

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 3, 2025

TO: R.T. Davis, Acting Technical Director
FROM: Sonia G. Thangavelu, Ph.D., Cognizant Engineer
SUBJECT: Nevada National Security Site (NNSS) Report for December 2024

DNFSB Staff Activity: The Board's staff did not conduct onsite activities in December.

Evaluation of the Safety of the Situation (ESS) of Comet Deimos Experiment at National Criticality Experiments Research Center: As mentioned in the NNSS monthly report for November 2024, Misson Support and Test Services, LLC (MSTS) submitted the ESS for Nevada Field Office (NFO) approval to address the positive unreviewed safety question determination for the Comet machine and Deimos experiment. In the ESS, MSTS implemented a compensatory measure to demonstrate by operation of a critical assembly machine that it is subcritical at a distance from full closure equal to the minimum sudden control rod activation by manual means (SCRAM) distance. MSTS requires this action for any changes made to core material types and quantities, interstitial moderators, or core geometries during an experiment. MSTS will update the safety basis to require a verification that the travel distances of the Comet and Planet hydraulic rams is sufficient to ensure the credited SCRAM safety system can perform its intended safety function for future experiments.

6-Foot Vessel Subcritical Experiment (SCE) Contractor Readiness Assessment (CRA) Plan of Action at Principal Underground Laboratory for Subcritical Experimentation (PULSE): As mentioned in the NNSS monthly report for October 2024, MSTS submitted the first quarter startup notification report to execute a 6-foot vessel SCE CRA as a new hazard category-2 activity at PULSE. On December 3, 2024, MSTS approved the CRA plan of action. The readiness assessment will demonstrate using new mechanical material handling equipment to move the SCE to the entombment location, emplacing the SCE on a basket assembly inside the vessel and personnel exiting the vessel, final configuration and button-up activities, and connecting the vessel to the PULSE ventilation system. MSTS and Los Alamos National Laboratory plan to perform the CRA in Spring 2025.

Glovebox Enhanced Capabilities (GBEC) Project at Device Assembly Facility (DAF): On November 6, 2024, MSTS transmitted the GBEC project safety design strategy and major modification evaluation checklist per DOE Standard 1189-2016, *Integration of Safety into the Design Process* requirements for NFO approval. The GBEC is a new major modification project that will allow new plutonium furnace, metallurgy, and metrology process operations at DAF in credited gloveboxes purchased by Lawrence Livermore National Laboratory (LLNL). The new processes will introduce new hazards (e.g., hydrogen deflagration, criticality, pyrophoric reactions) that will require significant changes to existing DAF safety systems, structures, and components; and new hazard controls (e.g., criticality accident alarm system, glovebox exhaust system) that are not currently analyzed in the DAF safety bases. MSTS will use the LLNL Plutonium Facility safety bases, hazard evaluation, and material at risk assumptions as a reference point to derive the GBEC safety control strategy.

Implementation Verification Review (IVR) of Coordinate Measuring Machine (CMM) at DAF: The CMM is a newly credited system to measure high explosive and special nuclear material configurations. On November 6, 2024, MSTS issued the IVR report in preparation for CMM readiness activities at DAF. The IVR identified two findings and one opportunity for improvement. The findings relate to information omitted from a limiting condition of operation and listing the CMM operator and vendor as performers in a surveillance procedure even though they did not perform any procedure steps. LLNL will resolve the issues and perform the management self-assessment planned for December 2024. LLNL will use the CMM to support an upcoming SCE campaign.