

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 5, 2018

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan, Resident Inspector
SUBJECT: Oak Ridge Activity Report for Week Ending October 5, 2018

Building 9206: Building 9206 was constructed in 1944. It is a hazard category 2 nuclear facility due to the current inventory of radioactive materials. Most production operations stopped in 1994. Since then, stabilization, deactivation, and de-inventory activities have been ongoing in preparation for eventual demolition. Much of the processing equipment and enclosures has been abandoned in place since 1994 or 1995. Enriched uranium hold-up in various forms, including solutions, continues to require processing in order to complete stabilization, deactivation, and ultimately, demolition. Notably, all of the enriched uranium in combustible liquid solutions has been removed from the building, though the Documented Safety Analysis conservatively assumes some may be present.

Examples of ongoing activities range from pouring the contents of safe bottles into waste containers and preparations to remediate gloveboxes full of contaminated process equipment. In Fiscal Year 2017, CNS drained the final tank of the primary evaporator feed system, shipped three boxes of piping off-site, and transferred several cans generated from cleanout activities to Building 9212 for processing. In 2017, CNS estimated it would require approximately \$103 million to finish the work required to transfer the facility to the control of DOE Environmental Management by the end of Fiscal Year 2025.

In the meantime, CNS and NPO would like to downgrade the facility to hazard category 3 or below when justifiable. This would require removal of additional radioactive material and a determination that a nuclear criticality accident is not possible. The end state objective for nuclear criticality safety is to achieve a quantity, form, and distribution of fissile material such that criticality is precluded through segmentation or nature of process during the post-deactivation surveillance and maintenance phase and decommissioning phase. Several proposals to achieve this end state have been considered. The most conservative option would include cleanout of each system to the point that nothing could be mobilized through water ingress. The second would clean and isolate each system such that no more than 700 grams of uranium-235 (including uncertainty) would be present. Any remaining material would be immobilized with a fixative. The third option would clean each system to the same level without immobilization, but more robustly isolate each system with hardware such as welded caps or bolted flanges.

The resident inspector accompanied CNS criticality safety personnel on their quarterly walk-down of Building 9206. There have been two recent events where facility personnel conservatively followed the procedure for an abnormal condition involving fissile material. An example of such an event was when a container with an unknown yellow solution was discovered during legacy material cleanout activities. After establishing administrative control of the area, the shift manager contacted all of the appropriate people and organizations. A criticality safety engineer determined the container was geometrically safe and had the container moved to a temporary staging area. Nondestructive assay later determined the container was filled with a solution containing depleted uranium.