TESTIMONY OF

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

SAFETY OVERSIGHT OF DEPARTMENT OF ENERGY DEFENSE NUCLEAR FACILITIES

SUBCOMMITTEE ON STRATEGIC FORCES
HOUSE ARMED SERVICES COMMITTEE

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MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to testify on nuclear safety issues at defense nuclear facilities operated by the Department of Energy (DOE) and the National Nuclear Security Administration (NNSA). This is a period of significant transition for DOE and includes billions of dollars in design and construction projects and a huge portfolio of site cleanup work, as well as ongoing activities to support the nuclear weapons stockpile. The Defense Nuclear Facilities Safety Board (Board) believes it is prudent to proactively address safety issues at DOE's defense nuclear facilities to ward off threats to public health and safety. The Board continues to champion the early integration of safety in design, efforts to improve safety culture in DOE's federal and contractor workforce, and the need to strengthen worker protections through improvements in work planning and conduct of operations at DOE's defense nuclear facilities.

Today I will briefly discuss the Board's Fiscal Year (FY) 2014 Budget Request along with the impact of the FY 2013 Continuing Resolution on the Board's mission. I will then provide some background on the Board's mission and how we operate, which will be followed by the Board's assessment of high-priority safety issues related to DOE and NNSA defense nuclear facilities. I will conclude by summarizing the changes to the Board's enabling statute enacted in the FY 2013 National Defense Authorization Act.

Resource Needs of the Defense Nuclear Facilities Safety Board

I would like to say a few words about the Board's FY 2014 Budget Request. The President's Budget Request for FY 2014 includes $29.915 million in new budget authority for the Board. This is an increase of approximately $3.1 million compared to the budget enacted in the FY 2013 Full-Year Continuing Appropriations Act, after the effect of sequestration. This budget request will support a staffing level of 120, which is the target that the Board has been growing toward for the past several years. Given the current pace and scope of activities in the DOE defense nuclear complex, the Board believes this level of staffing is necessary to provide

independent oversight to ensure that public and worker health and safety are adequately protected.

Our FY 2013 new budget authority under the Continuing Appropriations Act after sequestration is $26,785,695. To meet its financial commitments for the remainder of FY 2013, the Board will reduce planned agency travel by 29%. Travel is a vital part of fulfilling our safety oversight mission. Visits by staff to DOE defense nuclear facilities are the most effective way for the Board to conduct its firsthand assessment of safety at DOE sites. The Board will also reduce its advisory and assistance contracts by 76%. These contracts have provided a valuable source of very specific expertise to the Board. The Board continues to evaluate the fiscal landscape and may ultimately reduce oversight at some sites by reducing the number of site representatives or staff reviews. Later in this testimony, the Board will discuss the risk factors it will use to prioritize its oversight to ensure adequate protection of the public and workers.

The Board's budget is essentially devoted to maintaining and supporting an expert staff of engineers and scientists (most of whom have technical master's degrees or doctorates) required to accomplish our highly specialized work. Seventy percent of our budget request for FY 2014 is for salaries and benefits, four percent is for travel and transportation (essential because of the need to physically visit defense nuclear facilities), and three percent is for technical expert contracts. In all, approximately 80 percent of the Board's obligations are directly related to technical oversight.

As you will see in my assessment of high-priority safety issues in this testimony, the scope of the Board's mission continues to evolve and grow. The Board is required to provide safety oversight of increasingly complex, high-hazard operations critical to national defense, including assembly and disassembly of nuclear weapons, fabrication of plutonium pits and weapon secondaries, production and recycling of tritium, criticality experiments, subcritical experiments, and a host of activities to address the radioactive legacy resulting from nearly 70 years of operations. Additionally, even with DOE's decision to suspend the Chemistry and Metallurgy Research Replacement project at Los Alamos, the Board is required to provide

oversight to alternate plutonium strategies that will be necessary to support the nuclear weapons stockpile.

