TESTIMONY OF

MS. JESSIE H. ROBERSON, VICE CHAIRMAN

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

SAFETY OVERSIGHT OF DEPARTMENT OF ENERGY DEFENSE NUCLEAR FACILITIES

SUBCOMMITTEE ON STRATEGIC FORCES
HOUSE ARMED SERVICES COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

MARCH 24, 2015

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). The Defense Nuclear Facilities Safety Board (Board) is a small agency, overseeing billions of dollars in DOE construction projects, a huge portfolio of site clean-up work, and ongoing activities supporting the nuclear weapons stockpile. We strive to proactively address safety issues at DOE defense nuclear facilities to ward off threats to public health and safety. Specifically, we have advised and will continue to advise DOE and NNSA on the need to effectively integrate safety into the design of new facilities, strengthen the protection of workers through improvements in work planning and conduct of operations, and improve emergency preparedness and safety culture at sites with defense nuclear facilities.

Today I will briefly discuss the Board's Fiscal Year (FY) 2016 Budget Request. I will then provide some background on the Board's mission and operations, followed by the Board's assessment of high-priority safety issues related to DOE and NNSA defense nuclear facilities. Last year's radioactive material release at the Waste Isolation Pilot Plant (WIPP) demonstrated the significant impact likely to result from any radiological incident at a DOE defense nuclear facility. The WIPP radioactive material release resulted in 22 workers receiving low-level intakes of radioactive material and severely contaminated the underground waste disposal facility. Waste disposal operations have been shut down for over 13 months, and they will likely remain shut down for at least another year. This has impacted cleanup activities across DOE's entire defense nuclear

complex and illustrates that even activities judged to be relatively low-risk can still have major safety consequences and large impacts on DOE's ability to accomplish its mission when radioactive materials are involved. The Board is the only government agency that provides independent scientific and technical oversight of DOE and NNSA defense nuclear facilities.

Resource Needs of the Board

The President's Budget Request for FY 2016 includes $29.15 million in new budget authority for the Board. This is an increase of $650,000 compared to the budget enacted in the Consolidated and Further Continuing Appropriations Act for FY 2015. This Budget Request will support a staffing level of 122.5 full-time equivalent (FTE) employees. Effective next fiscal year the Board's employee ceiling will be 130 full-time equivalent personnel, and we are striving to achieve an on-board strength of 125 employees by the end of FY 2016. We believe this level of staffing will allow the Board to (1) provide independent oversight to ensure that public and worker health and safety are adequately protected, given the current pace and scope of activities in the DOE defense nuclear complex; (2) implement improved internal controls over the Board's operations; and (3) be responsive to the permanent assignment of the Nuclear Regulatory Commission's Office of Inspector General (NRC-OIG) as the Board's Inspector General (IG) by the National Defense Authorization Act for FY 2015 (NDAA). The Consolidated and Further Continuing Appropriations Act for FY 2015 echoed the NDAA's IG amendment, and appropriated $850,000 directly to the NRC-OIG for that purpose.

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 the Board's highly specialized work. Nearly 80 percent of the Board's obligations are directly related to technical oversight. Of that, seventy percent of the Board's Budget Request for FY 2016 is for salaries and benefits, four percent is for travel and transportation—essential because of the need to physically visit DOE defense nuclear facilities—and three percent is for technical expert contracts. In all, nearly 80 percent of the Board's obligations are directly related to technical oversight.

Statutory Mission and Operations of the Board

The Board was created by Congress in 1988. The statutory 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, offsite transportation of nuclear explosives or materials, the U.S. Enrichment Corporation—now known as Centrus Energy Corp.—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, as well as other national security purposes. To effectuate its oversight mission, the Board is statutorily mandated 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 support of its mission, the Board may conduct investigations, issue subpoenas, hold public hearings, gather information, conduct studies, establish binding reporting requirements for the Secretary, and take other actions in furtherance of its review of health and safety issues at DOE defense nuclear facilities. These powers facilitate accomplishment of the Board's primary function to independently oversee the safety of DOE's defense nuclear facilities. The Secretary of Energy is required to cooperate fully with the Board and provide the Board with ready access to such facilities, personnel, and information the Board considers necessary to carry out these responsibilities.

