



NNSS DAF DSA Development Issues

Response to DNFSB Letter dated December 12, 2023



Introduction

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- DNFSB staff reviewed the Nevada National Security Site (NNSS) Device Assembly Facility (DAF) Documented Safety Analysis (DSA) Rewrite Project (DDRP) 90 percent submittal and identified several deficiencies in the draft analysis.
- Concerns with NNSS DSA submittal quality were previously communicated by the DNFSB in 2021 (Radioactive Waste Facility)
 - In response, NNSA highlighted several MSTs corrective actions to improve the quality of DSA submittals.
- Given the recent number of issues identified in the 90% DDRP submittal, additional quality improvement actions may be warranted.

Bottom Line Up Front

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- Safety basis submittal quality has improved. However, MSTS performance on major deliverables does not fully meet expectations.
- MSTS completed corrective actions to improve safety basis development.
- NFO is committed to conducting in-depth reviews and using NNSA corporate resources on reviews of major deliverables to ensure approved documents meet DOE/NNSA expectations.
- NFO will assess MSTS's safety basis deliverable process in FY25.

Background

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- MSTS formally identified an issue in March 2019 for quality issues in DSA submittals.
- MSTS corrective actions based on the causal analysis included:
 - Developing an Annual Update central database
 - Revise development procedure and incorporate development checklist
 - Develop a reviewer checklist for internal reviews
 - Conducting safety basis status meetings with stakeholders, including written comment resolutions
 - Conduct alignment sessions with NFO to ensure comment resolution is appropriate
 - Acquire outside expertise with experience in DOE-STD-3009-2014
 - Corrective Action Effectiveness Validation Report (April 2022)

Background

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- Additional actions after issue closure:
 - Guidance Documents
 - Writers Desktop Instruction
 - Consistency checklist
 - Hazard Analysis procedure (in development)
 - Continuing Training
 - DSA Development Training – Scheduled in 2024
 - TSR Development Training – Scheduled in 2024
 - DOE National Training Center Safety Basis Academy Classes
 - SBA-100 series of web-based training
 - SBA-220, *Hazard Analysis Review* (April 2023)
 - SBA-240, *TSR Review* (May 2023)
 - SBA-230, *Accident Analysis & Control Selection Review* (Cancelled; rescheduling)
 - Increased Staffing
 - 13 analysts on-board, with one additional hiring action in-process (8 qualified, 5 in initial training)

Background

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- DDRP is a major rewrite effort that includes updating the safe harbor methodology from DOE-STD-3009-94 to DOE-STD-3009-2014 and merging the activities described within the existing DAF DSA and the DAF DSA Addendum for the National Criticality Experiments Research Center (NCERC).
- The 2021 90% DDRP deliverable was submitted to NNSA/NFO and reviewed by the DNFSB prior to the full implementation of MSTs corrective actions.

DNFSB Question 1

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- Question 1

How does NNSA's Nevada Field Office measure the effectiveness of the MSTS corrective actions to improve the quality of DSA submittals?

Has NNSA's Nevada Field Office found these corrective actions to be effective for the DAF DSA rewrite project and other safety basis submittals at NNSS?

- Question 1 Response

NFO measures the effectiveness of MSTS corrective actions through facility safety basis reviews (e.g., Safety Basis Review Team comments).

MSTS has improved its development process. While change notices have had fewer issues, more complex deliverables have been challenging (e.g., 3009-2014 updates, PULSE major modifications).

DNFSB Question 1

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- MSTs processed ~20 submittals for NFO review approval between 2022 and 2023.
 - Annual Updates with New, Additional Changes
 - Change Notices
 - Major Updates or Modifications (e.g., DOE-STD-1189, -3009, -1228)
- Submittals were informally evaluated by NFO for quality (High, Medium, Low) based upon the number of significant SBRT issues identified.
- Change Notices have frequently been at medium to high quality
- Major Revisions and Safety-in-Design documentation quality has been inconsistent.

DNFSB Question 2

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- Question 2

What additional measures, if any, are being considered by NNSA's Nevada Field Office to improve the quality of DSA submittals?

- Question 2 Response

A formal assessment on safety basis development will be conducted by NFO with NA-ESH support in FY25 to determine if current MSTs processes are effective. NA-NV is in contact with the NNSA Production Office to learn from its response to DNFSB Recommendation 2019-1.

DNFSB Question 3

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- Question 3

What actions have been taken or are planned by NNSA's Nevada Field Office to ensure that MSTS addresses the identified safety issues in its final version of the DSA for DAF?

