

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 4, 2022

TO: Christopher J. Roscetti, Technical Director
FROM: Daniel B. Bullen, Ph.D., P.E., Cognizant Engineer
SUBJECT: Sandia National Laboratories (SNL) Report for October 2022

Annular Core Research Reactor Facility (ACRRF) Dropped Fuel Element: On October 19, 2022, ACRRF staff conducted routine fuel element inspections. As the fuel handler removed the fuel element from the core grid, the element dislodged from the handling tool and dropped a few inches to the top of the ACRR core. The bottom of the fuel element came to rest on the core grid, while the top leaned over to the Neutron Radiography Tube (NRT). ACRRF staff members observed that the fuel element was stable, upright, and leaning on the NRT at a 45-degree angle with no indications of damage to the fuel element, core grid plate, or NRT. The facility manager paused operations and immediately conducted a hotwash. Technical Area V (TA-V) management and staff conducted a fact-finding on October 24, and the causal analysis team began their investigation on October 27. During their evaluation of the event, TA-V staff members employed the Learning Team approach recommended in the corrective actions for previous lifting events at the ACRRF (see SNL Monthly Reports for March 2022, April 2022, and June 2022). As part of the work planning and control effort for the recovery of the fuel element, TA-V staff constructed a mockup of the fuel element configuration in the Gamma Irradiation Facility (GIF) pool to allow fuel handlers to practice recovering the fuel element. During ten fuel element recovery “dry runs” in the GIF pool, the fuel handlers successfully recovered the fuel element each time. On October 31, ACRRF fuel handlers recovered the dropped fuel element, completed the inspection of the element (identifying no changes from the previous inspection), and returned the reactor to a standard configuration.

Close-Out of the Dropped Handrail Event at the ACRRF: On March 15, 2022, ACRRF staff members dropped a section of handrail into the Fuel-Ringed External Cavity, Version II (FREC-II) central cavity during preparation for a critical lift (see SNL Monthly Reports for March 2022 and June 2022). On September 29, 2022, the SNL Deputy Laboratories Director and the SNL Associate Laboratories Director provided an update to the Sandia Field Office (SFO) Manager summarizing the SNL responses to this event. The update cited implementation of immediate improvements outlined in the SNL letter of May 24, 2022, including the review and removal of unneeded items from the ACRR pool and tank lip, weekly and monthly reviews of conduct of operations, and progress on corrective actions and maintenance items around the facility. In addition, the update cited recent accomplishments addressing the human performance improvement methodology at ACRR, in TA-V, and in Sandia’s Environmental Safety and Health (ES&H) organizations. The update concluded that the March event led to human performance improvements that will reduce recurrences and produce a broad cultural shift in which ACRR and TA-V staff engage across SNL to advance organizational learning throughout the corporation. The Board’s cognizant engineer for SNL observed significant human performance improvements in the response to the dropped fuel element at ACRRF (cited above).

Corrective Action Effectiveness Review for ACRRF Hoisting and Rigging: On October 4–13, 2022, a National Technology and Engineering Solutions of Sandia, LLC, contractor team conducted an effectiveness review of the corrective actions for hoisting and rigging taken in response to the Blue Dragon *Causal Analysis Report of Annular Core Research Reactor (ACRR)*, October 16, 2021. The effectiveness review team concluded that all root causes are resolved and that the corrective actions can sustain the intended outcome, which is to prevent recurrence of hoisting and rigging incidents at the ACRRF.