

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 5, 2024

TO: Timothy J. Dwyer, Technical Director
FROM: Daniel B. Bullen, Ph.D., P.E., Cognizant Engineer
SUBJECT: Sandia National Laboratories (SNL) Report for March 2024

Defense Nuclear Facilities Safety Board (Board) Staff Interactions: On March 4–7, 2024, two members of the Board’s staff and the Board’s cognizant engineer for SNL were on site to complete routine nuclear safety oversight and observe portions of a review of the SNL emergency management program conducted by the Department of Energy Office of Enterprise Assessments, Office of Emergency Management Assessments (EA-33). Staff team members walked down Technical Area V (TA-V) including the Annular Core Research Reactor Facility (ACRRF), Auxiliary Hot Cell Facility (AHCF), Sandia Pulsed Reactor/Critical Experiment (SPR/CX) Facility, and the Gamma Irradiation Facility (GIF). The staff team also met with National Technology and Engineering Solutions of Sandia, LLC (NTESS) and National Nuclear Security Administration (NNSA) Sandia Field Office (SFO) managers and staff.

Third Quarter Fiscal Year 2024 (FY 2024) Startup Notification Report (SNR): On March 14, 2024, NTESS submitted the third quarter FY 2024 SNR to SFO noting that there are no readiness assessment activities scheduled for the next 12 months. However, NTESS submitted the SNR early due to scheduling of mission-critical activities. NTESS noted that an activity, *Demonstrate Proficiency for Experiments with HC-3 [Hazard Category-3] Quantities of Fissionable Material, Rev. 0*, is scheduled to be performed in April 2024. NTESS noted that this activity supports additional Lawrence Livermore National Laboratory (LLNL) mission-critical activities scheduled for August 2024. SFO reviewed the readiness level determination for this activity and agreed with the justification for performing a mock experiment at the ACRRF with no fissionable material in April 2024 to maintain proficiency for the LLNL activities scheduled for August 2024. SFO requested to be informed when the mock experiment is being performed at the ACRRF, so that federal oversight can be considered. On March 27, 2024, SFO approved the SNR for the third quarter of FY 2024.

Combined Radiation Environment for Survivability Testing (CREST) Facility Update: On March 28, 2024, NTESS presented a general overview and status update on the CREST project to SFO staff members and management. Two members of the Board’s staff attended the presentation remotely. CREST is one of SNL’s priority line-item projects, the purpose of which is to recapitalize the ACRRF and retain the present capability into the future. CREST will combine the ACRR radiation environments with an independent accelerator-driven gamma radiation source to provide additional capability to assess combined radiation environments. NTESS expects a draft of the 100-percent nuclear facility conceptual design to be delivered by May 9, 2024. In addition, NTESS anticipates the 90-percent reactor conceptual design to be completed by May 10, 2024. NTESS noted that the FY 2025 funding outlook may allow placement of the accelerator and office/light lab conceptual design contracts in April 2024 and May 2024, respectively. The reactor conceptual design currently includes the Annular Core Research Reactor II, the Multi-Use Neutron Science and Technology Reactor, and two subcritical assemblies (the Fuel-Ringed External Cavity for Large Experiments and the Reactor-Accelerator-Shock Cavity for Large Experiments). NTESS is evaluating the use of existing ACRR fuel as well as acquiring new UO₂-BeO fuel for ACRR-II. The CREST accelerator design consists of a commercially purchased, compact, Marx-driven induction voltage adder (IVA) machine rated at 13 million electron-volts (MeV). NTESS is working with NNSA to complete Critical Decision 1 (CD-1) approval as early as FY 2025 so that Preliminary/Final Design can begin in FY 2026.