

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 2, 2018

TO: Steven A. Stokes, Technical Director
FROM: B. Broderick and R. Jackson, Acting Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending March 30, 2018

Building 9212/Nuclear Criticality Safety: This week, as part of an on-going extent of condition (EOC) review stemming from a prior criticality safety issue (see 6/2/17, 7/14/17, and 11/9/17 reports), CNS personnel discovered significant accumulations of enriched uranium holdup in several locations in the Building 9212 casting line. The most notable discovery involved oxide accumulation in the large geometry lower vessel heads of two separate casting furnaces. The accumulated uranium was not mixed with appreciable moderator material in the furnace vessel bottoms, but moderator could have been introduced by an independent failure of water cooling lines associated with the furnaces. The criticality safety evaluation governing casting operations did not analyze the potential for significant quantities of uranium to be present in these unfavorable geometry areas. Facility operators safely removed the accumulated material and CNS management suspended casting furnace operations pending evaluation of the problem and development of controls to prevent recurrence.

The EOC review that resulted in this week's discovery was prompted by the June 2017 identification of significant uranium holdup in the sand separator portion of the Building 9212 reduction process line. Prior activities associated with the same EOC review also led to the December 2017 discovery of significant accumulations of uranium holdup in other areas of the Building 9212 casting line (see 12/15/17 report). Based on this week's events, CNS senior managers are evaluating potential changes to strengthen and accelerate the existing EOC plan.

Uranium Processing Facility (UPF): On March 23, 2018, the Chief Executive for Project Management approved critical decision (CD) – 2/3, *Performance Baseline and Site Construction*, for the UPF's Main Processing Building (MPB) and the Salvage and Accountability Building (SAB) subprojects. This milestone allows both hazard category 2 nuclear facilities to start construction, which is scheduled for CD-4, *Project Completion*, by December 2025. The approved MPB scope also includes the Highly Enriched Uranium Materials Facility Connector, the Perimeter Intrusion Detection Assessment System, and the MPB yard tie-ins to existing facility utilities. The SAB scope will include the fire tank pump house, standby diesel generators, and the personnel support facility (which physically connects the SAB and MPB). The CD approval for both subprojects was given based on two conditions of approval: 1) The construction contractor must attain an Earned Value Management System certification as required by DOE Order 413.3B by June 2018, and 2) complete all corrective actions associated with the final External Independent Review (EIR) corrective action plan.

UPF Chemical Recovery Calciner: After completing prototype testing, the project received Technology Readiness Level (TRL) 7 for the UPF chemical recovery calciner design in June 2017. In order to make the calciner production more robust in terms of volumetric throughput, UPF Engineering recommended that the length of the heated zone be increased to 44 inches as opposed to the 22 inch prototype calciner. Prior to implementing the design change for fabrication, the UPF Project Office was required to resubmit the design changes to the Technology Readiness Assessment (TRA) team to confirm that TRL 7 will be maintained. The TRA team determined that the increased heater zone length constitutes a design "improvement" rather than a functional change and still demonstrates the operating parameters required by TRL 7. This allows the project to proceed with verification testing of the production calciner prior to deployment.