In a joint report to Congress on July 19, 2007, the Board and DOE agreed that early integration of safety in design is both crucial and cost-effective, as it avoids schedule delays as compared to the case when safety issues are recognized late in the design process (or worse, after construction has commenced). The failure to identify design flaws that could impact public and worker health and safety early in the design process can significantly increase project costs due to the price of re-engineering and the need to make post-construction modifications to complex DOE defense nuclear facilities. Such flaws have in the past typically increased costs and delayed operations while corrections were made. With DOE's design and construction costs on the order of $20 billion, each increase in project cost of one percent equates to an increase of about $200 million. Consequently, the Board's Fiscal Year 2014 Budget Request provides cost-effective oversight while protecting public and worker health and safety.

The same principles of oversight apply to the safe conduct of operations—hazards are recognized while the procedure for an operation is being developed, safety controls are built into the process, and the operation is then conducted safely and efficiently. Finally, the Board oversees DOE's technology development activities and brings attention to new technologies that are important to safety and should be fully mature and capable of performing their intended safety functions.

Statutory Mission and Operations of the Board

The Board was created by Congress in 1988. Congress tasked the Board to conduct independent safety oversight of defense nuclear facilities under the control or jurisdiction of the Secretary of Energy. The mission of the Board 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 the Department of Energy, in providing adequate protection of public health and safety at such defense nuclear facilities. The

Atomic Energy Act of 1954, as amended, currently establishes two categories of facilities subject to Board jurisdiction: (1) those facilities under the Secretary of Energy's control or jurisdiction, operated for national security purposes that produce or utilize special nuclear materials; and (2) nuclear waste storage facilities under the control or jurisdiction of the Secretary of Energy. The Board's jurisdiction does not extend to facilities or activities associated with the Naval Nuclear Propulsion Program, transportation of nuclear explosives or materials, the U.S. Enrichment Corporation, facilities developed pursuant to the Nuclear Waste Policy Act of 1982 and licensed by the Nuclear Regulatory Commission, or any facility not conducting atomic energy defense activities.

Under its enabling statute, 42 U.S.C. § 2286 *et seq.*, the Board is responsible for independent oversight of all programs and activities impacting public health and safety within DOE's defense nuclear facility complex – a complex that has served to design, manufacture, test, maintain, and decommission nuclear weapons and has served other national security purposes. The Board is required to review the content and implementation of DOE standards, facility and system designs, and events and practices at DOE defense nuclear facilities that the Board determines have adversely affected, or may adversely affect, public health and safety. The Board is further authorized to access and analyze any information related to a DOE defense nuclear facility. In all cases, the Board is required to make recommendations to the Secretary of Energy that the Board believes are necessary to ensure adequate protection of public health and safety. In this regard, the Board's actions are distinguishable from a regulator because the Secretary may accept or reject the recommendations in whole or in part.

Under its statute, the Board must consider the technical and economic feasibility of implementing its recommended measures. Consistent with the approach taken by DOE and with commercial nuclear regulations, the Board is not required to refrain from issuing a safety recommendation based on either consideration. Nonetheless, in formulating its recommendations to the Secretary of Energy, the Board is confident that it has considered the technical and economic feasibility of each of its recommendations. On February 14, 2013, the Board issued a report to the congressional defense committees regarding how the Board

considers the technical and economic feasibility of implementing its recommended measures. The Board is very mindful of the need for efficient and cost-effective solutions to safety problems at defense nuclear facilities. In evaluating the proper course of action for existing facilities that do not meet modern industry standards and design requirements, both the Board and DOE consider the entire suite of options for mitigating hazards as well as factors such as the remaining life of the facilities, schedules for replacing them, and means to mitigate disruptions to ongoing operations that may result from recommended safety improvements. However, the Board has no authority to specify a particular solution; that authority is the Secretary's alone.

Under the Board's statute, the Secretary of Energy may "accept" a Board recommendation but make a determination that its implementation is impracticable because of budgetary considerations or because the implementation would affect the Secretary's ability to meet the annual nuclear weapons stockpile requirements. The Secretary must report any such decision to the President and to Congress. The Secretary of Energy has never made a determination that a Board recommendation cannot be implemented due to budget impracticability. The Board believes we have executed our statute in a faithful and responsible manner.

