

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 4, 2025

TO: Technical Director
FROM: Nevada National Security Site (NNSS) Cognizant Engineer
SUBJECT: NNSS Report for March 2025

DNFSB Staff Activity: During the week of March 3, the NNSS cognizant engineer met with Nevada Field Office (NFO) and Mission Support and Test Services, LLC (MSTS) personnel to discuss safety topics and perform walkdowns at NNSS facilities as part of routine oversight. On March 18, 2025, a DNFSB staff team discussed topics associated with the glovebox enhanced capabilities project. The following week, another DNFSB staff team attended a virtual integrated project team meeting to discuss upcoming readiness activities for the enhanced staging project.

Safety Basis Update for 6-Foot Vessel Experiments at Principal Underground Laboratory for Subcritical Experimentation (PULSE): As mentioned in the NNSS Monthly Report for April 2024, MSTS issued an operational restriction to prohibit 6-foot vessel experiments in the Cygnus zero room in response to a potential inadequacy in the safety analysis (PISA). MSTS concluded the current design parameters and safety systems, structures, and components in the zero room would not be able to withstand an over pressurization event from a 6-foot vessel breach using the existing zero room pressure evaluation. On March 4, 2025, NFO approved a change notice to the PULSE safety bases to address the PISA and issued a safety evaluation report in accordance with DOE Standard 1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents* requirements. In the change notice, MSTS updated the process operations and use of new equipment to support 6-foot vessel subcritical experiment (SCE) activities. Unlike 3-foot vessel experiments, operators will perform SCE placement, diagnostic feedthrough connections, and fragment/blast shielding operations while inside a 6-foot vessel. The change notice also revised several technical safety requirements (TSR), namely establishing new high explosive inventory limits for 6-foot and 3-foot vessel experiments based on a newly developed zero room pressure evaluation. The TSRs will also allow the use of repurposed 6-foot vessels, the use of the electric vessel transport system during limited concurrent activities, and the use of the post execution ventilation system to pass a pressure test and withstand a pressure differential up to a specified value. MSTS also added a new criticality safety function to verify the post-execution special nuclear material debris contained in the vessel is protected from ingress of water and grout during reentry activities, as well as a new accident scenario in the hazards analysis for drop-induced explosion during SCE placement in a 6-foot vessel.

Performance Degradation of Fire Suppression System at Device Assembly Facility (DAF): On March 10, 2025, MSTS performed a work package as part of an annual fire suppression surveillance in a DAF assembly room building. MSTS stopped work after identifying the smoke/heat detectors failed the smoke detection test and confirming the detector is a component of the safety significant boundary in the building as defined in the TSR. MSTS entered a limiting condition of operation and declared the fire suppression system inoperable in the building until the detector is replaced and the annual fire suppression system preventive maintenance and associated surveillances are complete.

Authorization to Execute a SCE Experiment in PULSE: On March 26, 2025, LLNL submitted a letter to NFO requesting authorization to execute a SCE in PULSE after completing experiments at LLNL and key safety document deliverables (e.g., device response methodology, criticality evaluation, and vessel containment evaluation) that meet NFO Order 450.X5, *Subcritical Experiment Program* requirements. LLNL plans to execute the experiment in May 2025.