DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 7, 2025

TO: Technical Director
FROM: Oak Ridge Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending February 7, 2025

DNFSB Staff Activity: S. Thangavelu and B. Sharpless are onsite covering the electrorefining readiness assessment. A resident inspector (RI) and staff members attended the kickoff meeting, engineering walkdowns, interviews, pre-job briefings, and demonstrations throughout the week. Members of the Board's staff also attended the separate contractor and federal end of day meetings, during which identified issues and comments on the process were discussed. The readiness assessment is scheduled to be performed through the end of next week.

Criticality Safety: A resident inspector attended the event investigation for material holdup concerns in the machine coolant system located in Building 9215. In early December, nuclear criticality safety (NCS) and non-destructive assay (NDA) engineers started discussing concerns related to the most recent enriched uranium inventory report and the potential amount of material holdup located in the machine coolant system return troughs. The report documents conditions in which NDA scans of the troughs would no longer indicate an accurate or usable value. Due to these concerns, CNS entered the potential NCS issue process in early January. NDA data indicated potentially more material existed in the machine coolant system than the criticality safety evaluation (CSE) analyzed. NCS issued a field report in late January to establish administrative control over the machine coolant system at that time to prevent further use of the system. NCS revised the field report a few days later to allow inspection, sampling, and photography of the troughs in the machine coolant system. CNS filed an occurrence report due to a deficiency in the criticality safety analysis, such that adequate controls were not in place for a credible criticality accident scenario. This was based on the sampling data and photographs that were taken per the revised field report.

CNS developed preliminary corrective actions during the investigation process to address material holdup in the machine coolant system. These actions included the creation of two document change notices to the machine coolant system CSE to establish cleanout criteria and authorization to perform that cleanout for the troughs. CNS created a final action that required the new CSE requirements to be met and the cleanout to be completed before restoration of the system would be authorized. During the event investigation, the RI asked if CNS planned on addressing the source of the material causing the holdup, which appeared in the photographs as a black sludge, and was told the extent of the cleanout would be focused on the troughs. The black sludge had previously appeared during the legacy machine and coolant system piping removal back in May 2023 (see 5/5/2023 report). Discussions with a CNS subject matter expert revealed that this sludge was introduced from a legacy process to reduce the potential for a nuclear criticality in the system but now just sits dormant in the supply piping until a surge in the system occurs. Such surges have happened when new machines have been added and when piping has been removed. The CSE revision proposal, if implemented correctly, should remove future risk of excessive holdup in the troughs, but does not address the movement of sludge through other parts of the system.