Finally, if the Board determines that a recommendation relates to an imminent or severe threat to public health and safety, the Board is required to transmit its recommendations to the President, as well as to the Secretaries of Energy and Defense. After receipt by the President, the Board is required to make such recommendations public and transmit them to the Committees on Armed Services, Appropriations, and Energy and Commerce of the House of Representatives and the Committees on Armed Services, Appropriations, and Energy and Natural Resources of the Senate. Throughout its history, the Board has never made a determination of imminent or severe threat to the public.

The Board evaluates all of DOE's and NNSA's activities at defense nuclear facilities in the context of Integrated Safety Management (ISM). The core functions of ISM are

straightforward and have been institutionalized in policy by DOE and NNSA in response to the Board's recommendations. They are:

- Define the scope of work;
- Analyze the hazards;
- Develop and implement hazard controls;
- Perform work within controls; and
- Provide feedback and continuous improvement

ISM also institutionalizes guiding principles that form the basis for a safety-conscious and efficient organization, including:

- Balanced mission and safety priorities;
- Line management responsibility for safety;
- Competence commensurate with responsibility; and
- Identification of safety standards and requirements appropriate to the task at hand

ISM is a process-based approach in which safety considerations are built into activities as they are planned and into facilities as they are designed. ISM is far more effective than attempting to add safety measures after an activity is already planned or after a facility's basic design is established. ISM is also far more effective than an outcome or performance-based approach in which thorough consideration of safety only occurs after an inadequately planned activity results in an undesirable outcome. In a defense nuclear facility, that undesirable outcome could be a catastrophic event that cripples the facility and harms the workers and the public. It is critical to avoid the low-probability, high-consequence event that could destroy a facility or program. A performance-based outcome approach may appear successful on the surface, but underlying weakness in processes may lead to serious accidents and unwanted results.

When properly implemented at all levels, ISM results in (1) facility designs that sufficiently address hazards, (2) operating procedures that are safe and productive, and (3) feedback that drives continuous improvement in both safety and efficiency. Shortcomings in safety and efficiency in the operation of DOE and NNSA defense nuclear facilities can almost always be related to a failure to apply ISM.

The Board does not impose requirements on DOE's capital projects or other activities. The Board operates by ensuring that DOE identifies a satisfactory set of safety requirements for a project or operation, and then by evaluating DOE's application of those requirements. The safety requirements are embodied in DOE's directives and/or invoked in national consensus standards. For example, the requirement that facilities withstand seismic events and other natural phenomena hazards is a DOE requirement that is implemented in a graded fashion, including consideration of the hazard associated with the facility. The requirement to assess the probabilistic seismic hazard analysis for DOE facilities built in seismically active areas every decade is likewise a DOE requirement. Up-to-date analyses incorporate the best information available about the earthquake hazards at each site, and are vital to ensure that all DOE facilities – both existing and proposed – provide adequate protection for seismic events.

The Board's overriding priority is to protect the public, including workers. In order to provide the most efficient and effective oversight, the Board considers a set of risk factors to prioritize its oversight. These factors are:

- **Location**. Proximity to collocated workers and the offsite public;
- **Nuclear Materials**. Quantity, chemical composition (i.e., pure elements, stable compounds, reactive compounds), physical form, and radiological characteristics of material stored or handled in the facility;
- **Release Mechanisms and Energetic Events**. Mechanisms for release of materials (e.g., earthquakes, tornados, chemical reactions, fires, explosions, and other potential energy sources), nuclear criticality, highly energetic violent reactions involving nuclear explosives, or nuclear detonations;

- **Safety Control Set**. Complexity of safety controls and degree of reliance on active safety systems or administrative controls instead of passive design features;
- **Unproven or Unique Applications**. Degree of application of new or one-of-a-kind materials, processes, and technologies with limited operational experience; and
- **New Circumstances**. Changes in facility configuration, facility conditions (e.g., degradation of aging systems and structures), operations, or personnel (e.g., transition to a new operating contractor).

