

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 11, 2023

TO: Timothy J. Dwyer, Acting Technical Director
FROM: Clinton Jones and Frank Harshman, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending August 11, 2023

Building 9212: CNS resumed operations for pressing uranium chips into briquettes following a pause of chip processing activities (see 2/24/23 report). On the second day, a briquette underwent an exothermic reaction inside a metal container. Workers had completed pressing a batch of briquettes inside an inert glovebox, placed them in an argon-filled metal can, and then moved the can to a ventilation hood for weighing. After weighing the briquettes, workers opened the lid of the can to “top off” the container with argon prior to moving it to a transfer cart. When a worker opened the can, the briquette was glowing and smoldering. The worker immediately replaced the lid. Shortly after replacing the lid, a loud pop was heard, the lid was displaced off the can, and a blue and orange flame was observed. Another worker poured coke on the briquette, which appeared to extinguish the reaction, and 911 was called. The resident inspectors noted during the event investigation that this event occurred in the same location, with the same type of enriched uranium material, and at a similar place in the operating procedure as the February event. CNS changed their operating procedure after the February event to weigh the briquettes in a metal can instead of a shallow metal pan. This procedural change enabled the carbon nanospheres (coke) to accumulate on the briquettes instead of falling off and allowing the reaction to continue. CNS fire protection engineering reviewed the incident and determined that it did not meet the CNS definition of a fire. Based on questions raised by the resident inspectors about visible flames being present, CNS has committed to re-evaluate that determination.

Criticality Safety: The resident inspectors attended the weekly NPO nuclear criticality safety (NCS) walkdown in Building 9995. The NPO NCS Program Manager questioned the spacing of a cart in proximity to one of the process hoods. The nuclear criticality safety engineer (NCSE) reviewed the criticality safety evaluation and determined that it might have violated the general spacing requirements and advised a backoff per the abnormal operating procedure for an abnormal condition involving fissile material. A 15-foot boundary was established and the shift manager (SM) was notified. Prior to the SM announcement of an administrative boundary being established, four separate boundary violations occurred. This was due to improper establishment of boundaries. The resident inspector discussed the boundary violations with the NPO NCS Program Manager, who then discussed the backoff and proper control of boundaries with the supervisor. After the SM office made an announcement calling out the boundary around the hood in question, three lab workers exited a space next to the hood, transiting through the boundary area. The supervisor then taped off one side of the area and walked through the boundary to tape off the other side of the area. The SM arrived and gave permission for the NCSE, the criticality safety officer (CSO), the supervisor, and himself to enter the area and evaluate the issue. The SM removed the tape from one side of the boundary and assigned the CSO to enforce the boundary. Subsequently, two workers entered the boundary without approval. At this point the supervisor unprofessionally yelled for individuals in the area to get back. CNS performed an event investigation and critique on the ineffective control of a NCS administrative boundary. Follow-up actions include revising the criticality safety evaluation and creating a conduct of operations academics lesson for this event.