

TESTIMONY OF
DR. PETER S. WINOKUR, 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

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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), including the National Nuclear Security Administration (NNSA). DOE remains in a state of transition, with billions of dollars in construction projects and a huge portfolio of site clean-up 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. DOE needs to effectively integrate safety into the design of new facilities, improve the safety culture in their federal and contractor workforce, and strengthen the protection of workers 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) 2015 Budget Request. I will then provide some background on the Board's mission and how it operates, followed by the Board's assessment of high-priority safety issues related to DOE defense nuclear facilities. Finally, I will address the Board's focus on management and communications.

Resource Needs of the Board

I would like to say a few words about the Board's FY 2015 Budget Request. The President's Budget Request for FY 2015 includes \$30.15 million in new budget authority for the Board. This is an increase of approximately \$2.15 million compared to the budget enacted in the Consolidated Appropriations Act for FY 2014. This Budget Request will

support a staffing level of 125 full-time equivalent (FTE) employees. The Board believes this level of staffing will allow the Board to (1) provide independent oversight sufficient 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 Nuclear Regulatory Commission's Inspector General, who was assigned as the Board's Inspector General in the Consolidated Appropriations Act for FY 2014.

During FY 2013 and the first quarter of FY 2014, the Board reduced agency travel to defense nuclear facilities and curtailed advisory and assistance contracts because of the reduced budget authority under sequestration and the uncertainty of future funding under continuing resolutions. Travel is a vital part of fulfilling the Board's safety oversight mission. Performing oversight of field activities at DOE defense nuclear facilities is the most effective way for the Board to conduct its firsthand assessment of safety at DOE sites. Advisory and assistance contracts are likewise important to the Board as a source of very specific expertise to supplement the Board's staff's capabilities for reviews of particular safety issues. Since the enactment of the Consolidated Appropriations Act for FY 2014, the Board has been able to restore its field oversight activities and to resume obtaining outside expertise through advisory and assistance contracts. The President's Budget Request for FY 2015 increases support for field oversight activities.

Recent events at the Waste Isolation Pilot Plant (WIPP) underscore the need for the Board to carefully monitor all of DOE's defense nuclear facilities. From a distance,

waste disposal at WIPP can seem like a relatively benign operation. Yet, just this past February, an underground fire and then a release of radioactive material occurred. The Board is reviewing available information to assess the causal factors, emergency response, recovery activities, and corrective actions for both these events. Operations at the WIPP site were not performed with the rigor necessary for a hazard category 2 defense nuclear facility, especially for operations that were deemed to be nonnuclear in nature. Both the federal and contractor workforce proved unprepared for emergency response. No one was seriously hurt in either event, but these were both near misses. Since 2010, the Board has sent four letters to DOE that revealed flaws in WIPP's fire protection program, maintenance practices, activity-level work planning and execution, and electrical safety program. Our staff has followed up and has observed incremental improvements; however, some issues, particularly those that identified fire hazards and associated risks for underground operations were not adequately assessed in the facility Fire Hazard Analysis. These events illustrate that activities judged to be relatively low-risk can still have major safety consequences and correspondingly large impacts on DOE's ability to accomplish its mission, particularly when radioactive materials are involved.

The Board's budget is 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. Seventy-one percent of the Board's Budget Request for FY 2015 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. This distribution will be adjusted to add several staff to perform function necessary to efficiently address the reviews and audits by the NRC-IG.

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 70 years of operations. Additionally, continued uncertainty regarding the path forward for modernizing uranium capabilities at the Y-12 National Security Complex and plutonium capabilities at Los Alamos National Laboratory means that the Board is required to provide safety oversight both of ongoing work in existing facilities that do not meet modern safety standards and of the safety aspects of alternate plutonium and uranium strategies that will be necessary to support the nuclear weapons stockpile in future years.

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. Moreover, 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. The Board has been committed to working with DOE to effect early integration of safety in design with such projects as the Uranium Capabilities Replacement Project, also known as UPF. However, as you know, that project is undergoing major restructuring due to cost growth not related to safety issues. Nevertheless, with DOE's design and construction costs going forward on the order of \$20 billion, the Board's FY 2015 Budget Request will provide cost-effective oversight while protecting public and worker health and safety.