These risk factors are inputs to calculations performed by the Board and DOE that provide a measure of risk to the public and workers following potential releases of radiological material. More specifically, these calculations estimate doses to the public and workers resulting from natural phenomena hazards and operational accidents and are used to define the types of controls necessary to mitigate or prevent their harmful consequences.

High-Priority Nuclear Safety Issues at DOE and NNSA Defense Nuclear Facilities

I would like to highlight the following safety issues as particularly important to ensuring that the defense nuclear complex can safely accomplish its missions:

- Earthquake Hazard at Los Alamos National Laboratory;
- Early Integration of Safety in Design;
- Maintaining Adequate Safety Controls;
- Revision of DOE Standard 3009;
- Integrated Safety Management at the Activity Level;
- Hanford Waste Treatment and Immobilization Plant;
- Safety Culture;
- Conclusion of DOE's 2010 Safety and Security Reform Plan;
- Contractor Assurance Systems; and
- Longevity of High-Level Waste Storage Systems

Earthquake Hazard at Los Alamos National Laboratory

The risk posed by the Plutonium Facility (PF-4) at Los Alamos National Laboratory remains among the Board's greatest concerns. An earthquake resulting in collapse of the facility would likely result in very high radiological doses to the public in nearby towns. The Board continues to urge DOE to take meaningful, near-term action to mitigate this risk.

On October 26, 2009, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, to focus DOE and the NNSA on the need to address the danger posed by the potential for an earthquake to damage PF-4 and start a major fire in the facility. In response, NNSA took immediate actions to reduce the nuclear material at risk, combustible materials, and ignition sources. NNSA also completed analyses confirming that a large earthquake would likely damage the PF-4 structure and many of its safety systems. As a result, NNSA reinforced several structural elements, including the roof.

However, continuing review of NNSA's seismic analyses has led the Board to conclude that more needs to be done to reduce the risks at the facility. The Board issued a letter to NNSA on July 18, 2012, questioning the modeling approach that the site contractor is using in seismic analyses. In response, NNSA has begun work on an independent seismic analysis of PF-4. NNSA expects to complete this analysis in 2013.

In September 2012, the site contractor completed its own detailed analysis and identified previously unknown structural weaknesses that could result in PF-4 collapsing during an earthquake. The newly revealed weaknesses result in postulated offsite dose consequences that could significantly exceed DOE's guideline for protecting the public, despite the structural upgrades made to PF-4 in response to the Board's Recommendation 2009-2. NNSA is evaluating this new information using guidance issued by the Deputy Secretary of Energy in response to the Board's Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers*. As part of this effort, NNSA is examining the need for additional actions to strengthen the facility.

In light of the developments during 2012, the Board issued a letter to the Secretary of Energy on January 3, 2013, strongly urging DOE to take additional near-term measures to reduce the consequences of a potential earthquake-induced collapse of PF-4.

Early Integration of Safety in Design

During 2012, DOE struggled to integrate safety prior to construction of its large, complex design projects and to improve timeliness in resolving safety-related issues. For example, in an April 2, 2012, letter to NNSA, the Board expressed concern that the project team developing the Uranium Processing Facility 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 safety documentation.

In the case of the Hanford Waste Treatment and Immobilization Plant, DOE struggled to integrate safety into the design, and has not resolved the most critical open technical issues. For example, DOE's response to the Board's Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*, is being delayed. On April 30, 2012, DOE informed the Board that the approach described in its implementation plan for verifying the design of vessel mixing systems was inadequate. DOE committed to revise its implementation plan to describe a workable approach by 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 resolving the mixing issues. The Secretary committed to incorporate these changes into the planned revision of the Recommendation 2010-2 implementation plan in early 2013. Meanwhile, DOE is slowing the construction of two key

facilities of the treatment plant to resolve longstanding safety-related issues and reevaluate the plant's design.

