. Staff review teams conducted teleconferences on the implementation of Technical Safety Requirements with NPO and CNS personnel and on the Oak Ridge Oxide Processing campaign with DOE Oak Ridge Office of Environmental Management and Isotek Systems, LLC personnel.

Building 9212: The causal analysis for the nuclear criticality safety deficiency of the hydraulic fluid leak in the casting furnace enclosure determined that there had been no preventive maintenance schedule for the hydraulic system and repairs were only made on an as-needed basis (see 8/9/19 report). Preventive maintenance for the hydraulic cylinders would involve replacing small O-rings, which is extremely difficult to perform within the casting furnace enclosure. CNS is performing an engineering evaluation to determine whether the hydraulic cylinders should be replaced. The cost associated with performing a complete overhaul of the hydraulic system is considered prohibitive by CNS and NPO in part because the Building 9212 enriched uranium casting furnaces will be shut down with the startup of the Uranium Processing Facility. The Uranium Processing Facility is scheduled to start operation in 2025.

Development: Last month, an event occurred during operation of the uranium alloy atomizer equipment in a development facility (Building 9202). The operation involves melting depleted uranium alloy and spraying the melted metal with an argon gas stream to atomize it. During the metal pouring portion of the operation, an abnormal pressure increase occurred in the equipment. This pressure increase caused a rupture disc to break. This disc breakage is interlocked to the high pressure argon gas supply and automatically shut off the flow of argon after the pour had initiated. Without the gas flow, molten metal hit a stainless steel sheet and melted a hole in this sheet that allowed some metal to leak onto the floor.

Personnel conducting the operation saw sparks as a result of this breach in the equipment and immediately exited the area, turning off the furnace supply power on the way out. The personnel did not alarm the personnel contamination monitors when exiting the foundry area. None of the personnel were injured and radiological control evaluations of nasal swabs and personal air monitor results were not elevated. The fire department responded to the scene and found that the temperatures were trending down and did not locate any hot spots. The area has since been surveyed, decontaminated and down-posted by radiological control personnel. At the fact finding, actions were developed to review the atomizer design to add a liner material to the section of the equipment where the breach occurred; investigate the argon pressure and flow data to determine the cause of the pressure increase; and review the hazard analysis for improvements.