The Board employs a similar approach to safety oversight of DOE's technology development for facility systems, processing equipment, and other technologies that have safety ramifications. The Board brings attention to such technologies to ensure that DOE demonstrates that they are fully mature and capable of performing their intended safety functions before they are implemented in a defense nuclear facility. For example, the Board's Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*, addressed safety concerns related to a novel mixing technology planned for use in the new facilities being built to pretreat and immobilize high-level waste at the Hanford Site. The Board applies the same principles of oversight to work planning and control and the safe conduct of operations—when hazards are recognized while the procedure for an operation is being developed, safety controls can be built into the process, allowing the operation to be conducted safely and efficiently.

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, 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 reporting requirements for DOE, 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. 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. To enhance collaboration between the Board and DOE, Congress revised the Board's enabling legislation in the National Defense Authorization Act 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.

Under its statute, the Board must consider the technical and economic feasibility of implementing its recommended measures. 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.

Another revision to the Board's enabling legislation in the National Defense Authorization Act 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 (e.g., earthquakes, tornados, chemical reactions, fires, explosions, and other potential energy sources), nuclear criticality, highly energetic violent reactions involving nuclear explosives, and nuclear detonations; and (4) complexity of safety controls and the degree of reliance on active safety systems or administrative controls instead of passive design features.

The Board is very mindful of the need for efficient and cost-effective solutions to safety problems at defense nuclear facilities and performs independent oversight of DOE's evaluation of options for mitigating hazards. These options may include 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 transmit the recommendation to the President, as well as to the Secretaries of Energy and Defense. After receipt by the President, the Board would also be 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.

Board's Evaluation of DOE's Activities at Defense Nuclear Facilities

The Board evaluates DOE'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 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.

Properly applied, ISM allows management to institutionalize 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. In safety space, ISM is also far more effective than an outcome or performance-based approach in which 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 nuclear security 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 consequences are simply unacceptable.

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.

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 the risk of a facility or activity in prioritizing its oversight, as described above in the discussion of the Board's process for developing safety recommendations. Those risk factors serve as 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;
- Criticality Safety at the Los Alamos Plutonium Facility;
- Early Integration of Safety in Design;
- Revision of DOE Standard 3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*;
- ISM at the Activity Level;
- Longevity of High-Level Waste Storage Systems; and
- Emergency Preparedness, Response, and Recovery.

Earthquake Hazard at Los Alamos National Laboratory

The risk posed by the Plutonium Facility (PF-4) at the Los Alamos National Laboratory remains among the Board's greatest safety concerns. 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. A 2007 reanalysis of potential earthquakes at Los Alamos indicated a greater than fourfold increase in the predicted earthquake ground motion. PF-4 contains significant amounts of plutonium, much of it in dispersible forms such as powders and liquids stored in containers not certified to survive facility collapse. 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.

On October 26, 2009, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, to focus the attention of DOE and NNSA leadership on the need to address the danger posed by an earthquake and subsequent fire at PF-4. In response, the laboratory undertook a series of actions to improve the safety posture of this facility. These actions included efforts to strengthen the structure of the building and to reduce the likelihood and severity of a post-seismic fire.

In 2011, the laboratory contractor discovered that the increase in the seismic ground motion postulated in the updated probabilistic seismic hazard analysis for the site could lead to collapse of PF-4, amplifying the Board's concerns regarding a seismic event at PF-4. NNSA's initial modeling of this accident identified structural vulnerabilities that

could fail and result in loss of confinement capability or collapse. Subsequently, the laboratory contractor initiated upgrades to address the vulnerabilities. NNSA also sponsored a more detailed seismic analysis to further refine PF-4's response to a major earthquake. The analysis, completed in September 2012, identified two additional weaknesses that could result in collapse. The laboratory has begun physical modifications to the facility to address these weaknesses, with an initial completion target date of March 2016.

