

**FY 2015  
BUDGET REQUEST  
TO THE CONGRESS**

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**Defense Nuclear Facilities Safety Board**

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March 11, 2014

## **GPRA MODERNIZATION ACT**

### **GPRA Strategic Planning Reporting Requirements**

The Government Performance Results Act (GPRA) Modernization Act of 2010 requires each agency to make available on its website a strategic plan establishing general strategic goals and objectives for a period of not less than four years. The Defense Nuclear Facilities Safety Board's (Board) Strategic Plan for Fiscal Years (FY) 2014-2018 is available on the Internet at [www.dnfsb.gov](http://www.dnfsb.gov). In addition, agencies are required to develop an Annual Performance Plan (APP) covering a two-year period with performance goals that contribute toward achieving the strategic plan's goals and objectives, and an Annual Performance Report (APR) comparing actual performance achieved with the performance goal established. The Board's APP for FY 2014 and FY 2015, as well as its APR for FY 2010 through FY 2013, are included in this Budget Request in accordance with the requirements of OMB Circular A-11.

For a comprehensive review of the Board's activities to improve the safety of the Department of Energy's defense nuclear facilities, see the Board's Annual Reports to Congress, which may be reviewed at the Board's public website (referenced above).

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# 1. INTRODUCTION

## Defense Nuclear Facilities Safety Board FY 2015 Congressional Budget Request

### APPROPRIATION & EXPENSE SUMMARY

(Tabular in thousands)

#### OPERATING EXPENSES

	ACTUAL FOR FY 2013	FINANCIAL PLAN FOR FY 2014	BUDGET REQUEST FOR FY 2015
New Budget Authority	26,786*	28,000**	30,150
Obligations	26,252	29,083	31,207
Outlays	27,951	28,502	30,583

\* Consolidated and Further Continuing Appropriations Act, 2013, Pub. L. No. 113-6

\*\* Consolidated Appropriations Act, 2014, Pub. L. No. 113-76

Enabling Statute:

National Defense Authorization Act, Fiscal Year 1989, Pub. L. No. 100-456, § 1441, 102 Stat. 1918 (1988), amended the Atomic Energy Act of 1954 (42 U.S.C. § 2286, *et seq.*)

As Amended by:

National Defense Authorization Act, Fiscal Year 1991, Pub. L. No. 101-510, § 3201, 104 Stat. 1485 (1990).

National Defense Authorization Act, Fiscal Years 1992 and 1993, Pub. L. No. 102-190, § 3201, 105 Stat. 1290 (1991).

Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (1992).

National Defense Authorization Act, Fiscal Year 1994, Pub. L. No. 103-160, § 3201, 107 Stat. 1547 (1993).

Federal Reports Elimination Act, Pub. L. No. 105-362, 112 Stat. 3280 (1998).

National Defense Authorization Act, Fiscal Year 2001, Pub. L. No. 106-398, § 3201, 114 Stat. 1654 (2000).

National Defense Authorization Act, Fiscal Year 2003, Pub. L. No. 107-314, § 3201, 116 Stat. 2458 (2002).

National Defense Authorization Act, Fiscal Year 2013, Pub. L. No. 112-239, § 3201, 126 Stat. 1632 (2013).

**Defense Nuclear Facilities Safety Board  
FY 2015 Congressional Budget Request**

**PERSONNEL SUMMARY**

	<u>FY 2013 ACTUAL</u>	<u>FY 2014 FINANCIAL PLAN</u>	<u>FY 2015 BUDGET REQUEST</u>
Statutory Personnel Ceiling: (FTEs) <sup>1/</sup>	150	150	150
FTE Usage <sup>2/</sup>	113	116	125
<hr/>			
Board Members and Permanent Employees at End of Fiscal Year	111	120	125

<sup>1/</sup> National Defense Authorization Act for FY 1992 and FY 1993, Pub. L. No. 102-190, raised the Board's statutory employee ceiling from 100 to 150 full-time staff to accommodate mandated additional nuclear weapons oversight responsibilities. See 42 U.S.C. § 2286b(b)(1)(A).

<sup>2/</sup> Includes five full-time Board Members appointed by the President, by and with the advice and consent of the Senate.