Maintaining Adequate Safety Controls

Weaknesses in the development, review, approval, and implementation of safety controls at DOE defense nuclear facilities were highlighted in Recommendation 2010-1. In 2012, the Board noted several examples where DOE and NNSA placed insufficient emphasis on the use of bounding safety analyses and on following the well-established "hierarchy of controls" defined in DOE Standard 3009. This standard dictates that bounding, conservative safety analyses be employed and that engineered structures, systems, and components are to be preferred over reliance on administrative controls. Deficiencies noted by the Board in the selection and implementation of safety controls were communicated to DOE in the following letters:

- At Lawrence Livermore National Laboratory, the Board identified systemic deficiencies related to the development, review, and approval of safety control strategies for nuclear operations at both the Tritium Facility and the Plutonium Facility. In particular, the Board identified non-conservative accident analyses and inadequate federal oversight that resulted in mischaracterization of hazard scenarios and improper safety controls. The Board also found that the defined safety functions of certain systems could not be reliably implemented and that the boundaries of some safety systems were inappropriately defined. (Letter, Defense Nuclear Facilities Safety Board to National Nuclear Security Administration, August 30, 2012)

- At Los Alamos National Laboratory, the Board identified deficiencies in the safety bases and control strategies at the Plutonium Facility and the Area G waste storage and disposal facility. At the Plutonium Facility, the Board found that the accident analysis used non-conservative input parameters and methodologies that resulted in underestimating the offsite dose consequences of certain accident scenarios. As a result, it is likely that compensatory measures or more robust safety control strategies will be necessary. At

Area G, the weaknesses included non-conservative and inadequately supported analyses that resulted in an inadequate set of safety controls. (Letter, Defense Nuclear Facilities Safety Board to National Nuclear Security Administration, June 18, 2012; Letter, Defense Nuclear Facilities Safety Board to Los Alamos Site Office, November 19, 2012)

- At the Hanford Tank Farms, the Board determined that a revised control strategy approved by DOE was inadequate. The revised strategy downgraded the safety importance of ventilation systems that limit the accumulation of flammable gas and thereby help to prevent explosions in the high-level waste tanks. Consequently, the Board issued Recommendation 2012-2, *Hanford Tank Farms Flammable Gas Safety Strategy*, on September 28, 2012.

Revision of DOE Standard 3009, Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses

DOE issued Standard 3009 in 1994 to formalize preparation of safety analyses for its nuclear facilities. This standard established safety expectations that were applied by the contractors for the following 15 years, resulting in significant improvement to the safety posture of defense nuclear facilities. Subsequent to the issuance of subpart B, *Safety Basis Requirements*, to the Nuclear Safety Management Rule (10 CFR Part 830), DOE adopted the methodology prescribed in Standard 3009 as an acceptable approach for preparing safety bases that comply with the rule. The Board agreed that the methodology described in this standard, if implemented properly, would enhance the safety of defense nuclear facilities.

DOE approved a safety basis for one of its plutonium facilities in 2008 that was a significant departure from the approach provided in Standard 3009. In subsequent correspondence with the Board, DOE stated that the standard, though a safe harbor for 10 CFR Part 830, was nevertheless guidance rather than a prescriptive requirements document. Consequently, the Board issued Recommendation 2010-1 on October 29, 2010, in order to

strengthen DOE's regulatory framework and identify clear and unambiguous requirements for protection of the public and the workers.

One of the major actions in DOE's implementation plan for the Board's recommendation is to revise Standard 3009 so that it clearly identifies the requirements that must be met to ensure adequate protection of the public and the workers. DOE is currently working on the revision. Completing and implementing a revised standard with a clear and comprehensive set of safety requirements should improve the safety posture of DOE's defense nuclear facilities significantly.

Integrated Safety Management at the Activity Level

From 2008 to 2012, the Board's staff conducted a series of reviews at all DOE sites with defense nuclear facilities to evaluate the implementation of ISM at the activity/worker level. Effective planning of work at the activity level is based on the development of effective procedures to perform work safely and the ability of workers to follow those procedures as written. This planning is essential to accomplish DOE's mission safely and involves implementing the five core functions of ISM: defining the scope of work, analyzing the hazards, developing and implementing hazard controls, performing work within those controls, and providing feedback and continuous improvement. As the staff's reviews progressed, the Board transmitted reports to NNSA and to DOE's Office of Environmental Management detailing deficiencies and weaknesses in the implementation of ISM at the activity level.

