

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

July 24, 2017

TO: Steven Stokes, Technical Director
FROM: Jennifer Meszaros and Rory Rauch, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending July 21, 2017

R. Oberreuter was at Y-12 to augment resident inspector coverage. B. Caleca and R. Jackson were at Y-12 to observe Uranium Processing Facility (UPF) construction activities. J. Abrefah and S. Thangavelu were at Y-12 to conduct a review of the UPF Calciner and airborne release fraction/respirable fraction (ARF/RF) testing results.

Criticality Accident Alarm System (CAAS): In March 2016, CNS entered the potential inadequacy of the safety analysis (PISA) process for new information relating to CAAS detectors. In-service CAAS detectors are routinely tested and calibrated to ensure they will alarm when exposed to the minimum radiation expected as a result of a criticality, as required by ANSI/ANS-8.3, *Criticality Accident Alarm System*. Additionally, CAAS detectors utilized at Y-12 have previously undergone reactor pulse testing, during which they are exposed to intense and short-duration neutron and gamma radiation fields, to satisfy an ANSI/ANS-8.3 requirement that mandates detectors also alarm when exposed to an expected maximum radiation dose. CNS used the new information PISA process to document a concern that certain CAAS detectors currently available for use at Y-12 have not been fully subjected to reactor pulse testing because they were either procured in 2005 after the last documented test or because they have had key components (e.g., photomultiplier tubes and voltage cards) replaced.

This week, in order to partially address the issue identified in 2016, six Y-12 detectors were subjected to reactor pulse testing at the Godiva IV fast metal burst reactor located at the Nevada National Security Site's National Criticality Experiments Research Center. The detectors that were tested represented several configurations of old and new components and were subjected to various radiation doses over the course of three days in order to mimic pulse testing that was last performed on Y-12 CAAS detectors in 1989. During these tests, all detectors functioned properly. CNS is currently planning early next year to subject additional detectors, including those procured in 2005, to pulse testing in order to fully evaluate the new information identified in 2016.

Building 9995: The Plant Shift Superintendent recently declared emergency work for an activity to remove the top portion of a Building 9995 stack, per the site work control manual. The stack is a part of the exhaust ventilation system that supports facility uranium analysis operations and consists of three sections that are joined via bolted/flanged connections. Approximately one year ago, maintenance personnel identified a crack in the top portion of the stack. A CNS structural engineer evaluated the degradation and concluded at that time that it was not so significant that action was immediately necessary. As such, facility personnel did not repair the stack. Since the initial evaluation, facility personnel have informally monitored the crack via visual inspection during other maintenance activities. Last month, a facility maintenance supervisor noted that the crack had grown significantly. Last week, a structural engineer was able to inspect the degradation again and noted that the crack had propagated around a welded seam and covered approximately two-thirds of the stack's circumference. The engineer concluded that the affected portion of the stack was in imminent danger of collapse and recommended that the top section be removed at the flange connection immediately. The emergency work was performed safely, and this week facility personnel conducted a test of the system and ensured sufficient airflow velocities could be achieved in affected hoods without the removed portion of the stack. The stack was subsequently returned to service.