**Defense Nuclear Facilities Safety Board  
FY 2015 Congressional Budget Request**

**PROPOSED APPROPRIATIONS LANGUAGE**

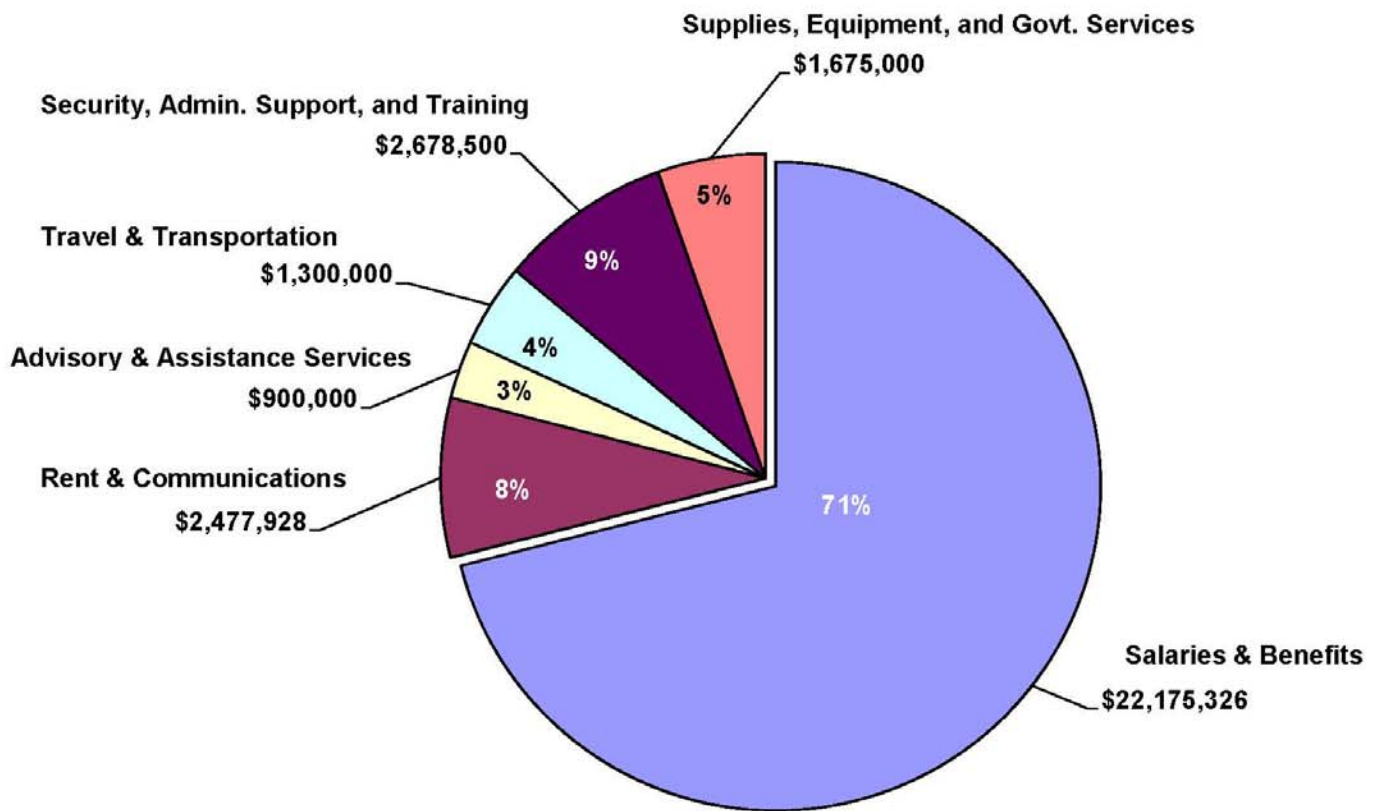
**SALARIES AND EXPENSES**

For necessary expenses of the Defense Nuclear Facilities Safety Board in carrying out activities authorized by the Atomic Energy Act of 1954, as amended by Public Law No. 100-456, section 1441, *\$30,150,000* to remain available until September 30, 2016.

