DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 3, 2024

TO: Todd Davis, Acting Technical Director
FROM: Daniel B. Bullen, Ph.D., P.E., Cognizant Engineer
SUBJECT: Sandia National Laboratories (SNL) Report for December 2024

Department of Energy (DOE) Office of Enforcement: On December 12, 2024, the DOE Office of Enforcement informed the Sandia Field Office (SFO) of their decision to investigate the facts and circumstances associated with unplanned worker doses from radiation that was emitted during experimental tritium shots at the Z Machine, which is located in Building 983 at SNL. National Technology and Engineering Solutions of Sandia, LLC (NTESS) conducted a total of three tritium experiments in Building 983 on April 24, April 30, and June 5, 2024, in accordance with approved work plans. For all experiments, Z Machine staff established an approved extended neutron exclusion boundary in accordance with local procedures. After the June 5, 2024, experiment, work area dosimetry identified a potential exposure event outside the approved neutron exclusion boundary. NTESS collected, read, and processed all work area dosimeters used to monitor doses at the extended neutron boundary and occupied areas. NTESS dosimetry program personnel estimated doses using all available neutron codes. The NTESS analysis, conducted with the majority of the neutron codes for all 20 locations outside the neutron exclusion boundary, indicated a potential exposure greater than the allowable limit. The DOE Office of Enforcement noted that while investigating the unplanned worker doses at the Z Machine will be the general purpose of this investigation, additional issues relating to the scope, nature, and extent of compliance by NTESS with DOE's nuclear safety requirements specified in 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*, may be pursued as issues arise during the investigation. The investigation will include an onsite visit and interviews with NTESS personnel.

Second Quarter Fiscal Year (FY) 2025 Startup Notification Report (SNR): On December 16, 2024, NTESS submitted the second quarter FY 2025 SNR in accordance with SNL procedure GN470109, *Implementing the Startup and Restart Process for Nuclear Facilities, Activities, and Operations*. NTESS noted that during this quarter, there were no activities evaluated by the readiness level determination team for entry conditions into the readiness review process. Additionally, there are no potential activities identified for readiness review within the next twelve months.

SNL Technical Area V (TA-V) Quality Assurance (QA) Audit: In 2021, the TA-V Senior Manager declared the 2017 version of the American Society of Mechanical Engineers Nuclear Quality Assurance Standard (NQA-1), *Quality Assurance Requirements for Nuclear Facility Applications*, as the TA-V quality assurance program standard. NTESS updated the TA-V Management System to identify NQA-1 as the selected standard and to indicate how TA-V conducts work in accordance with NQA-1. (See SNL Monthly Report for December 2021). As part of the implementation of NQA-1 at TA-V, NTESS conducts internal and external reviews and audits of the TA-V QA program. The Board's cognizant engineer for SNL recently received the report for the most recent external QA audit of TA-V completed in August 2024. The report noted that the scope of the audit was limited to evaluating the adequacy and implementation effectiveness of the TA-V Management System and related programs and procedures for conformance and implementation of NQA-1, Subparts 2.7 and 2.14, for TA-V nuclear safety-related activities. The audit identified five Findings, one Observation, and three Noteworthy Practices. The Findings noted ineffective implementation of NQA-1 requirements and limited objective evidence of implementation for some QA elements due to limited safety related work at TA-V. NTESS is completing corrective actions to address the Findings.