DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 2, 2018

TO: Christopher J. Roscetti, Technical Director
FROM: Daniel B. Bullen, Ph.D., P.E., Cognizant Engineer
SUBJECT: Sandia National Laboratories (SNL) Report for October 2018

Defense Nuclear Facilities Safety Board (Board) Staff Activity: The Board's staff provided three person-weeks of on-site safety oversight at SNL during October 2018. On October 15–19, 2018, D.J. Brown, K.L. Deutsch, and D.B. Bullen were on site to review quality assurance (QA), software quality assurance (SQA), and instrumentation and control (I&C) aspects of the Annular Core Research Reactor (ACRR) Reactivity Control System Upgrade (RCSU).

Discovery of a Violation of Criticality Safety Control at the Auxiliary Hot Cell Facility (AHCF): On October 4, 2018, the AHCF facility supervisor and a nuclear criticality safety engineer discovered a violation of a criticality safety control that occurred on November 5, 2015. The violation involved opening a container stored in a Criticality Safety Index (CSI) array in the mid-bay of Building 6597. In preparation for an upcoming waste packaging campaign, the facility supervisor requested assistance from a nuclear criticality safety engineer with planning where to open a container stored in a CSI array in order to remove the two 55-gallon drums stored within the container. The container was moved from the processing area in the high-bay into the CSI array in the mid-bay on November 5, 2015, at which time the container was opened in the CSI array so that additional shielding could be added for ALARA purposes. Opening the container was a violation of a criticality safety control that states packages shall not be opened in a CSI array. The material was in a safe configuration when the additional shielding was added and the lid placed back on the container in November 2015, therefore no immediate actions were necessary upon discovery of the event in October 2018. Appropriate notifications were made. SNL completed a causal analysis of this event.

ACRR Manual SCRAM: On Monday, October 15, 2018, while performing a steady state operation with the reactor power at 0.05%, the ACRR reactor operator noted an unexpected response on the Log Master Rod Timer display and notified the reactor supervisor. The reactor supervisor directed the reactor operator to terminate the operation by an auto run down command (which inserts all rod drives at their programmed fast speeds). While monitoring the Rod Drive display, the reactor operator observed "step-like" insertion behavior for the rod drive indications and alerted the reactor supervisor that he was going to perform a manual SCRAM via the Plant Protection System (PPS). The PPS manual SCRAM performed as designed. The reactor operator confirmed normal reactor shut down conditions were achieved. The reactor supervisor ensured all response procedures were properly followed and promptly notified SNL and Sandia Field Office (SFO) managers. No further reactor operations were conducted. SNL is completing a causal analysis of this event.

Board's Staff Review of the ACRR RCSU: On October 15–19, 2018, a Board's staff team traveled to SNL to review and evaluate QA, SQA, and I&C aspects of the ACRR RCSU project. The Board's staff team noted potential formality and rigor issues with the QA plan and commercial grade dedication processes and observed opportunities for improvement in QA at the SNL corporate, SFO management, and Technical Area-V management levels. The Board's staff team also reviewed the portions of the I&C hardware and software that provide shutdown margin, safety interlocks, display feedback, and control safety functions.