

Thomas A. Summers, Acting Chairman
Patricia L. Lee

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



March 25, 2025

The Honorable Christopher Wright
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Wright:

The Defense Nuclear Facilities Safety Board (Board) has completed a review of the efficacy of project reviews conducted by the National Nuclear Security Administration (NNSA). The Department of Energy (DOE) Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, requires specific project reviews to ensure early and effective integration of safety into design and construction. DOE specifically added one of these project reviews as a result of the joint effort by the Board and DOE, as documented in the July 2007 report, *Improving the Identification and Resolution of Safety Issues During the Design and Construction of DOE Defense Nuclear Facilities*.

The Board found that NNSA has made improvements to its project review processes that should increase the effectiveness of these reviews. The Board also identified several suggested improvements that NNSA is considering to further strengthen these reviews. Institutionalizing these improvements may increase visibility of nuclear safety issues, which have a profound ability to negatively impact projects if not addressed expeditiously. For example, nuclear safety issues related to facility worker protection recently caused delays with the Savannah River Plutonium Processing Facility project. The enclosed report is provided for your information and use.

Sincerely,

A handwritten signature in black ink that reads "Thomas A. Summers". The signature is written in a cursive, flowing style.

Thomas A. Summers
Acting Chairman

Enclosure

c: Ms. Teresa Robbins, Acting Administrator, NNSA
Mr. Joe Olencz, Director, Office of the Departmental Representative to the Board

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Report

November 1, 2024

Project Reviews Conducted by the National Nuclear Security Administration

Summary. A staff review team from the Defense Nuclear Facilities Safety Board (Board) assessed the efficacy of project reviews conducted by the National Nuclear Security Administration (NNSA). The staff team attended three project reviews and conducted two interactions with NNSA’s Office of Project Analysis, Oversight, and Review (NA-90.2), which is responsible for executing NNSA’s project reviews. The staff team identified the four safety observations that are summarized below.

1. ***NA-90.2 Improved the Project Review Process***—Since 2023, NA-90.2 has aggressively identified areas for improvement and implemented changes in the project review process. The staff team found that the three project reviews that it observed in 2023 were of higher quality than those from past years.
2. ***Comments Involving Nuclear Safety Should Require Tracking or Additional Explanation***—Nuclear safety issues have a profound ability to result in project complications if not resolved expeditiously. NNSA project reviews have previously documented comments involving nuclear safety that did not have an associated recommendation and were not immediately addressed. Their delayed resolution resulted in impacts to the project. As an opportunity for improvement, the Board’s staff team suggests requiring review teams to track comments involving nuclear safety or explain in their report why the nuclear safety comment did not rise to the threshold of a recommendation. Doing so would improve visibility, ensure understanding of the safety concerns, and increase the likelihood of timely resolution.
3. ***Department of Energy (DOE) Order 413.3B¹ has a New Requirement for Lessons Learned that has not been Incorporated into Project Reviews***—Change 7 to DOE Order 413.3B, approved in June 2023, requires that lessons learned from project peer reviews with “Department-wide implications” be submitted into the DOE lessons learned system of record. As of October 1, 2024, NA-90.2 did not yet have processes in place to meet this new requirement.
4. ***NNSA Supplemental Directive 413.3-1² is Expired and Requires Revision***—NNSA approved this supplemental directive in May 2021, and it expired in May 2024. This supplemental directive adds value by providing additional guidance, requirements, and information outlining the processes for conducting project reviews that are not included in DOE Order 413.3B or DOE Guide 413.3-9A³. However, the

¹ DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets* [15].

² NNSA Supplemental Directive 413.3-1, *Project Reviews* [16].

³ DOE Guide 413.3-9A, *Project Reviews for Capital Asset Projects* [17].

supplemental directive does not currently reflect the improvements NA-90.2 made to the project review process and would also be improved by including some other key information in the next revision.

Background. DOE Order 413.3B requires project reviews for design and construction projects throughout the critical decision (CD) process⁴ (see Figure 1). Project reviews consist of teams of federal and contractor personnel that assess project performance in technical and non-technical areas. NA-90.2 leads and manages these reviews.