As the final product of these reviews, the Board transmitted Technical Report DNFSB/TECH-37, *Integrated Safety Management at the Activity Level: Work Planning and Control,* to DOE in August 2012. This report concluded that DOE had not achieved sustained improvement in implementing ISM at the activity level. In the Board letter accompanying the report, the Board stated that it believes "this is in large part due to a lack of formalized requirements and guidance within DOE's directives system and the resulting lack of DOE and contractor oversight in this area." The Board is currently evaluating DOE's response.

Hanford Waste Treatment and Immobilization Plant

The Hanford Waste Treatment and Immobilization Plant (WTP), under design and construction at an estimated cost of more than $12 billion, is essential to the safe stabilization and disposal of 53 million gallons of high-level waste stored in 177 underground tanks, some of which date back to World War II. DOE began a significant redesign of the facility in 2009, when the design was already more than two-thirds complete and construction of the WTP facilities ranged from about one-quarter to halfway done. The Board is expending a significant portion of its resources evaluating the safety of the revised design, many aspects of which are continuing to evolve. Technical issues still must be resolved to support completing the design and construction of the Pretreatment Facility and, to a lesser extent, the High-Level Waste Facility at the plant. Four key safety issues that require resolution are summarized below:

- The unproven effectiveness of the mixing and transfer systems, which are essential to the operation of WTP and are needed to prevent flammable gas from accumulating in process vessels and to prevent accumulations of solids, which could pose a nuclear criticality hazard;

- Questions regarding the new control strategy for flammable gas in process systems, which implement a novel application of quantitative risk analysis as a design tool;

- The need to demonstrate that erosion and corrosion of piping, vessels, and pulse jet mixer nozzle located in black cells is within allowable limits over the 40-year design life of the facility; and

- The uncertain ability of the Tank Farms to characterize, control, and transfer waste to WTP in compliance with the waste acceptance criteria that must be met to allow the safe and successful operation of the WTP Pretreatment Facility.

Safety Culture

The Board issued Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*, following an investigation into the safety culture of the Waste Treatment and Immobilization Plant project at the Hanford Site. DOE submitted its implementation plan for the recommendation to the Board in December 2011 and provided an addendum describing additional actions in September 2012. DOE completed a number of actions from the implementation plan during 2012, many of which focused on working to achieve and reinforce a safety conscious work environment at Hanford and across the DOE defense nuclear complex. Notably, the Secretary of Energy conducted a town hall meeting at Hanford to directly convey his expectations to the management personnel and staff of DOE and its contractors. DOE also developed training on achieving a safety conscious work environment for the senior leadership of DOE and its contractors.

As part of the implementation plan, DOE's Office of Health, Safety and Security undertook independent assessments of the safety culture at DOE's Office of Environmental Management, the operating contractor at the Pantex Plant, as well as several major design and construction projects across the complex. These assessments were led by recognized experts in safety culture and found numerous areas needing attention. 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.

Conclusion of DOE's 2010 Safety and Security Reform Plan

During 2012, the Board completed its review of key safety directives that DOE had revised as part of the *DOE 2010 Safety and Security Reform Plan.* These directives included:

- DOE Order 420.1C, *Facility Safety;*

- DOE Guide 420.1-1A, *Nonreactor Nuclear Safety Design Guide for Use with DOE O 420.1C, Facility Safety;*
- DOE Standard 1066-2012, *Fire Protection;* and
- DOE Standard 1020-2012, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*

The Board ensured that the final versions included effective sets of safety requirements. DOE's approval of these directives on December 4, 2012, officially concluded the Reform Plan.