**Defense Nuclear Facilities Safety Board  
FY 2015 Congressional Budget Request**

**FY 2015 TOTAL PROJECTED OBLIGATIONS**

FY 2015 Total Projected Obligations = \$31,206,754



## 2. BUDGET REQUEST SUMMARY

The Board's FY 2015 Budget Request for \$30,150,000 and 125 FTEs includes a program increase of 9 FTEs to address additional workload requirements and funding for statutory increases in civilian salaries and associated employee benefits (e.g., employer contributions to employee health benefit and retirement accounts). A brief description of each requirement and associated funding request follows (a full explanation is included on the referenced page number):

	New Budget Authority	FTEs	Page Reference
Baseline – FY 2014 Enacted Appropriation	\$28,000,000	116	
<b>Funding for the assumed 1.0% civilian pay raise effective in January, 2015 and other salary/personnel benefits adjustments.</b> [Note: budget projection based on paying increased salaries and benefits for nine months in FY 2015 for a 1.0% Federal pay raise and other salary/benefit adjustments.]	\$260,000		12
<b>Funding for additional FTEs to address additional workload requirements under its statutory authority.</b> [Note: funding for four additional FTEs required for staffing level of 120 included in FY 2014 President's Budget.]	\$840,000	4	11
<b>Funding for additional FTEs to address additional workload requirements.</b> [Note: in response to requirements from the National Defense Authorization Act (NDAA) for 2013, the assignment of the Inspector General (IG) of the Nuclear Regulatory Commission (NRC) to also serve as the Board's IG, and the need for increased resources for safety oversight of the design and construction of the Waste Treatment and Immobilization Project at the Hanford site, funding for five additional Board FTEs is required to absorb additional workload.]	\$1,050,000	5	11-12
<b>Total Additional Funding Requirements in FY 2015 Budget Request.</b>	\$2,150,000		
<b>FY 2015 New Budget Authority</b>	\$30,150,000	125	



### 3. EXECUTIVE SUMMARY

The Board is an independent agency within the Executive Branch (42 U.S.C. § 2286, *et seq.*) with a mission to identify the nature and consequences of potential threats to public health and safety<sup>1</sup> at the Department of Energy's (DOE) defense nuclear facilities, to elevate such issues to the highest levels of authority, and to inform the public. To execute its oversight mission of ensuring adequate protection of public health and safety at DOE's defense nuclear facilities commensurate with the workload generated by DOE in FY 2015, the Board is requesting a total of \$30,150,000 in new budget authority and 125 FTEs.

The Fukushima Dai-ichi nuclear disaster and the Deepwater Horizon accident serve as sobering examples of the risks and hazards of what can result from ineffective government oversight. A nuclear accident at a defense nuclear facility is unacceptable to the public, the Congress, and the Administration. The Board is the only government agency that provides independent scientific and technical safety oversight of DOE's defense nuclear facilities. The scope of the Board's mission will require a staffing level of 125 FTEs in FY 2015 due to a number of external factors:

1. The Board is performing safety oversight of approximately one dozen major DOE design and construction projects with an estimated value of more than \$20 billion, including the \$12.3 billion Hanford Waste Treatment and Immobilization Plant and the Uranium Capabilities Replacement Project (formerly the Uranium Processing Facility) at the Y-12 National Security Complex (see Exhibit A). The design and construction reviews conducted by the Board of DOE facilities are resource-intensive and time consuming. DOE design and construction projects involve building one-of-a-kind, highly complex facilities that often incorporate leading-edge technologies requiring safety-related controls. Performing these safety reviews at the earliest design stages is the key to preventing safety flaws in these projects that could render a facility unusable and without adequate safety controls to protect the public, the workers, and the environment.

2. Many aging DOE facilities are unsound and the transition to new facilities will take decades. For example, the Chemical and Metallurgy Research Facility at Los Alamos National Laboratory and the 9212 Complex at the Y-12 National Security Complex are of particular concern because of their deficient structures and advanced age. The Board will need to evaluate the rigor and maintenance of a robust safety posture in such facilities and inform the Secretary of potential threats to public health and safety.

3. A recent DOE/IG Audit Report (DOE-IG-0881, February 2013) entitled *National Nuclear Security Administration Contractor Governance*, reviewed the effectiveness of a 2007 National Nuclear Security Administration (NNSA) requirement for contractors to implement self-assessment systems to measure performance and ensure effective and efficient mission accomplishment. The audit report notes that despite five

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<sup>1</sup> The Board's 1991 Annual Report to Congress states the following: "The various provisions of the statute and their attendant legislative history indicate that Congress generally intended the phrase "public health and safety" to be construed broadly. For example, both Congress and the Board have interpreted the public to include workers at defense nuclear facilities."

years of effort, NNSA and its support offices and site contractors have not yet implemented fully functional and effective contractor assurance systems. Specifically troubling was the recognition that contractor self-assessments were not effective in identifying safety weaknesses subsequently identified by independent reviews and that Federal site level officials felt the contractor governance approach prohibited them from intervening in contractor activities. The Board remains vigilant and will continue to provide oversight support to NNSA as they continue to reform, enhance and mature their contractor assurance and governance systems and the Federal oversight of them.