The Board expressed concern to the Deputy Secretary of Energy in a letter dated July 18, 2012, that this latest analysis was proceeding without adequate definition and technical justification. Subsequently, the Deputy Secretary of Energy directed NNSA to evaluate PF-4 using a second modeling approach. This alternate analysis is currently being performed by an independent engineering firm. Results are expected in the spring of 2014.

On January 3, 2013, the Board issued a letter to the Secretary of Energy urging implementation of additional near-term measures to protect the public while analyses are under way. In a letter to the Board dated March 27, 2013, the Secretary identified near-term actions being taken. The Secretary asserted that, notwithstanding its known vulnerabilities, PF 4 is safe because it meets DOE's standard for providing confinement of radioactive materials. The Board responded by letter on July 17, 2013, challenging the validity of the methodology supporting the Secretary's conclusions. At this time, the Board is awaiting the results of the alternative analysis.

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. Recently, a severe staffing shortage occurred in the laboratory's criticality safety group and has inhibited progress in correcting the deficiencies in this program. In May 2013, the Board's staff conducted a review of the criticality safety program at PF-4. The staff review team identified several new criticality safety concerns, including widespread weaknesses in conduct of operations. Specifically, the Board staff's concerns included the following: (a) many procedures did not include criticality safety controls, (b) operators typically did not utilize written procedures when performing fissile material operations, (c) packages containing fissile material were not labeled with parameters relevant to criticality safety, and (d) some credible abnormal conditions were not properly analyzed in criticality safety evaluations.

Subsequent to this review, the laboratory performed an extent-of-condition assessment that found additional deficiencies in criticality safety and conduct of operations, including several instances where operating procedures could not be executed as written. On June 27, 2013, the laboratory director paused all programmatic activities in PF-4. The pause remains in effect as of the date of this testimony. On July 15, 2013, the Board issued a letter and report to the Secretary of Energy to assist NNSA in improving criticality safety and conduct of operations at Los Alamos.

On December 6, 2013, NNSA provided to the Board a report from the laboratory contractor that described the root causes of recent criticality safety infractions and

detailed actions to be taken prior to resuming operations. Identified causes included (a) deficiencies in management commitment to criticality safety, self-discovery, communication to the worker, and continuous improvement; (b) unclear roles, responsibilities, authorities, and accountabilities; (c) insufficient improvement in conduct of operations; (d) ineffective performance assurance processes; and (e) loss of criticality safety personnel and corporate knowledge. Actions to be taken include (a) ensuring that operating procedures can be performed as written, (b) incorporating criticality safety controls into operating procedures, (c) designating important operating procedures as “Use Every Time” procedures, (d) reducing the plutonium mass limits to the minimum needed for specific operations, and (e) delivering refresher training on criticality safety and conduct of operations to all fissile material handlers.

The laboratory contractor plans to resume programmatic operations in PF-4 methodically, beginning with operations involving the lowest criticality safety risk. NNSA assigned a senior criticality safety expert as a technical advisor to the laboratory director during resumption activities. Meanwhile, NNSA is pursuing a causal analysis to evaluate why the contractor’s problems at Los Alamos persisted for so long without federal action. NNSA believes this analysis can be used to strengthen federal oversight and ensure sustained resolution of criticality safety issues.

Early Integration of Safety in Design

During 2013, DOE made progress in resolving certain safety issues affecting complex design and construction projects. On other issues, however, DOE encountered problems with closure and integration of safety into the design process. For example, in

a July 31, 2102, letter to DOE, the Board identified that the unmitigated spray leak accident analysis for the K-Basin Closure Sludge Treatment Project (STP) lacked conservatism and improperly relied upon active engineered controls and operator actions. As a result, the project's safety control set may not have been adequate. DOE agreed to address this issue, and in 2013 the STP project team revised the spray leak accident analysis to produce bounding consequences and eliminate reliance on active engineered controls and operator actions in the unmitigated analysis.

DOE continued to struggle with open safety issues at the Waste Treatment and Immobilization Plant at the Hanford Site. Beginning in 2012, DOE slowed the construction of two of the plant's key facilities—Pretreatment and High-Level Waste—to resolve technical issues, reevaluate the project's design, and identify a credited set of safety controls required to license the facilities. Many of these issues have been outstanding for years.

