DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 9, 2017

TO: Steven Stokes, Technical Director
FROM: Jennifer Meszaros and Rory Rauch, Site Representatives
SUBJECT: Oak Ridge Activity Report for Week Ending January 6, 2017

Building 9212: CNS enriched uranium (EU) operations (EUO) personnel have recently encountered several unplanned oxidation events during operations in Building 9212 (see 12/16/16/report). Most of the events occurred while processing EU briquettes, but operators also observed evidence of a minor reaction while re-containerizing EU fuel plates. This week, the site representatives walked down the areas in Building 9212 where briquettes are formed, stored, and processed and confirmed that operator handling of briquettes outside of ventilated enclosures and non-inert environments is minimal. On December 22, 2016, CNS management held a critique to take a broader look at these events and consult with site subject matter experts (SMEs) regarding opportunities to improve the safe storage, handling, and processing of the subject EU materials.

Regarding the EU fuel plates, site SMEs noted that the large surface area to volume ratio of the plate geometry increases the potential to achieve hazardous reaction rates. EUO management plans to institute a process change that foregoes an intermediate re-containerization step and allows the plates to be transferred directly from their shipping container to a casting crucible. This change ensures that operators will only handle the plates in a ventilated enclosure. EUO management also plans to evaluate whether the hazards presented by the geometry of these plates were properly considered in the activity-level hazard evaluation for the previous re-containerization activity.

Regarding EU briquettes, the critique attendees noted that EUO personnel had discontinued the practice of using argon to inert the atmosphere in briquette storage containers. At the time of the critique, EUO management and engineering support personnel were not able to identify precisely when the practice was discontinued nor could they reconstitute the basis for the decision. EUO management plans to revisit this decision. Site SMEs also noted that briquettes are more likely to form less stable compounds when left in storage for extended periods of time (i.e., months to years). The SMEs indicated that improperly cleaned briquette feedstock can further contribute to the formation of these compounds. To address these comments, EUO management plans to form a team to reevaluate the current approach to cleaning briquette feedstock and evaluate opportunities to increase the rate at which briquettes are processed. These efforts should also benefit material-at-risk reduction initiatives, which had already resulted in an increase in briquette processing rates (see 7/15/16 report).

Building 9204-2E: This week, a Building 9204-2E criticality accident alarm system (CAAS) detector failed to activate when exposed to a source during a quarterly surveillance credited in the facility technical safety requirements (TSR). As a result of the failed surveillance, the shift manager declared the station inoperable and entered the appropriate limiting condition of operation (LCO). CNS personnel successfully replaced the detector on the same day and the shift manager subsequently exited the LCO. Next week, CNS system engineers plan to troubleshoot the failed detector.

Recently, a CAAS detector at Building 9212 also failed to activate during a similar quarterly TSR surveillance (see 8/5/16 report). CNS system engineers evaluated this and other recent CAAS detector failures with support from the manufacturer, but have yet to identify the cause of the detector failure (see 11/11/16 report). This detector remains with the manufacturer for further evaluation.