Board Safety Recommendations

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. The Secretary may accept or reject the recommendations in whole or in part. To enhance collaboration between the Board and DOE, Congress revised the Board's enabling legislation in the NDAA for FY 2013 to require the Board to provide its safety recommendations to the Secretary of Energy in "draft" form, and to allow the Secretary 30 days to comment on the draft recommendations prior to finalization and publication in the Federal Register. The Board issued the first recommendation that followed the revised process last year. That recommendation was recently accepted by the Secretary, and DOE is currently working on development of its implementation plan.

Another revision to the Board's enabling legislation in the NDAA for FY 2013 directed the Board to "specifically assess risk (whenever sufficient data exists)" in making its recommendations. Consistent with commercial nuclear industry practices, an assessment of risk involves an evaluation of (1) what can go wrong, (2) how likely it is, and (3) what its consequences might be. In performing a risk assessment, the Board takes many factors into account, including: (1) proximity to collocated workers and the offsite public; (2) quantity, chemical composition, physical form, and radiological characteristics of material stored or handled in the facility; (3) mechanisms for release of materials such as earthquakes, tornados, chemical reactions, fires, explosions, nuclear criticality, highly energetic violent reactions involving nuclear explosives, nuclear detonations, and other

potential energy sources; and (4) complexity of safety controls and the degree of reliance on active safety systems or administrative controls instead of passive design features.

Per its statute, the Board must consider the technical and economic feasibility of implementing its recommended measures. 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. We are very mindful of the need for efficient and cost-effective solutions to safety problems at DOE defense nuclear facilities and perform independent oversight of DOE's evaluation of options for mitigating hazards. DOE may consider 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 various congressional committees.

If the Board were to determine that a recommendation relates to an imminent or severe threat to public health and safety, the Board would be required to simultaneously transmit the recommendation to the President and the Secretary of Energy, and copy for

informational purposes the Secretary of Defense. After receipt by the President, the Board would also be required to make such a recommendation public and transmit it 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. The President has the exclusive authority to make the decision concerning acceptance or rejection of the Board's recommendation, and must notify the relevant congressional committees of the decision and reasons therefor. The Board has never determined that a recommendation relates to an imminent or severe threat to the public.

Current Nuclear Safety Issues at DOE and NNSA Defense Nuclear Facilities

The Board's mission is broad and constantly evolving. The Board is required to provide safety oversight of 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 70 years of operations. 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. 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.

I would like to highlight the following safety issues:

- Criticality Safety at the Los Alamos Plutonium Facility
- Earthquake Hazard at Los Alamos National Laboratory
- Nuclear Explosive Safety
- Early Integration of Safety in Design
- Work Planning and Control
- Recovery Actions at WIPP
- Emergency Preparedness and Response

Criticality Safety at the Los Alamos Plutonium Facility

Since 2005, NNSA has recognized that the Los Alamos National Laboratory's criticality safety program does not fully comply with applicable requirements. In 2013, a severe staffing shortage in the Laboratory's criticality safety group inhibited progress in correcting the deficiencies in this program. Reviews by the Board's staff in 2013 brought this concern as well as new deficiencies in the Laboratory's criticality safety program to the attention of Laboratory management and NNSA. On June 27, 2013, the Laboratory Director paused all programmatic activities at the Los Alamos Plutonium Facility (PF-4).

During the first few months of 2014, NNSA resumed operations in PF-4 that pose a lower criticality safety risk; many others remained under the Laboratory Director's operational pause while Laboratory personnel continued to execute corrective actions. Due to the length of time that has elapsed since the Laboratory last performed many higher-risk operations, DOE directives require federal readiness assessments prior to resuming the operations. NNSA plans to perform several of the readiness assessments in 2015. The Board's staff will closely monitor these readiness assessments to ensure that

the Laboratory's corrective actions have effectively addressed all deficiencies in criticality safety and conduct of operations.

