## Post-Hearing Questions for the Record Submitted to the Honorable Joseph F. Bader From Senator Claire McCaskill

## "Contract Management by the Department of Energy" June 27, 2013

- 1. The Department of Energy has been on GAO's high risk list for its contract management for over 20 years. The Department's projects have had chronic cost overruns and schedule delays. One reason appears to be that safety issues are not incorporated in the design and planning phase of these projects.
  - Q: Does the Defense Nuclear Facilities Safety Board ("Safety Board") have concerns about safety issues being incorporated into project planning?

## Board's Response:

The Board continues to have concerns about DOE identifying and addressing safety issues during project planning. Ongoing Board concerns are explained in the 23<sup>rd</sup> Annual Report to Congress<sup>1</sup>, which states that the Department of Energy (DOE) continues to struggle to integrate safety early into its large, complex design projects and to improve timeliness in resolving safety-related issues. Two current examples involve the Uranium Processing Facility (UPF) at the Y-12 National Security Complex and the Hanford Waste Treatment and Immobilization Plant (WTP).

In an April 2, 2012, letter to the National Nuclear Security Administration (NNSA), the Board expressed concern that the project team developing the UPF at the Y-12 National Security Complex had not integrated safety adequately into the preliminary design. The Board identified numerous deficiencies, including that the hazard analyses failed to analyze all hazards necessary to comply with the methodology in DOE Standard 3009, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses," and DOE Standard 1189, "Integration of Safety into the Design Process," for performing unmitigated hazard analysis. NNSA is taking corrective actions to revise the UPF project's safety documentation.

In the case of Hanford WTP, DOE has (1) struggled to integrate safety into the design, (2) implemented a significant redesign of the project in 2009, well into construction, and (3) not resolved the most critical open technical issues related to nuclear safety. For example, DOE's response to the Board's Recommendation 2010-2, "Pulse Jet Mixing at the Waste Treatment and Immobilization Plant," continues to be delayed. On April 30, 2012, DOE informed the Board that the approach described in the DOE implementation plan to verify the vessel mixing system design was inadequate. DOE committed to revise their implementation plan to describe a workable approach by

<sup>&</sup>lt;sup>1</sup> This report can be found at: http://www.dnfsb.gov/board-activities/reports/reports-to-congress/twenty-third-annual-report-congress

December 31, 2012. However, in the ensuing period, the Secretary of Energy undertook a more comprehensive review of the plant's design. In a letter dated November 8, 2012, the Secretary informed the Board that this review may result in further changes to DOE's approach to resolve safety-related mixing and other technical issues. The Secretary committed to incorporate these changes into a revision of the Recommendation 2010-2 implementation plan. Meanwhile, DOE slowed the construction of two key facilities of the treatment plant to resolve longstanding safety-related issues and address the impacts of the resulting technical solutions on the WTP design.

Q: Ideally, at what point would the Safety Board be consulted in the planning process?

Board's Response:

One of the key functions in the Board's Enabling Statute is:

## (4) Review of facility design and construction.

The Board shall review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and shall recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety. During the construction of any such facility, the Board shall periodically review and monitor the construction and shall submit to the Secretary, within a reasonable time, such recommendations relating to the construction of that facility as the Board considers necessary to ensure adequate protection of public health and safety. An action of the Board, or a failure to act, under this paragraph may not delay or prevent the Secretary of Energy from carrying out the construction of such a facility.

When performing this function, the Board conducts its formal reviews of DOE's project information in accordance with the availability of documentation associated with DOE's acquisition decision process as laid out in DOE Order 413.3B, "Program and Project Management for the Acquisition of Capital Assets." Within this process, DOE's Critical Decision phases are aligned with the production of safety documentation and resolution of project issues. This allows the Board to identify and communicate any concerns it may have to DOE and stay off DOE's critical path. This is the Board's goal. Significant DOE project design changes after beginning construction or failure to adequately resolve known safety issues have resulted in cost increases and project delays. In the July 19, 2007, Joint Report to Congress, the Board and DOE stated that a number of problems have resulted from the untimely identification and resolution of safety issues during the design and construction of new defense nuclear facilities. Both the Board and DOE recognize that untimely identification and resolution of safety issues has resulted in large part from the failure by DOE to adequately identify and incorporate safety requirements into the design at the earliest stages of a project.

Q: What would allow the Safety Board to be brought into the planning process earlier?

Board's Response:

As described in the previous response, the Board's Enabling Statue requires that the Board review the design and construction of new Department of Energy defense nuclear facilities. In actual practice, the Board's involvement is predicated upon DOE's generation of safety and design documents as the project matures through the DOE's Critical Decision phases. This process is described in DOE Standard 1189 and DOE Order 413.3B. The Board carefully documents its concerns in (1) Board letters and Recommendations to DOE, (2) "Project Letters" at DOE's Critical Decision points for conceptual and preliminary design, and (3) the Board's Periodic Report to Congress.

Q: Are there other ongoing projects that the Safety Board is concerned about?

Board's Response:

The Board's Periodic Report to Congress is designed to answer this question with a section named "Projects with the Most Significant Unresolved Safety Issues." The latest Report to Congress was issued on July 15, 2013. Within that report, the Board identified the following projects as having the most significant unresolved safety issues: (1) the seismic evaluation and upgrade of Los Alamos National Laboratory's (LANL) Plutonium Facility (PF-4), (2) the Hanford Site's WTP, and (3) the UPF at the Y-12 National Security Complex. Further details and a summary of the Board's safety concerns are contained in the report.