The Board supports DOE's efforts to integrate safety concepts at an early stage in design and construction projects. To this end, the Board uses "project letters" to provide timely notification of safety issues to DOE. Project letters are often issued prior to major project milestones (known as "Critical Decisions") to ensure that DOE is aware of unresolved safety issues and to assist DOE in evaluating the readiness of a project to move forward. During 2013, the Board completed a review of the conceptual design and safety documentation for the Transuranic Waste Processing Center Sludge Processing Facility Buildouts Project at Oak Ridge National Laboratory. In anticipation of DOE's

approval of Critical Decision-1, the Board sent DOE a project letter on November 8, 2013, identifying safety risks that the project will need to address in the future.

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

One of the major actions in DOE's implementation plan for the Board's Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers*, is to revise and improve DOE Standard 3009 so that it clearly identifies safety requirements. The revision is significantly behind the original implementation plan schedule, and the latest draft fails to meet a number of commitments made by the Secretary of Energy when he partially accepted the Recommendation. On July 24, 2013, the Board issued a letter to the Secretary of Energy requesting an updated schedule and a report on how DOE would meet the commitments of its implementation plan. Based on DOE's response dated September 20, 2013, the Board expects to receive a final version of the revised standard for review sometime this year. Completing a revised standard with a clear and comprehensive set of safety requirements and implementing it across the defense nuclear facilities complex should improve the overall safety posture significantly.

ISM at the Activity Level

From 2008 to 2012, the Board's staff conducted reviews at all of DOE's defense nuclear facility sites 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 involves implementing the five core functions of ISM: (1) defining the scope of work, (2) analyzing the hazards, (3) developing and implementing hazard controls, (4) performing work within those controls, and (5) providing feedback and continuous improvement.

As the final product of these reviews, the Board transmitted DNFSB/TECH-37, *Integrated Safety Management at the Activity Level: Work Planning and Control*, to DOE in August 2012. DNFSB/TECH-37 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.”

DOE provided its written response to the Board’s letter and technical report in December 2012 and briefed the Board in January 2013 on an action plan for improvements. DOE’s action plan included (a) development of a new DOE directive providing comprehensive guidance for contractors, (b) revision of DOE’s directive on oversight to explicitly address this area, (c) evaluation of operating experience, (d) holding of a complex-wide workshop, and (e) emphasis by DOE senior management on increasing the rigor of oversight. The Board’s staff closely followed these efforts, providing comments to assist and enhance the resulting products. By December 2013, DOE was completing final review of the new and revised directives and had completed the other planned actions. At year’s end, DOE submitted a report to the Board on the

effectiveness of the actions taken in response to DNFSB/TECH-37. This report is under review.

Longevity of High-Level Waste Storage Systems

Stabilization and final disposition of the remnants of nuclear weapons production are essential tasks to protect the public. DOE stores more than 50 million gallons of high-level radioactive waste in 177 underground tanks at the Hanford Site. Many of the old single-shell tanks have been known to leak. As a result, DOE transferred most of the liquid waste in those tanks to newer double-shell tanks. The Board has been following DOE's plans for leaking tanks and the impact these tanks have on DOE's overall waste retrieval, treatment, and disposition strategy. In August 2012, DOE discovered that waste in double-shell tank AY-102 was leaking into the tank's secondary containment. This situation reinforces the need to retrieve and treat the tank waste and for vigilance in maintenance and safe operations in the Hanford Tank Farms for the foreseeable future, including maintaining ventilation as a safety-significant system to prevent flammable gas from accumulating in the tanks. The Board believes that prolonged storage of waste in the Hanford Tank Farms represents a potential threat to public health and safety.