Earthquake Hazard at Los Alamos National Laboratory

A 2007 reanalysis of potential earthquakes at Los Alamos indicated a greater than fourfold increase in the predicted earthquake ground motion over the original design requirements for PF-4. PF-4 was designed and constructed in the 1970s, and its structure lacks the ductility and redundancy required by today's building codes and standards. PF-4 contains significant amounts of plutonium, much of it in dispersible forms. The facility's safety documentation, approved by NNSA in December 2008, indicated that the radiation dose consequence to the public following an earthquake and resulting fire could exceed DOE's allowed levels by several orders of magnitude.

Since 2007, much has been done to strengthen the structure of the building and to reduce the likelihood and severity of a post-seismic fire, and further improvements are planned. Notwithstanding those improvements, additional analyses have raised further questions regarding the possibility of severe damage to the facility, including a potential facility collapse following a design basis earthquake.

In September 2012, the Deputy Secretary of Energy directed NNSA to evaluate the seismic vulnerability of PF-4 using a new modeling approach. This alternate analysis has been performed by an independent engineering firm. NNSA originally informed the Board that it expected the alternate analysis to be completed in early 2014; this timeline has continued to slip. NNSA chartered an expert panel to assess the results of the

analysis completed thus far. NNSA recently informed the Board that it expects by the end of March 2015 to have the information necessary to finalize the path forward to ensure appropriate seismic margin for PF-4. The Board will evaluate NNSA's plan for further analyses and/or additional structural upgrades once it is defined.

Nuclear Explosive Safety

The primary mission of the Pantex Plant is to assemble, disassemble, examine, and dismantle nuclear weapons. The highest level of safety oversight is warranted to preclude an accident involving a nuclear detonation or violent reaction of high explosives. Personnel in NNSA's nuclear explosive safety program are responsible for ensuring all operations meet the required standard of safety for these high-hazard operations. The Board has continually urged NNSA to strengthen its nuclear explosive safety program.

Throughout 2013 and 2014, NNSA realigned nuclear explosive safety responsibilities and authorities at the headquarters level and worked to revise its nuclear explosive safety directives, including two revised DOE Orders and a new NNSA Supplemental Directive. The Board is working closely with NNSA to ensure there is no lapse in nuclear explosive safety as NNSA strives to implement its new organizational structure and begin executing the newly defined processes and standards.

Early Integration of Safety in Design

During 2014, DOE made progress in resolving certain safety issues affecting complex design and construction projects. Examples include the Sludge Treatment

Project at the Hanford Site, where Board safety issues identified in earlier stages of design with safety instrumented systems were addressed by DOE prior to the final design stage, and the Waste Treatment and Immobilization Plant (WTP) at the Hanford Site, where DOE adopted a key design standard that effectively addressed some open Board issues.

DOE has refocused its approach for WTP to pursue direct feed of waste for vitrification in the Low Activity Waste Facility while it addresses issues with the other WTP facilities. The Board is reviewing this plan as it develops and has not identified significant safety issues thus far.

DOE continued to struggle with many open safety issues for the other WTP facilities. In 2012, DOE slowed the construction of the Pretreatment and High-Level Waste Facilities to resolve safety issues and to reevaluate the project's design. In 2014, DOE authorized the WTP contractor to resume engineering work to finalize the design of the High-Level Waste Facility. The Board reviewed the revised safety documentation for these facilities and identified safety issues in 2014 concerning volcanic ashfall events and unanalyzed melter accidents. Further issues with the High-Level Waste Facility identified by the Board thus far in 2015 include the seismic classification of safety components and the need for a strategy to prevent hydrogen explosions following a loss of power.

The Board uses "project letters" to provide timely notification of safety issues to DOE at major project milestones (known as "Critical Decisions") to ensure that DOE is aware of unresolved safety issues and to assist DOE in evaluating a project's readiness to

move forward. During 2014, the Board completed two project letters. The Board concluded that no significant safety issues remained for Hanford's Sludge Treatment Project at the completion of final design and documented that conclusion by letter to DOE on May 2, 2014. In an August 7, 2014, letter to DOE, the Board reiterated outstanding issues at the completion of final design of the Transuranic Waste Facility project at Los Alamos National Laboratory. The letter also identified new issues with worker safety controls for that facility.