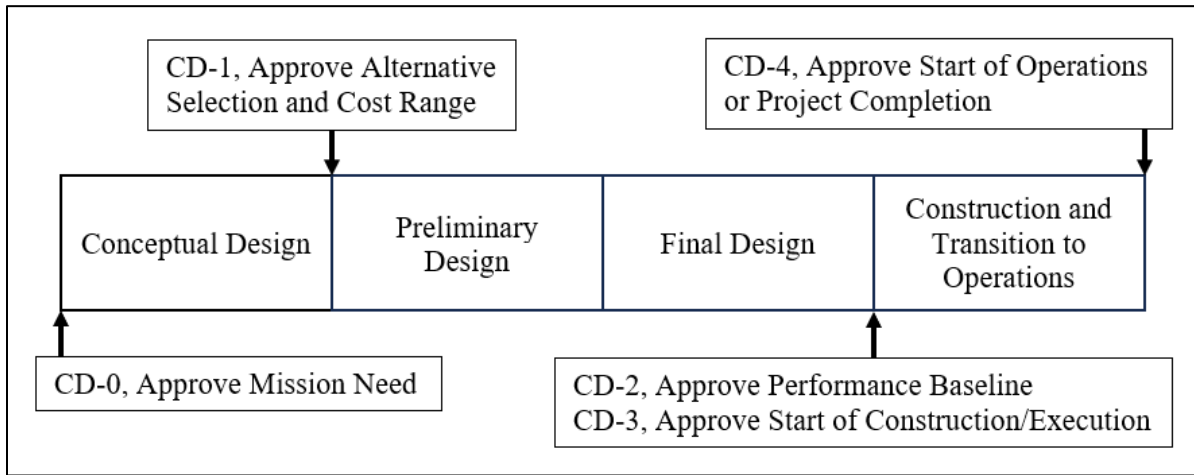


Figure 1. An illustration of a typical project’s CD process.

DOE Order 413.3B requires peer reviews, independent project reviews (IPR), and technical independent project reviews (TIPR):

- **Peer Reviews**—The order requires peer reviews on projects with total costs of \$100 million or greater (or lower as deemed appropriate) between CD-0 and CD-1; annually between CD-1 and CD-2; and at least annually between CD-2 and CD-4. The order states that these reviews “evaluate technical, managerial, cost and scope, and other aspects of the project, as appropriate.”
- **IPR**—The order requires an IPR prior to CD-1 for hazard category 1, 2, and 3 nuclear facilities “to ensure early integration of safety into the design process.”
- **TIPR**—The order requires a TIPR at or near the completion of preliminary design for hazard category 1, 2, and 3 nuclear facilities as a prerequisite for CD-2. The order states that “a TIPR will be performed to ensure that safety is effectively integrated into design and construction.”

⁴ The order prescribes five critical decisions over the life of a project. It defines critical decisions as “[a] formal determination made by the CE [Chief Executive for Project Management] or PME [Project Management Executive] at a specific point during the project that allows the project to proceed to the next phase or CD.”

The staff team’s review focused on identifying best practices and evaluating the review efficacy per requirements in DOE Order 413.3B and NNSA Supplemental Directive 413.3-1 and review guidance in DOE Guide 413.3-9A. Staff team members observed three project reviews as part of this review activity (see Table 1). For each of these project reviews, the staff team observed the preparatory virtual meetings, attended the onsite portion of the reviews, and observed the exit briefings virtually. Following the project review observations, the staff team conducted two virtual interactions with NA-90.2 on May 15, 2024, and June 25, 2024.

Table 1. *Onsite dates for project reviews attended by staff team members.*

Onsite Review Dates	Review Type	Project
June 12–16, 2023	Peer Review	Savannah River Plutonium Processing Facility (SRPPF)
July 31–August 4, 2023	TIPR	Los Alamos Plutonium Pit Production Project, 30 Reliable Equipment Installation Subproject
November 6–9, 2023	Peer Review	Surplus Plutonium Disposition Project

Discussion. The staff team identified the safety observations described below:

NA-90.2 Improved the Project Review Process—NA-90.2 has aggressively identified areas for improvement and implemented changes in the project review process. For example, NA-90.2 implemented additional document study, preparatory meetings, and personnel interviews prior to going onsite to conduct project reviews. NA-90.2 also no longer schedules the formal exit briefing the same week as the onsite portion of the review. These changes alleviate schedule congestion during the onsite review and allow the review team to be more prepared prior to arriving on site.