At the Savannah River Site, DOE stores about 37 million gallons of high-level waste in tanks. DOE is processing and stabilizing this waste, but will need to continue safely storing it for years to come because of the sheer volume. During 2013, the Board's staff reviewed how DOE is managing and maintaining ventilation systems in the Tank Farms. As at Hanford, ventilation is a key safety system that prevents flammable gas from accumulating in the tanks and also provides containment and filtration of airborne

radioactive contamination. In the recent past, however, cracked ductwork, failed reheaters, and a release of contamination through the stack have indicated that this system is not entirely reliable. DOE and its contractor are facing challenges in maintaining these aging systems.

Emergency Preparedness, Response, and Recovery

The WIPP fire and release of radioactive material demonstrate why the Board continues to stress the importance of emergency preparedness and response. Especially critical is the capability of defense nuclear facilities to prepare for and respond to severe events and “beyond design basis” events such as the earthquake and tsunami that caused great damage to the Fukushima Daiichi Nuclear Power Plant. The Board has made a practice of including emergency preparedness and response as a panel session topic at its public hearings on the safety of operations at defense nuclear facilities.

The Board addressed emergency preparedness at the Pantex Plant and the Y-12 National Security Complex in public hearings in Amarillo, Texas, on March 14, 2013, and Knoxville, Tennessee, on December 10, 2013. At the hearing on Pantex, as part of their response to Board questions, contractor personnel committed to conducting an exercise that would assess the termination and recovery phases of emergency response. NNSA and contractor personnel also acknowledged that the strategy used to evaluate past exercises was flawed and committed to upgrade the strategy and re-evaluate past exercises. At the hearing on Y-12, the Board focused on analysis of the consequences of events that affect multiple facilities, actions developed to address these events, and how emergency response personnel have been prepared to take the necessary actions and

prioritize resources when cascading events overwhelm emergency response resources. The Board also focused on the condition of emergency response facilities and their survivability and habitability after a severe event and coordination of emergency response by multiple stakeholders.

Throughout the year, the Board's Site Representatives and other members of the Board's staff conducted reviews to improve emergency preparedness and response capabilities at DOE sites. These reviews included observations of exercises and drills at various DOE sites, as well as programmatic reviews of emergency preparedness and response programs and associated facilities and equipment. The Board's staff also provided input directly to DOE's staff assigned to regulate emergency preparedness and response at DOE sites. This input included feedback on proposed DOE guidance on severe events and observation of independent assessments conducted by DOE's Office of Health, Safety and Security at Lawrence Livermore National Laboratory, the Hanford Site, and the Nevada National Security Site. The Board is evaluating the information gathered at hearings and staff reviews to determine if further communications to DOE are needed.

Changes to the Board's Management and Communication

In the past fifteen months the Board has developed and instituted new procedures for how the Board Members operate as a Board, and how we interact with each other and with our staff. The Board Members adopted these procedures unanimously. I feel confident that each Board Member believes he or she has the ability to bring forward a minority viewpoint for consideration by the full Board. We don't always agree on every

issue – in fact, we have some strong personalities with strong viewpoints – but we have a process for vetting these concerns. We are keenly aware that our small agency with a thirty million dollar budget has a significant direct impact on multibillion dollar DOE and NNSA budgets, and an indirect impact on crucial national security issues.

We have also instituted a significant set of internal controls so we remain keenly aware of the Board’s mission and our statutory responsibilities.

The best example I can give you of how these procedures and internal controls are working is the ongoing effort to improve criticality safety at Los Alamos National Laboratory that I spoke of earlier. When the Board staff’s review uncovered significant problems in May 2013, the problems were briefed by the staff to senior Laboratory management and to the NNSA oversight staff. Subsequently, some individual Board Members shared their concerns with senior NNSA leadership. Ultimately, LANL management and NNSA acted before the Board ever communicated to the Secretary of Energy. As a result, corrective actions have been internally driven by LANL and NNSA rather than externally driven by the Board. The Board has continued to monitor these actions and has maintained a dialogue with NNSA that has been healthy for both sides. It is our expectation that the extended pause in plutonium operations will result in significant long-term improvement in safety. And by acting now, LANL and NNSA will ensure that their operations and training will support a significant ramp up in programmatic needs in the coming years.

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 ISM, 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, ISM 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, the Board 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 the Board's 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.