4. On July 9, 2012, the Secretary of Energy issued a memorandum entitled *Enterprise Risk Management (ERM) Framework for Directives*, announcing a new framework for development, revision, and review of all DOE directives. Under this initiative, each new or revised DOE directive will be reviewed to determine the likelihood, magnitude, and potential costs of the risks it seeks to mitigate; whether any external requirements or standards are available to address the risks; whether other DOE directives address the risks; and lastly, whether to accept the remaining risks or to include controls in the directive to mitigate them. The Board will be reviewing the process and evaluate proposed changes to nuclear safety requirements.

5. DOE has developed actions responding to the Board's letter of August 28, 2012, that forwarded technical report DNFSB/TECH-37, *Integrated Safety Management at the Activity Level: Work Planning and Control*. Proper work planning and control is essential to ensure adequate safety controls are identified and implemented to protect workers during execution of hazardous nuclear activities. The DOE improvement actions responding to DNFSB/TECH-37 include development of new DOE guidance for implementation of work planning and control and emphasis on rigorous oversight by contractors and DOE. These actions are to be fully implemented by FY 2015. The Board will continue reviews at defense nuclear facilities to assess the implementation of these DOE improvement actions and the overall conduct of work planning and control.

6. In addition to the focus on specific DOE activities noted above, the Board needs to continue its oversight of operations throughout the DOE defense nuclear complex to ensure operations are conducted safely. These operations include 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 maintenance and other activities to address the radioactive legacy of nearly 70 years of these operations. Continued effective oversight of the conduct of operations is the only way the Board may ascertain whether operations are being conducted with the appropriate formality, identify potential safety problems promptly, and advise the Secretary of Energy in order to ensure adequate protection of public and worker safety at DOE's defense nuclear facilities.

7. Mindful of the lessons learned from the Fukushima Dai-ichi nuclear disaster, the Board continues to encourage DOE and its contractors to plan and prepare to respond to severe events, as well as to recover from these events. As part of its engagement with DOE on this topic, the Board has reviewed the emergency preparedness and response capabilities of various sites, and identified weaknesses and vulnerabilities, such as

problems with assessments, drills and exercises, as well as corrective actions. The Board has shared its concerns with DOE and its contractors through Board public hearings and meetings and Board site visits.

8. The NDAA for FY 2013 (Pub. L. No. 112-239) made meaningful modifications to the Board's enabling act. For example, the Board must now "specifically assess risk (whenever sufficient data exists)" when formulating recommendations. The NDAA also mandated that the Board provide the Secretary of Energy a draft recommendation and thirty day comment period prior to issuing a final recommendation. Finally, the NDAA required that the Board enter into an agreement with an agency of the Federal government having expertise in the Board's mission to procure the services of an IG in accordance with the Inspector General Act of 1978 (subsequently, the Consolidated Appropriations Act for FY 2014 assigned the IG of the NRC to also serve as Board's IG). These changes will have a significant workload impact on the Board, thus requiring additional FTEs.

The Board's FY 2015 Budget Request supports the successful effort that began with the FY 2009 Budget Request to increase the Board's staff to 120 FTEs by FY 2014 to meet its scope of oversight responsibilities. This approach received support as evidenced by the President's budget submissions. Because of sequestration, the Board's on-board strength at the end of FY 2013 was 111 personnel. The remaining nine positions are expected to be filled during FY 2014. This FY 2015 Budget Request includes funding for 125 FTEs for FY 2015 to address additional workload requirements (see pages 11-12 for further explanation.)

The cost of re-engineering and making post-construction safety modifications to complex DOE defense nuclear facilities due to the late identification of significant design flaws would require significantly more resources than the Board's requested budget. When incomplete or incorrect safety features are identified late in the design stage (or worse, in the construction stage) project costs are increased and schedules are delayed. With DOE's design and construction budget exceeding \$20 billion, each increase in project cost of one percent (1%) equates to an increase of more than \$200 million. Increases in project cost well in excess of this amount have driven Congress, as discussed above and elsewhere, to insist on identification of safety issues and their resolution early in the design stage. Given that the DOE Defense Environmental Cleanup and NNSA Weapons Activities accounts in DOE's FY 2014 budget request included obligations of \$4.9 billion and \$9.3 billion respectively, the Board provides cost-effective oversight while protecting public and worker safety. To aid in the early resolution of safety issues, the Board provides Project Review Letters and Recommendations to the Secretary and Periodic Reports to Congress and DOE on significant unresolved safety issues concerning the design and construction of DOE's defense nuclear facilities.