NA-90.2 also established a core group of reviewers that mostly remain constant for each of the reviews and stated that it understands the importance of remaining independent from the projects, which will be a point of emphasis. DOE Order 413.3B and NNSA Supplemental Directive 413.3-1 have guidance and requirements consistent with NA-90.2’s efforts to maintain independence and team continuity:

- The order states: “Each Under Secretary shall ensure that the peer reviews have independence from line management and, to the greatest extent possible, use experts who are familiar with the projects to ensure continuity for future reviews.”
- The supplemental directive states that NA-90.2 “[e]nsures objectivity and independence of reviews, avoiding conflicts of interest and undue influence.”

The staff team also observed the 2023 SRPPF peer review team specifically pursuing resolution of safety observations, including issuing recommendations, related to concerns identified during the Board’s conceptual design review. This is consistent with the supplemental directive, which states that peer reviews address “specific project issues or concerns identified during...external reviews.” External reviews include those conducted by the Board. This was an observed change. The earlier 2022 SRPPF peer review did not specifically address the Board’s safety observations from the conceptual design review.

Finally, NA-90.2 is also implementing a new cloud-based database that will be used to track recommendation closure, document lessons learned, file closure documents, and provide a source of analytics that can be tracked. Previously, NA-90.2 used an internally managed spreadsheet to track open recommendations and used email to track recommendation closure without saving the closure evidence. NA-90.2 stated that this spreadsheet contained open recommendations from 2017 and 2018. NA-90.2 plans to implement the new database this calendar year, which could be a significant improvement.

The staff team acknowledges the importance of project reviews and found that the three project reviews that it observed in 2023 were of higher quality than those from years past. The changes that NA-90.2 is implementing should continue to yield improvements in quality and efficiency.

Comments Involving Nuclear Safety Should Require Tracking or Additional Explanation—Project review conclusions include comments and recommendations. NNSA Supplemental Directive 413.3-1 requires project personnel to develop a corrective action plan for recommendations. The supplemental directive states: “The package to close a corrective action must include the explanation for closure...and the evidence for closure.” NA-90.2 and the federal project director jointly approve closure of the corrective action plan. However, no similar requirement exists for comments which, per the judgment of the review team, do not rise to the significance level of a recommendation. Recent review plans for project reviews define comments as “[d]escriptive material conveying the findings of the review and the review committee’s opinions based on the findings.” In reports reviewed by the staff team, although all recommendations have an associated comment, not every comment results in a recommendation.

The staff team reviewed the last three SRPPF project review reports [1] [2] [3] and found comments involving nuclear safety that were highlighted by project review teams but were not resolved. The subjects of these comments then later reappeared in subsequent reviews as additional comments or recommendations, and one of these nuclear safety issues delayed the project. Nuclear safety issues have a profound ability to result in project complications if not resolved expeditiously (see Figures 2-4).

The final report for the 2021 SRPPF IPR provides an example of a problematic comment involving nuclear safety. The IPR team⁵ made a comment in its final report [1] acknowledging a review by DOE’s Office of Enterprise Assessments (DOE-EA) that raised concerns with the lack of facility worker safety controls in the design [4]. Although, per DOE Order 413.3B, the goal of the IPR is to “ensure early integration of safety into the design process,” the IPR team chose not to provide an independent assessment of the validity of DOE-EA’s concern and did not make a recommendation associated with this comment.

⁵ It should be noted that the 2021 IPR team was under different leadership than the current NA-90.2 staff.



Figure 2. *An aerial view of the SRPPF project at the Savannah River Site, which was delayed due to the need for upgrading controls to safety significant in preliminary design.*



Figures 3 and 4. *Aerial views of the Waste Treatment and Immobilization Plant (left) at the Hanford Site and the Salt Waste Processing Facility (right) at the Savannah River Site, which were delayed due to nuclear safety issues.*

Following the IPR, NNSA’s Savannah River Acquisition and Project Management Office and NNSA’s Savannah River Site Field Office dismissed DOE-EA’s safety concerns in a joint letter [5]. NNSA’s Office of Environment, Safety, and Health [6] [7] [8], the Board [9] [10] [11], and DOE’s Office of Environment, Health, Safety and Security [12] subsequently all raised related concerns with facility worker safety. As a result, SRPPF project personnel upgraded a series of controls to safety significant, which included more than 100 local alarms; more than 200 gloveboxes, hoods, and sections of material transfer system trunklines; and the building fire suppression system [13] [14]. These changes delayed the project. There is no guarantee that this outcome could have been avoided if the 2021 IPR team completed its own assessment of the adequacy of facility worker protection or made its comment into a recommendation, but at a minimum, it would have forced additional review and increased visibility of a highly important safety topic at a key juncture in the design.

