DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 4, 2021

TO: Christopher J. Roscetti, Technical Director
FROM: Austin R. Powers, Cognizant Engineer
SUBJECT: Nevada National Security Site (NNSS) Report for May 2021

DNFSB Staff Activity: During May, A. Powers, D. Andersen, and Y. Li remotely observed a meeting where a subcontractor performing the Device Assembly Facility (DAF) soil-structure interaction analysis discussed its results. Attendees included personnel from the Nevada Field Office (NFO), Mission Support and Test Services, LLC (MSTS), and the project participatory peer review team. The staff anticipates the subcontractor completing the final analysis report this summer. The staff conducted no onsite activities at NNSS during May.

DAF Safety Basis Update: In March, NFO approved a change notice to the DAF safety basis. In this change notice, MSTS expanded the use of plutonium oxide powder in the glovebox system. In addition, MSTS now permits the decontamination of approved containers that hold plutonium oxide powder in the downdraft table system. As a result, MSTS increased the plutonium powder form material-at-risk (MAR) limit in the glovebox building, added a plutonium powder form MAR limit in the downdraft table building, and updated the powder release hazard scenarios. MSTS identified three new specific administrative controls (SAC) to reduce the risk associated with the new plutonium oxide powder operations, which include: keeping the powder inside an approved container except when inside the glovebox; using a respirator when handling the approved container that holds the powder (i.e., when outside of the credited shipping container and glovebox); and limiting the amount of powder material allowed in approved containers. MSTS will also continue to rely on the existing SAC of using approved containers and shipping packages for radioactive material. NFO did not identify any conditions of approval but did identify one issue that needs to be addressed in the next annual update. The issue focuses on revising the hazard identification checklist and what-if analysis to account for the new plutonium oxide powder operations. These analyses precede the hazard analysis and identify which hazards need to be further analyzed. Given that MSTS has already updated the hazard analysis to account for the new operations and identified controls to reduce the associated risk, NFO concurred that this issue can be resolved in the next safety basis update.

Ultra-fast Closure Valve System (UCVS) Test Plan: As discussed in the NNSS Monthly Report for May 2018, MSTS updated the safety basis for the Joint Actinide Shock Physics Experimental Research (JASPER) Facility to account for the use of a larger diameter launch tube (an increase from 28 mm to 40 mm). Lawrence Livermore National Laboratory (LLNL) has conducted experiments using surrogate materials to understand the characteristics of the 40 mm launch tube (e.g., the projectile speeds that can be achieved using this tube and appropriate propellant mixture). However, LLNL has yet to perform an experiment using actinide material with the larger diameter tube because a 40 mm UCVS is needed to properly seal the primary target chamber. In April, LLNL issued a new test plan for the 40 mm UCVS. As part of the tests, LLNL needs to ensure that the UCVS completes a leak tight seal in the appropriate timeframe after receiving the trigger signal and that the closed UCVS passes the maximum allowable helium leak rate. LLNL will conduct the tests in phases at NNSS and will use each phase to improve the design of the 40 mm UCVS.