In line with congressional direction, the Board believes it is prudent to proactively address DOE safety issues relating to public and worker safety. To do so, the Board needs the resources requested. The Board's requested FY 2015 budget of \$30,150,000 in new budget authority and 125 FTEs is necessary to address congressional concerns and provide the scientific and technical resources needed to review DOE's design and construction projects, remediation activities, and weapons programs in a timely and efficient manner.

#### 4. FY 2015 BUDGET REQUEST

<i>FY 2015 Request Summary</i>	<i>Permanent Positions</i>	<i>FTE</i>	<i>Amount (\$000)</i>
FY 2013 Actual	111	113	\$29,130*
FY 2014 Budget Request	120	120	\$29,915
FY 2015 Budget Request	125	125	\$30,150
Total Change 2014-2015	5	5	\$ 235

\* reduced to \$26,786 due to rescission and sequestration.

#### **The Board's Mission**

The Board's mission is to provide independent analysis, advice, and recommendations to the Secretary of Energy to inform the Secretary, in his/her role as operator and regulator of DOE defense nuclear facilities, in providing adequate protection of public health and safety at such defense nuclear facilities.

Congress created the Board as an independent agency within the Executive Branch (42 U.S.C. § 2286, *et seq.*) to identify the nature and consequences of potential threats to public health and safety at DOE defense nuclear facilities, to elevate such issues to the highest levels of authority, and to inform the public. Since DOE is a self-regulating entity, the Board performs the only independent technical safety oversight of operations at the Nation's defense nuclear facilities. Under its legislative mandate (Exhibit B), the Board plays a key role in maintaining the future viability of the Nation's nuclear deterrent capability by:

- Ensuring that the health and safety of the public and workers at DOE defense nuclear facilities located throughout the United States are adequately protected, as DOE supports the readiness of the nuclear arsenal, dismantles surplus weapons, disposes of excess radioactive materials, cleans up surplus defense nuclear facilities, and constructs new defense nuclear facilities;
- Enhancing the safety and security of the Nation's most sensitive defense nuclear facilities when hazardous nuclear materials and components are placed in more secure and stable storage; and
- Providing for the early identification of health and safety vulnerabilities, allowing the Secretary of Energy to address issues before they become major problems.

#### **The Challenge**

The Board uses its oversight authority to reduce the nuclear safety risks that exist in the defense nuclear complex to the greatest extent possible. DOE's safety performance has greatly improved since the establishment of the Board, yet the DOE nuclear weapons program remains a technically challenging and hazardous operation. Reductions in the pace and scope of the Board's oversight could allow the nuclear weapons complex to deteriorate again to the

conditions that required the creation of the Board. Many tons of radioactive and toxic materials exist throughout the defense nuclear complex, either in storage or in use. There are multiple pathways by which these hazards might be released in the environment, creating risks to the workers and the public. A large number of the complex's facilities were constructed decades ago and are deteriorating.

The Board oversees nuclear facilities at primarily 10 DOE sites. It stations Site Representatives at five of the sites and maintains a cadre of technical staff at its Headquarters to perform oversight roles as required. During the next several years, the Board's safety focus at these sites will be on the following:

- **Pantex Plant in Texas.** Stewardship and maintenance of the nuclear weapons stockpile, including assembly and disassembly, surveillance, maintenance, and dismantlement of nuclear weapons and the storage of special nuclear material, particularly plutonium pits.
- **Oak Ridge National Laboratory (ORNL)/Y-12 National Security Complex (Y-12) in Tennessee.** Stewardship and maintenance of the nuclear weapons stockpile, including assembly and disassembly, evaluation, maintenance, and dismantlement of nuclear weapon components; fabrication of nuclear weapon components, including secondaries; processing of highly enriched uranium; and storage of nuclear materials, including uranium from weapon components. This also includes design and construction of the Uranium Capabilities Replacement Project.
- **Savannah River Site (SRS) in South Carolina.** Tritium operations, storage of special nuclear material, stabilization of high-level waste and residual nuclear materials from previous defense nuclear operations, and disposition of excess plutonium.
- **Los Alamos National Laboratory (LANL) in New Mexico.** Stockpile management and stewardship of the nuclear weapons stockpile, including research and enhanced surveillance of weapons, processing of nuclear materials, and pit production.
- **Lawrence Livermore National Laboratory (LLNL) in California.** Management and stewardship of the nuclear weapons stockpile, including research and enhanced surveillance of weapons, and processing of nuclear materials.
- **Nevada National Security Site (NNSS).** Stewardship of the nuclear weapons stockpile, including subcritical experiments and criticality experiments, packaging and disposal of radioactive waste, potential nuclear weapon assembly and disassembly operations, and potential operations with damaged nuclear weapons and improvised nuclear devices.
- **Sandia National Laboratories (SNL) in New Mexico and California.** Management and stewardship of the nuclear weapons stockpile, including research, enhanced surveillance of weapon components, operation of the Annular Core Research Reactor, and packaging of radioactive wastes.

