DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 8, 2021

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

DNFSB Staff Activity: During September, the Board's staff visited the site to perform walk downs at the Device Assembly Facility (DAF), Joint Actinide Shock Physics Experimental Research Facility, and the Area 5 Radioactive Waste Management Complex (RWMC). The Board's staff also discussed the status of the DAF soil-structure interaction analysis and safety basis revisions with personnel from Mission Support and Test Services, LLC (MSTS).

RWMC Low-Level Waste Disposal Event: While onsite in September, the Board's staff observed a low-level radioactive waste disposal activity at the Area 5 RWMC. This waste package had a high contact radiation measurement. When handling this type of waste, MSTS will remove the waste from the cask container using a crane, lower it into a pre-determined location in a disposal cell, and then immediately cover it with soil. Typically, MSTS will use the space between freight containers that they intentionally create when disposing of these high contact radiation waste packages in the cell. However, in this instance, MSTS wanted to utilize an open space behind a freight container in the cell. When MSTS lowered the waste package into this location, they found that it was not deep enough. As a result, MSTS paused work and kept the waste package where it was lowered (i.e., in the disposal cell and away from all personnel). MSTS considered several factors when determining the appropriate path forward, and ultimately decided to rearrange freight containers in the waste stack that were located near the initial disposal location. The benefits of this path forward meant that the waste package did not need to move until the new disposal location had been established, the crane did not need to be relocated, and soil was readily available to cover the waste package. MSTS was able to complete the disposal activity with no additional issues and kept the total dose to the entire crew to a minimum. During the post-job brief, MSTS discussed the work pause. MSTS noted that a similar waste package would be disposed of the following week and discussed whether the item could fit in the proposed disposal location.

Dispersion Model Analysis: At the U1a Complex, MSTS estimates the radiological dose consequences for explosive accident scenarios. MSTS uses the results from the calculations to determine whether credited safety controls are needed to prevent the scenario from occurring or mitigate its consequences. MSTS has found these results to vary for explosive scenarios depending on which software model and dispersion methodology are used. As a result, MSTS subcontracted Sandia National Laboratories (SNL) to conduct an analysis that compared different dispersion models for explosion scenarios. In August, SNL finalized the report for the analysis. SNL concluded that the Church methodology would be appropriate for dose consequence calculations for explosive accidents at the U1a Complex. The Church methodology, which was derived from explosive tests, assumes that the energy of the explosion moves the plume to a higher elevation and spreads out the radiological material. By the time the material reaches the ground, the calculated dose consequences are significantly lower than what would have been estimated if a ground-level release methodology was used.