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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 10, 2009

Gerald L. Talbot Jr.
Assistant Deputy Administrator for
Nuclear Safety and Operations
National Nuclear Security Administration
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Mr. Talbot:

Pursuant to the certification mandate provided in Section 3112 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, the Defense Nuclear Facilities Safety Board's (Board's) staff responsible for certification activities has reviewed design data for the Chemistry and Metallurgy Research Replacement (CMRR) Project provided to date by the National Nuclear Security Administration (NNSA). The Board's staff is focusing its review on topics previously raised regarding the nuclear safety strategy for CMRR, the Preliminary Documented Safety Analysis, and the design of safety-class and safety-significant systems. Those topics were provided electronically to NNSA on November 20, 2008. The staff has documented specific technical issues on a Findings Form. For purposes of the certification review, the staff considers a Finding a design topic related to an issue raised by the staff regarding the CMRR design that has not been adequately resolved and that could preclude certification by the Board.

Finding #5, Design Control - System Design Descriptions Do Not Incorporate Preliminary Documented Safety Analysis Requirements Adequately, was transmitted to your office on March 30, 2009. NNSA provided a response to this Finding on April 21, 2009. The Board's staff has evaluated that response and has determined that Finding # 5 can be considered closed. Enclosed is the completed Findings Form that includes the Board's Final Resolution to Finding #5. Should you have any questions regarding this matter, please contact me at (202) 694-7128.

Sincerely,

Roy E. Kasdorf
Nuclear Facility Design and
Infrastructure Group Lead

Enclosure

c: Mr. Mike Thompson
Mr. James McConnell
Mr. Patrick Rhoads
Mr. Herman LeDoux
Mr. Mark B. Whitaker Jr.

Board Findings

Chemistry and Metallurgy Research Replacement Facility: Congressional Certification Review

Topic: Design Control

Finding Title: System Design Descriptions Do Not Incorporate Preliminary Documented Safety Analysis Requirements Adequately

Finding: The Board CMRR certification review is evaluating the adequacy of the flow down of requirements from the Preliminary Documented Safety Analysis (PDSA) to the System Design Descriptions (SDDs). This includes SDD consistency with the PDSA and with DOE-STD-3024-98, *Content of System Design Descriptions*. The Board previously identified a Finding related to how the CMRR project documents and maintains design control of PDSA safety-related functions and requirements.

As stated in the introduction to DOE-STD-3024, "The SDD is a central coordinating link among the engineering design documents, the facility authorization basis, and implementing procedures." "Accordingly, the development of the SDD must be coordinated with the engineering design process and with the safety analysis development." It is critical that there is traceability between safety functions, functional requirements, performance criteria, and design requirements to ensure that the design of all safety-related structures, systems, and components is adequate. Two key attributes of the SDDs have been given in the Basis for Finding.

Review of several SDDs indicate that:

- The SDD safety functions and functional requirements are not consistent with the corresponding information in PDSA and do not have references back to the PDSA.
- In some cases PDSA functional requirements are identified as safety functions in the SDDs.
- In some cases, safety functions are identified in the SDDs that are not identified in the PDSA.
- The PDSA functional requirements and performance criteria are not always included in the SDD.
- The SDD safety requirements are not consistently and explicitly correlated back to the PDSA functional requirements and performance criteria. The requirements are not sorted by importance with PDSA related requirements interspersed with requirements from other sources.
- The bases for the requirements are incomplete, with the PDSA bases behind the requirements not discussed, instead only order or standard bases related to the requirement are given. As a result the importance of the requirements cannot be determined without referencing back to the PDSA contrary to the purpose of the SDDs per DOE-STD-3024.

Attached to this Finding are several examples that document the inconsistencies discussed above. These examples are not intended to be complete, but indicate that systemic PDSA/SDD integration issues exist.

This finding is based on a review of the following SDDs: Nuclear Facility Laboratory Enclosure System (017, Rev 0A), Fire Protection System (019, Rev 0B), Uninterruptible Power Supply System (021, Rev 0B), Engine Generator System (022, Rev 0B), Security Category 1 Building HVAC System (029, Rev 0B), Security Category 1 Building (036, Rev 0B), Security Category 1 Vault Building (037, Rev0B), Instrument Air and Compressed Air System (045, Rev 0H), Facility Management System (048, Rev 0B), Fuel Oil System (059, Rev 0A), Electrical Power

System (062, Rev 0B), Electrical Distribution System (063, Rev 0B).

Basis for Finding: DOE-STD 3024-98, *Content of System Design Descriptions*. Section 2.1, "Statements of safety functions in the SDD shall be consistent with the corresponding information in the facility authorization basis and specific references to the authorization basis documents shall be provided." Section 3 "The safety requirements statements shall be consistent with, and be explicitly correlated back to, the corresponding statements of functional requirements and performance criteria in the facility FSAR, TSRs/OSRs, and other authorization basis documents."

Suggested Resolution or Path Forward:

- **Pre-Certification:** The project must submit a plan for revising the SDDs to ensure consistency with the PDSA, including a schedule for SDD revisions. SDD revisions should be complete prior to award of the Final Design contract.
- **Post-Certification:** Revise the System Design Descriptions to identify PDSA safety functions, functional requirements, and performance criteria in accordance with DOE-STD-3024 to ensure the SDDs serve their function in aiding the complete and efficient incorporation of the PDSA requirements into the final design.

NNSA Response: The response is similar to that submitted for finding #3. The NNSA agrees that the safety functions and functional requirements should be explicitly listed in the appropriate SDDs. A detailed schedule for the completion of these activities (along with the remainder of the work to address the NNSA COAs contained in the PSVR (RO)) is in the attached document.

To address the long term consistency of the safety function and functional requirements within the PDSA and the SDDs, these elements will be included in the CORE database and reports for all of the documentation generated from CORE. This includes the PDSA and the SDDs. This is not intended to take the ownership of these descriptions from the safety basis team, but to place them into a common place for configuration control. The details of the schedule to accomplish this explicit conformance are included in the COA-6 portion of the schedule.

The approach also will address the commitments under the response to Finding #4.

DNFSB Final Resolution: The CMRR Project has taken steps to ensure that requirements established in the PDSA are properly linked in SDDs. The CMRR Project has committed to revising SDDs prior to the project proceeding into Final Design. The Board's staff will review the revised SDDs as they become available.

The CMRR commitment to revising SDDs to be consistent with the PDSA resulted in Finding #5 being closed.

DNFSB:


Roy Kasdorf

7/10/09
Date

NNSA: NNSA Response Signed by James

McConnell, Acting NA-17 Date: April 21, 2009