As an opportunity for improvement, the staff team suggests that tracking comments involving nuclear safety or requiring review teams to explain in their report why a nuclear safety comment did not rise to the threshold of a recommendation would improve visibility, ensure understanding of the safety concerns, and increase the likelihood of timely resolution. NA-90.2

stated that it now plans to proactively track nuclear safety comments in its new database. NA-90.2 stated it will begin tracking nuclear safety comments during its next two reviews this fiscal year at the Uranium Processing Facility at Y-12 National Security Complex and SRPPF at Savannah River Site.

DOE Order 413.3B has a New Requirement for Lessons Learned that has not been Incorporated into Project Reviews—DOE approved Change 7 to DOE Order 413.3B in June 2023. The order states that “[i]ndividuals leading project peer reviews, or other reviews intended to meet the project peer review requirements in this Order (e.g., EIR [external independent review] or IPR in preparation for a CD action performed in lieu of the annual PPR [project peer review]), will elicit lessons learned with potential Department-wide implications (e.g., those which may impact similar projects, or which may result in an update to an Order or Guide). Thereafter, they will enter elicited lessons learned into the lessons learned repository in the DOE lessons learned system of record, as described in DOE O 210.2 [DOE Order 210.2, *DOE Corporate Operating Experience Program*] (current version) prior to completing their review reports.”

In leading reviews of projects at multiple DOE sites, NA-90.2 is uniquely positioned to develop meaningful lessons learned. As an example, there are currently four NNSA projects that are designing and installing gloveboxes as safety systems (see Figure 5): the Uranium Processing Facility at Y-12 National Security Complex, the Los Alamos Plutonium Pit Production Project at Los Alamos National Laboratory, and SRPPF and the Surplus Plutonium Disposition projects at Savannah River Site. NA-90.2 conducts reviews for each of these projects. The lessons learned that NA-90.2 collects and enters into the DOE lessons learned system of record could help improve information exchange between these projects.



Figure 5. *Gloveboxes installed at the Plutonium Facility at Los Alamos National Laboratory.*

NA-90.2 stated that it does currently collect lessons learned from its reviews, but only maintains them informally. NA-90.2 stated it plans to incorporate new language into the revision to NNSA Supplemental Directive 413.3-1 to address the requirement for submitting lessons learned into the DOE lessons learned system of record.

NNSA Supplemental Directive 413.3-1 is Expired and Requires Revision—NNSA approved this supplemental directive in May 2021, and it expired in May 2024. The supplemental directive states that its purpose is to “establish the requirements and describe the processes for conducting Project Reviews....” This supplemental directive adds value by providing additional guidance, requirements, and information outlining the processes for conducting project reviews that are not included in DOE Order 413.3B or DOE Guide 413.3-9A. However, the supplemental directive does not currently reflect the improvements NA-90.2 made to the project review process and would also be improved by including the following additional content in the next revision:

- The current revision to the supplemental directive does not contain any definitions or guidance for the classification of review conclusions (i.e., recommendations, comments, and findings of fact). These definitions reside in recent review plans.
- The other safety observations in this report provide opportunities for adding content to improve the supplemental directive.

NA-90.2 stated that it is revising the supplemental directive. NA-90.2 also stated that the new revision will include additional definitions and guidance on the classification of review conclusions. In addition, the other staff team’s safety observations will be incorporated into the revision. Finally, NA-90.2 stated that it would provide training to its review teams on the revised supplemental directive following implementation.

Conclusion. The staff team observed two project reviews at Savannah River Site and an additional review at Los Alamos National Laboratory. The staff team assessed NNSA’s project review processes against applicable requirements in DOE Order 413.3B, NNSA SD 413.3-1, and guidance in DOE Guide 413.3-9A. Overall, the staff team concludes that NA-90.2 has improved project review processes. The staff team also identified several opportunities for further strengthening the project review process.

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- [4] Department of Energy Office of Enterprise Assessments, *Conceptual Safety Design Report Assessment for the Savannah River Plutonium Processing Facility*, December 2021.
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- [15] Department of Energy, *Program and Project Management for the Acquisition of Capital Assets*, DOE Order 413.3B, Change 7, June 2023.
- [16] National Nuclear Security Administration, *Project Reviews*, NNSA Supplemental Directive 413.3-1, May 2021.
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