Nevada National Security Site (NNSS) Radioactive Waste Facilities Safety Basis

Response to DNFSB Letter dated August 26, 2021

National Nuclear Security Administration

Introduction

- DNFSB staff review of Nevada National Security Site (NNSS) Radioactive Waste Facilities (RWF) safety basis was completed and documented in DNFSB Staff Report, *Nevada National Security Site Radioactive Waste Facilities Safety Basis Review*, dated June 2, 2021.
- DNFSB staff identified several safety-related issues which, if they remain unaddressed, could adversely impact workers and public health and safety.
- Based on RWF safety issues, DOE received DNFSB letter and associated reporting requirements, dated August 26, 2021.

Background

- RWF includes Area 3 Radioactive Waste Management Site (RWMS) and Area 5 Radioactive Waste Management Complex (RWMC).
  - Area 3 RWMS consists of five waste disposal cells used to dispose of low-level radioactive waste generated within state of Nevada.
  - Area 5 RWMC consists of waste disposal cells used to dispose of low-level and mixed low-level radioactive waste.
    - RWMC Transuranic (TRU) Pad Cover Building is permitted to accept and stage NNSS-generated TRU waste.
    - TRU waste staged within TRU Pad Cover Building consists of two internally contaminated explosion-proof spheres and several safety-significant primary target chambers from the Joint Actinide Shock Physics Experimental Research (JASPER) Facility.
    - No other TRU waste activities are authorized at RWMC.

RWF Safety Basis

- Existing Area 3&5 RWF Documented Safety Analysis (DSA) was developed in accordance with DOE-STD-3009-94, Change Notice 3 and DOE-STD-5506-2007.
- RWF DSA annual update expectations were not met - legacy problematic issues and inconsistencies were not addressed.
- Safety-related issues were identified and documented in DNFSB Staff Report.
  1. Deficiencies in safety basis submittals and federal reviews
  2. Continued delays in submitting complete annual safety basis update
  3. Lack of required formal process for handling noncompliant waste
  4. Improper implementation of a Specific Administrative Control (SAC)

DNFSB Reporting Requirements

- Safety Question 1 – What actions have been taken or are planned by the NNSA's Nevada Field Office to ensure that the site contractor is submitting high quality safety basis documents and updating the safety basis documents when required?

Safety Question 1

- Safety Basis Quality and Improvement
  - NNSA/NFO performance feedback and MSTS self-assessment data continue to drive substantive actions to improve quality of safety basis documents.
  - Safety basis development governing procedures have been revised to institutionalize lessons-learned and best practices.
  - Formal issues management processes ensure causes are understood and actions identified to address causes and prevent reoccurrence.
  - MSTS has transitioned from reliance on a sub-contracting strategy to development of in-house safety basis development capability.
  - Analytical improvements support upgraded safety bases (e.g., site-specific option 3 dispersion analysis protocol and Sandia high fidelity physics-based modeling to justify near-field dispersion models and parameters).
  - NNSA/NFO Manager meeting routinely with MSTS corporate directors and Board members from Honeywell and Huntington Ingalls Industries.

Safety Question 1

- Timely Periodic Safety Basis Reviews
  - Area 3&5 RWF DSA was revised in accordance with DOE-STD-3009-94, CN-3, to reflect annual update expectations, resolution of Potential Inadequacies in the Safety Analysis, and improvements based on previous DNFSB and NNSA/NFO feedback. Draft DSA/TSR (90%) has been submitted to NNSA/NFO.
  - DAF DSA was revised in accordance with DOE-STD-3009-2014. Draft DSA/TSR (90%) has been submitted to NNSA/NFO.
  - JASPER Facility DSA was revised in accordance with DOE-STD-1228-2019. Draft DSA/TSR (90%) has been submitted to NNSA/NFO.
  - On-site Transportation Safety Document is being revised in accordance with DOE O 460.1D and DOE O 461.2. Draft OTSD/TSR (90%) will be submitted to NNSA/NFO in fourth quarter of 2021.
  - U1a Complex DSA is being revised in accordance with DOE-STD-3009-94, CN-3 to reflect annual update expectations. Draft DSA/TSR (90%) has been submitted to NNSA/NFO. Next major revision will be developed in accordance with DOE-STD-3009-2014 and incorporate major modifications (i.e., U1a.03 Testbed and U1a Complex Enhancement Projects).

Safety Question 1

- Annual Update Timeliness
  - DSA annual updates for all NNSS nuclear facilities have either been submitted to NNSA/NFO for review and comment (at the 90% phase) or are in the final development phase pending MSTS internal review prior to submittal to NNSA/NFO for review and approval.
  - NFO will ensure MSTS annually submits an updated DSA or letter stating there have been no changes in the DSA since the last submittal.

DNFSB Reporting Requirements

- Safety Question 2 – What actions have been taken or are planned by the NNSA's Nevada Field Office to ensure that the identified technical issues in the RWF safety basis are addressed?

Safety Question 2

- Area 3&5 RWF Safety Basis was recently revised to incorporate annual update expectations and address previously identified technical issues.
  - The revision included consistency changes in accordance with DOE-STD-5506-2007, and other changes necessary to resolve outstanding Potential Inadequacies in the Safety Analysis involving the hazards and accident analyses.
  - A 90% draft version of the RWF DSA/TSR has been completed and formally submitted to NNSA/NFO for review and comment.

Safety Question 2

- Technical issues identified in DNFSB Staff report have been addressed in revised DSA/TSR.
  - Analysis was revised to address DOE-STD-5506-2007 event progression for different accident scenarios.
  - Dispersion analysis was revised for consistency with HSS Safety Bulletin 2011-02, DOE-STD-3009-94, and DOE-STD-5506-2007.
  - Analysis incorporates bounding Type-M lung absorption factor for all waste at RWF.
  - Analysis assumes all containers involved in any scenario contain maximum single container limit (in lieu of statistical methodology).
  - Analysis evaluates confined/unconfined split for fire scenarios in accordance with DOE-STD-5506-2007.

Safety Question 2

- Technical issues identified in DNFSB Staff report have been addressed in revised DSA/TSR (Continued).
  - Analysis was revised to remove credit taken for Safety Management Programs (SMPs) in the unmitigated case.
  - Controls are credited consistent with DOE-STD-5506-2007 to eliminate “double-counting” of waste containers in some hazard scenarios.
  - Process Hazard Analysis scenarios were added to evaluate overpressure events for LLW and TRU containers.
  - NNSA/NFO recommending incorporation of a TSR Bases section for design features in next annual update.
  - MSTS intends to add a TSR LCO to establish a process for handling noncompliant waste containers in the next update.

Summary

- NNSS nuclear facility safety basis upgrades are nearing completion.
  - Legacy problematic issues and inconsistencies have been identified and eliminated.
  - Hazards and accident analyses and control derivation reevaluated consistent with appropriate safe harbor methodologies.
  - Dispersion analyses updated for all NNSS hazard category 2 nuclear facilities/activities.
- Safe harbor methodology upgrades and associated safety basis revisions will directly address concerns raised by DNFSB staff.
- Safety basis upgrades represent a significant improvement for NNSS and ensure adequate protection of workers, the public, and the environment.
- Questions?