The Reform Plan significantly reduced the number of directives controlled by DOE's Office of Health, Safety and Security (HSS). However, the requirements that help ensure the safety of the public and workers at defense nuclear facilities remained largely unchanged. DOE started with 107 HSS directives (73 of interest to the Board) and ended with 55 HSS directives (40 of interest to the Board). Directives that are "of interest to the Board" involve any activity or operation at DOE defense nuclear facilities that could impact nuclear safety; for example, directives may include fire protection, quality assurance, and chemical safety.

Contractor Assurance Systems

During its May 2010 public hearing on DOE's implementation of Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, the Board expressed its concerns about DOE's increasing reliance on contractor assurance systems and the corresponding reduction in the level of independent Federal oversight for safety. As part of the Board's ongoing review of safety management programs, Board members and staff continue to find problems with the effectiveness of contractor assurance systems in identifying and correcting safety issues. Board members have addressed the use and effectiveness of contractor assurance systems during site visits and hearings. The Board is aware of lessons learned from the security incident at the Y-12 National Security Complex and will closely monitor safety management programs at defense nuclear facilities for applicability of the security lessons to safety management.

Longevity of High-Level Waste Storage Systems

DOE's plan for cleanup of the high-level waste Tank Farms at the Hanford Site rests on the integrity of 28 double-shell tanks at the site. These million-gallon tanks are to be used for decades as storage space for waste retrieved from the 149 older single-shell tanks. They will serve as feed tanks for the Waste Treatment and Immobilization Plant and for other supplemental treatment facilities designed to immobilize the waste for long-term storage and disposal.

During 2012, DOE discovered that the inner shell of Tank 241-AY-102, the first double-shell tank built at Hanford, had leaked a small quantity of waste onto the floor of the outer shell. The source of the leak was not visible, but DOE believes the leak was most likely due to corrosion of the steel bottom of the inner shell. DOE researched records from the construction of Tank 241-AY-102 and found evidence of problems that may have resulted in the inner shell being more susceptible to degradation than the other double-shell tanks. Presently, it is uncertain if the leak was caused by a defective weld, stress corrosion cracking, pitting corrosion, or some other factor. The uncertainty makes it difficult to predict the susceptibility of other tanks to failure as well as the ability of the outer shell of Tank 241-AY-102 to contain the leaking waste, since that shell also experienced construction difficulties. DOE has begun an extent-of-condition evaluation of six similar tanks and is considering options for eventually transferring waste from Tank 241-AY-102 should DOE determine that such a transfer is necessary. The Board is closely monitoring this effort because of the specific hazard posed by a leak from Tank 241-AY-102 and because of the broader implications for the high-level waste cleanup program at Hanford. It is worth noting that many double-shell tanks will be well beyond their design life before they are emptied.

In February of 2013, DOE announced that single-shell tanks are continuing to leak. This situation reinforces the need to retrieve and treat the tank waste and be vigilant in maintenance and safe operations in the Hanford Tank Farms for the foreseeable future.

Changes to the Board's Enabling Statute in the FY 2013 NDAA

The National Defense Authorization Act for Fiscal Year 2013 (NDAA), as passed by Congress and signed into law by the President on January 2, 2013, made a number of meaningful amendments to the Board's enabling legislation. Several of these amendments are listed below.

Section 3202(a) of the NDAA amended section 2286(c) of the Board's enabling legislation to provide further congressional direction regarding the Board's operation. Specifically, section 3202 modified the first sentence in section 2286(c)(2) to read "*In accordance with paragraph (5)*, the Chairman...," and added the following paragraph to the end of section 2286(c):

(5) Each member of the Board, including the Chairman and Vice Chairman, shall—

(A) have equal responsibility and authority in establishing decisions and determining actions of the Board;

(B) have full access to all information relating to the performance of the Board's functions, powers, and mission; and

(C) have one vote.

This amendment provides helpful clarification of the rights and responsibilities of the collective Board, which were not previously codified.

Section 3202(b) of the NDAA amended section 2286a of the Board's enabling act to add the following mission statement:

(a) Mission. – The mission of the Board shall be 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 the Department of Energy, in providing adequate protection of public health and safety at such defense nuclear facilities.