- 2. The Safety Board conducted an investigation into the safety culture at the Waste Treatment Plant at Hanford in 2011, and found that "DOE and contractor project management behaviors reinforce a subculture that deters the timely reporting, acknowledgement and ultimate resolution of technical safety concerns."
  - Q: What specific behaviors led to this conclusion?

Board's Response:

The Board's June 9, 2011 Recommendation, "Safety Culture at the Waste Treatment and Immobilization Plant," (Board Recommendation 2011-1) states that there were significant failures by both DOE and contractor management to implement their roles as advocates for a strong safety culture. The Recommendation went on to state that there was unusually high tension at the WTP project between organizations charged with technical issue resolution and development of safety basis scope, and those organizations charged with completing design and advancing construction. This unhealthy tension rendered the WTP project's formal processes to resolve safety issues largely ineffective. DOE reviews and investigations failed to recognize the significance of this fact. Consequently, neither DOE nor contractor management had taken effective remedial

action to advance the Secretary's mandate to establish and maintain a strong safety culture at WTP.

Q: Has the Safety Board found similar subcultures at other project sites?

Board's Response:

In the Secretary's Implementation Plan to address Board Recommendation 2011-1, the Secretary of Energy agreed to conduct an Extent of Condition review to determine whether safety culture weaknesses are limited to the WTP project or are more broadly occurring in DOE's defense nuclear complex. DOE has completed the following broadened set of independent safety culture assessments:

- LANL, Chemistry and Metallurgy Research Replacement (CMRR) Project;
- Y-12 National Security Complex, UPF Project;
- Idaho Cleanup Project, Sodium Bearing Waste Treatment Project;
- Savannah River Site, Salt Waste Processing Facility;
- Pantex Plant;
- Office of Environmental Management (EM) Headquarters.

As explained in the Board's 23<sup>rd</sup> Annual Report to Congress, these assessments were led by DOE's independent recognized experts in safety culture and found weaknesses in safety culture throughout the DOE defense nuclear complex. A number of important actions remain, including performing self-assessments at sites and facilities not assessed by the Office of Health, Safety and Security; integrating the findings across the complex into a coherent whole; and developing tools to sustain a robust nuclear safety culture throughout DOE's defense nuclear complex.

- 3. One reason for DOE's poor cost estimates is that EM has initiated construction of facilities before completing their design, also known as the "design-build" model.
  - Q: How has the design-build model impacted projects from the Safety Board's perspective?

Board's Response:

The most visible "design-build" project in the DOE complex is the Hanford Site's WTP. On March 22, 2012, the Board held a Public Hearing and Meeting to discuss the status of actions related to unresolved technical safety issues in the design of the WTP and infrastructure needs at the Hanford Tank Farms. The Board also examined the

relationship between the resolution of these unresolved safety issues and development of a sound nuclear safety strategy.

In the opening remarks, the Board recognized that DOE's decision to pursue a design-build, fast-track approach for this project involves greater risk than would a traditional design and construction approach. The Board's concerns are with DOE's decisions to continue design and construction of the plant when there are many major unresolved technical issues that can impact not only safety-related controls needed to protect the public and workers, but also the reliability and capability of a plant that must operate safely for decades. Once the plant is operating and processing radioactive waste, options for physical changes in process cells will be extremely limited, costly, and likely to expose workers to hazardous situations. To the maximum extent possible, solutions to design and operational issues must be accommodated before commissioning the plant. In summary, a learn-as-we-go operating philosophy is not prudent or safe for this facility.

- 4. At the hearing there was a discussion regarding the Safety Board's role in decisions made to modify the design of the Integrated Waste Treatment Unit at Idaho and whether these modifications led to delays.
  - Q: Can you clarify the Safety Board's role in decisions to make safety modifications and what if any impact the Safety Board's recommendations had on the project's schedule?

Board's Response:

With regard to the IWTU, the Board does not believe it contributed to the increases on the project's schedule. The Board issued two letters that provided independent analysis and advice to DOE about IWTU.

The Board's enabling legislation states that the Board's mission is to provide independent analysis, advice, and recommendations to the Secretary of Energy to inform the Secretary, in the role of the Secretary as operator and regulator of the defense nuclear facilities of DOE, in providing adequate protection of public health and safety at such defense nuclear facilities. As such, the Board does not have a decision making role for safety modifications for any defense nuclear facility. That role lies solely with DOE.

In the first letter, dated January 24, 2007, the Board stated there were not any significant safety issues at the IWTU at the Idaho National Laboratory. However, the Board did state that several items should be resolved prior to final design and construction. These items are listed below and were reported as open Board issues in the Board's Periodic Report to Congress from 2007 to 2009. The Board documented DOE's resolution of these issues in the Board's February 9, 2009, Periodic Report to Congress.

• Pilot plant testing

- Waste characterization
- Distributed control system design

The topic of the second Board letter, dated May 1, 2008, was the seismic and structural design of the IWTU. The Board's reviews revealed a number of issues related to the development of the design basis ground motion and overall seismic design for the facility. The issues originated in 2006 due to DOE's change in design requirements, during the preliminary design phase, to increase the facility scope to include the ability to process additional waste stored at the Idaho site. DOE's change in project scope required that the process and packaging cells meet a higher seismic design performance than was previously required.

The letter further stated that, as a result of significant efforts made by the DOE's Idaho Operations Office (DOE-ID) and the IWTU structural designer, Simpson, Gumpertz & Heger, all issues were resolved, and appropriate changes to the design were made. The Board commended both DOE-ID and Simpson, Gumpertz & Heger for resolving these issues in an expeditious manner. IWTU is currently progressing to the hot commissioning stage of operations, which is anticipated for 2014.