- Question 3 Response

- The significant comments on the 90% DDRP review prompted a comprehensive review by MSTS.
- NFO follows NNSA SD 413.3-2, *Corporate Integration of Safety Basis Document Reviews* and includes NNSA staff from NA-ESH on major reviews. DDRP also has a team member from the Office of Science.
- NNSA/NFO, MSTS, Livermore, and Los Alamos representatives met the week of March 11, 2024 to discuss the resolution for each 90% review comment. Additional meetings will be held.

Issues Identified in the DNFSB Staff Report

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- Technical issues in the following areas were identified in the DNFSB Staff review of the DDRP 90% draft document:
 - Specific Administrative Controls (SACs)
 - Existing DAF Safety Issues
 - Material at Risk (MAR) assumptions of Plutonium Oxide Powders
 - Other DSA Quality Concerns
 - Automated Emergency Defibrillators
- NFO and MSTs are committed to evaluating and responding to each identified issue. A high-level summary of the issues and responses follows.

Issues Identified in the DNFSB Staff Report

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- Specific Administrative Controls

- *Similar, Overlapping, and/or Non-specific SACs*

- SACs that perform similar or overlapping functions were combined.
 - SACs will meet the requirements in DOE-STD-1186-2016 and DOE-STD-3009-2014.

- *Qualified Explosives Handlers SAC*

- Standard training requirements are no longer SACs

- *Use of Respirator SAC & High Energy Initiators (HEI) and Electrical Equipment Used for High Explosive Operations*

- Specific performance criteria, including identification of associated SSC functional requirements, were added to ensure fulfilling the SAC's safety function

- *Low Energy Initiators*

- Unnecessary allowances (ex. Low Energy Initiators) in the DSA will be removed

Issues Identified in the DNFSB Staff Report

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- Existing DAF Safety Issues
 - *Device Shipping Container (DSC) Replacement*
 - The DSC Replacement is on the “Over Target” list for FY26, outlining requested scope that may be moved into the baseline if funding allows.
 - *Seismic Evaluations*
 - Completion of the 10-year Seismic Update and Fire Water Tank Seismic deficiencies are identified in the DSA as known vulnerabilities and planned improvements.
 - The updated DAF seismic evaluation for the building structure is in progress.
 - A Potential Inadequacy of the Safety Analysis (PISA) was declared on March 6, 2024 because several buildings do not meet the updated seismic evaluation criteria.
 - The component level evaluation of Safety Structures, Systems and Components will start in FY25.
 - *Fire Water Tank*
 - Refurbishment of the existing Fire Water Tank will start this month (April 2024). Refurbishment will address the potential for an imminent leak but will not address seismic.
 - New Fire Water Tank is funded to begin design and construction in FY26

Issues Identified in the DNFSB Staff Report

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- Material at Risk (MAR) Assumptions for Plutonium Oxide Powder
 - *Excessive MAR Limits and Inappropriate Packaging Assumptions*
 - Assumptions on quantities and location of plutonium oxide powders are being reevaluated
 - *Material Acceptance SAC*
 - Container contents will be verified to be within the testing boundaries prior to entering DAF

Issues Identified in the DNFSB Staff Report

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- Other DSA Quality Concerns

- *Credited Container SAC*

- Containers not meeting the specific performance criteria will be have compensatory measures identified to ensure the safety function is met or removed from the list

- *Lightning Protection and Standoff Distance*

- The evaluation of the DAF Lightning protection system is being finalized. The results will determine any required standoff distance

- *Linkage between What-if Scenarios and Control Set*

- PrHA events are being reviewed to verify sufficient control sets for each what-if scenario

- *High-Efficiency Particulate Air (HEPA) Filters*

- An LCO will cover HEPA operability and maintenance

- *Post-Seismic Fire Analysis*

- The Complex Fire scenario is an operational fire that propagates throughout the complex and evaluates 15 buildings at full capacity.

Issues Identified in the DNFSB Staff Report

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- Other DSA Quality Concerns (continued)
 - *Supporting Calculations*
 - Supporting calculations will be finalized and included in the final document
- Automated Emergency Defibrillators
 - Automated External Defibrillators (AEDs) are approved for use (with restrictions) in DAF
 - Formal training for DAF employees on facility-specific restrictions will be required.

Summary

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- Safety basis submittal quality has improved. However, MSTS performance on major deliverables does not fully meet expectations.
- MSTS completed additional corrective actions to mature its safety basis development process.
- NFO conducts in-depth reviews of safety basis deliverables and uses NNSA corporate resources for major deliverables. NFO is confident that the approved and implemented documents meet expectations.
- A collaborative in-person process is being used for resolution of the DDRP comments.
- A formal assessment on safety basis development will be conducted by NFO in FY25 to determine if current MSTS processes are effective.