This amendment aligns with the Board's historical and current interpretation of its statutory mandate. The new section 2286a(a) codifies that the mission of the Board is to provide

independent analysis, advice, and recommendations to the Secretary of Energy to ensure that public health and safety are adequately protected.

Section 3202(b) of the NDAA also amended section 2286(b)(5) of the Board's enabling act to read:

> "In making its recommendations, the Board shall consider, *and specifically assess risk (whenever sufficient data exists),* the technical and economic feasibility of implementing the recommended measures."

The Board is developing a policy statement to ensure that it properly performs the "risk assessment" requirement when issuing a recommendation to the Secretary of Energy.

Section 3202(c) modified section 2286d of the Board's enabling act to alter the process by which the Board submits recommendations to the Secretary of Energy. Specifically, section 3202(c) added the following new subsection (a) to section 2286d:

> **(a) Submission of Recommendations.—(1)** Subject to subsections (h) and (i), not later than 30 days before the date on which the Board transmits a recommendation to the Secretary of Energy under section 312, the Board shall transmit to the Secretary in writing a *draft* of such recommendation *and any related findings, supporting data, and analysis* to ensure the Secretary is adequately informed of a formal recommendation and to provide the Secretary an opportunity to provide input to the Board before such recommendation is finalized.
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> **(2)** The Secretary may provide to the Board comments on a draft recommendation transmitted by the Board under paragraph (1) by not later than 30 days after the date on which the Secretary receives the draft recommendation. The Board may grant, upon request by the Secretary, *additional time* for the Secretary to transmit comments to the Board.
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> **(3)** After the period of time in which the Secretary may provide comments under paragraph (2) elapses, the Board may transmit a final recommendation to the Secretary.

The Board is presently developing several directives and policy statements on the subject of "draft recommendations." The policy statement will articulate: (1) the Board's procedure for creating, voting upon, and transmitting a "draft recommendation" to the Secretary; (2) the Board's extension of time for all Secretarial comments; (3) the Board's expectation regarding the form of Secretarial comments; (4) how those comments will be collected and stored; and (5) the Board's procedure for transmitting a "final recommendation" to the Secretary.

Section 3202(f) added a section to the Board's enabling legislation requiring the Board to obtain inspector general services.

(a) In General.—Not later than October 1, 2013, the Board shall enter into an agreement with an agency of the Federal Government to procure the services of the Inspector General of such agency for the Board, in accordance with the Inspector General Act of 1978 (5 U.S.C. App.). Such Inspector General shall have expertise relating to the mission of the Board.

(b) Budget.—In the budget materials submitted to the President by the Board in connection with the submission to Congress, pursuant to section 1105 of title 31, United States Code, of the budget for each fiscal year, the Board shall ensure that a separate, dedicated procurement line item is designated for the services of an Inspector General under subsection (a).

The Board is actively working to comply with this amendment.

Conclusion

The Board is confident that DOE has put in place a safety framework that facilitates the safe operation of its defense nuclear facilities. This safety framework is based on Integrated Safety Management, which is a process-based approach in which safety considerations are built into activities as they are planned and into facilities as they are designed. When properly implemented at all levels, Integrated Safety Management results in facility designs that efficiently address hazards, operating procedures that are safe and productive, and feedback that drives continuous improvement in both safety and efficiency.

The Board believes DOE has demonstrated a good safety record. However, we cannot ignore the current and emerging challenges that will define the future of DOE's defense nuclear facilities, the need for federal stewardship of this enterprise, and the federal commitment to protect the health and safety of the workers and the public. Today's challenges of aged infrastructure, design and construction of new and replacement facilities, and the undertaking of a wide variety of new activities in defense nuclear facilities coupled with ongoing mission support activities require continued vigilance in safety oversight to assure public and worker protection.

I anticipate that the issues I have described are familiar to DOE, NNSA, and our congressional oversight committees. They have been previously identified by the Board in public documents, such as letters to DOE and NNSA, reports to Congress that summarize unresolved safety issues concerning design and construction of defense nuclear facilities, reports to Congress on aging facilities, and the Board's Annual Report to Congress. These reports and documents are available for review on the Board's public web site.