During the Board's October 7, 2014, public hearing on safety culture in DOE, the Secretary of Energy testified that DOE was in the process of revising its fundamental project management structures to improve the execution of projects. The Secretary announced the changes on December 1, 2014, in a memorandum titled *Improving the Department's Management of Projects*. Important changes include strengthening the Energy Systems Acquisition Advisory Board, establishing a project management risk committee, and directing the Under Secretaries to develop plans to clarify lines of responsibility and improve the peer review process. The Secretary's memorandum also directed all programs to ensure their projects comply with DOE Orders and directed the establishment of a project leadership institute to create and sustain a culture of project delivery excellence.

Work Planning and Control

In 2012, the Board concluded that DOE had not achieved sustained improvement in the planning and control of hazardous work in defense nuclear facilities. In 2014, DOE completed a new DOE directive providing comprehensive guidance for contractors

and revised its directive on federal oversight to explicitly address work planning and control. The Board's staff closely followed these efforts, providing comments to assist and enhance the resulting products. DOE issued a new DOE Handbook 1211-2014, *Activity-level Work Planning and Control Implementation*, and revised DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*.

Also in 2014, the Board's staff assessed work planning and control at the Y-12 National Security Complex, the Hanford Plutonium Finishing Plant, the Savannah River Site, and the Los Alamos National Laboratory. The Board's staff also observed DOE assessments of work planning and control at the Idaho Advanced Mixed Waste Treatment Project and at Sandia National Laboratories. The Board's staff noted improvement in the implementation and oversight of work planning and control during these assessments. Implementation of the new directives should enable DOE and its contractors to achieve and sustain further improvements and better ensure worker safety at defense nuclear facilities.

Recovery Actions at WIPP

WIPP suspended operations on February 5, 2014, following a fire involving an underground vehicle. Nine days later, on February 14, 2014, a release of radioactive material occurred underground, contaminating a portion of the mine and releasing a small amount of radioactive contamination into the environment. Fortunately, no workers were underground at the time, but 22 workers at ground level received low-level intakes of radioactive material. DOE suspended disposal of transuranic waste at WIPP to

investigate the accidents and develops corrective actions. DOE completed its fire investigation but is still finalizing the report of its investigation into the cause of the radioactive material release.

Elimination of the hazards posed by shallow burial and surface storage of transuranic waste at DOE's other defense nuclear facilities has been delayed by the suspension of operations at WIPP. The Board deployed members of its staff to WIPP to closely monitor DOE's response and recovery actions for the accidents, and sent three letters to the Secretary of Energy in 2014 regarding establishing and maintaining safe conditions at WIPP. The Board continues to closely monitor ongoing recovery actions and DOE's development of facility modifications and other corrective actions to ensure transuranic waste disposal operations can be conducted safely at WIPP.

Emergency Preparedness and Response

During the past several years, the Board examined issues associated with the emergency preparedness and response capabilities at DOE sites during Board site visits and at several public hearings. Members of the Board's staff reviewed the emergency management programs at several defense nuclear facilities and provided continuous oversight of the response to the truck fire and radioactive material release events at WIPP. The Board's site representatives made numerous observations of the state of emergency preparedness at their respective sites. The increased oversight revealed a number of significant issues that warranted near-term resolution. As a result, on September 3, 2014, the Board issued Recommendation 2014-1, *Emergency Preparedness and Response*, recommending that DOE make specific improvements in its emergency

management requirements and implementation to ensure the continued protection of workers and the public.

The Secretary of Energy accepted the Recommendation on November 7, 2014. DOE is in the process of developing its implementation plan to accomplish the improvements specified in the Recommendation.

The Board's staff will continue to review the effectiveness of emergency management programs at defense nuclear facilities. Reviews will include observing emergency response drills and exercises and targeted reviews of site emergency management program elements, as well as continued oversight by the Board's site representatives.

Conclusion

We believe DOE has demonstrated a good safety record. However, 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 the Board's congressional oversight committees. They have been previously identified by the Board in public documents, such as letters to DOE and NNSA, and reports to Congress. These reports and documents are available for review on the Board's public web site.