- **Hanford Site in Washington.** Storage and stabilization of high-level waste, stabilization of residual sludge from corroded spent nuclear fuel, stabilization of other residual nuclear material from previous operations, and dismantling and disposition of excess defense nuclear facilities. This also includes design and construction of the Waste Treatment and Immobilization Plant as well as the supporting infrastructure in the Hanford Tank Farms necessary to feed high-level waste to the plant when operational.
- **Idaho National Laboratory (INL) in Idaho.** Storage and stabilization of high-level waste, storage of spent nuclear fuel, packaging and disposition of radioactive waste, and dismantling and disposition of excess defense nuclear facilities.
- **Waste Isolation Pilot Plant (WIPP) in New Mexico.** Receipt, handling, and permanent deep geological disposal of transuranic wastes.

### **The Risks**

The potential for release of hazardous materials to the environment at DOE defense nuclear facilities continues to pose safety and health risks to the public and the facility workers. Many current facilities are old and deteriorating and contain significant amounts of hazardous materials, especially nuclear waste. These current facilities require careful oversight as operations continue or as they undergo decommissioning and cleanup. New facilities being built to replace current ones or to process, stabilize, and dispose of legacy nuclear waste in turn create their own new waste streams, and require extensive planning to mitigate risks of environmental release. Safety systems in both new and old facilities must be designed to prevent the release of hazardous materials. These systems, moreover, must function during and after earthquakes, extreme winds, floods, lightning, wildland fires, and other such natural phenomena. Natural phenomena hazards can simultaneously affect multiple facilities on a site, greatly complicating emergency preparedness, response, and recovery.

In addition to natural phenomena, hazardous nuclear materials may be released because of inadequate safety controls, human error, equipment malfunctions, chemical reactions, fire, detonation of explosives, and inadvertent nuclear criticality events. Many DOE facilities continue to contain sufficient amounts of fissionable material such that the risk of an accidental nuclear criticality exists and must be controlled. Chemical reactions in materials used in defense nuclear work need to be carefully monitored. As the massive DOE nuclear waste cleanup effort continues, the use of leading edge technologies in new facilities can create additional nuclear safety risks due to lack of experience in designing, constructing, operating, and maintaining these facilities. DOE's nuclear weapons stockpile stewardship and management operations are unique in that they include nuclear activities and experiments involving co-located high explosives and nuclear material. The risks at these defense nuclear facilities are not solely a function of the quantities of nuclear material present but, more importantly, the potential for explosive dispersal of radioactive materials or inadvertent nuclear detonation.

### **Strategic Goals**

In FY 2014 the Board published an updated Strategic Plan for FY 2014 through FY 2018. Technical safety oversight is the number one priority for the Board and encompasses activities as

outlined in the Board's enabling legislation and other congressional direction included in authorization and/or appropriations legislation. As will be discussed in more detail later in this budget request, the Board plans to focus its technical safety oversight through three interdependent strategic goals:

Strategic Goal # 1: Improve Safety of Operations

Strategic Goal # 2: Strengthen Safety Standards

Strategic Goal # 3: Strengthen Safety in Design

In order to properly support and manage its technical safety oversight mission, the Board has identified a fourth goal that supports the other strategic goals.

Strategic Goal # 4: Achieve Excellence in Board Management and Communication with Stakeholders

### **Human Capital—The Board's Greatest Asset**

Seventy-one percent of the Board's Budget Request is dedicated to salaries and benefits for its staff and Board Members. The Board must function as an oversight organization comprising leading technical experts who quickly recognize problems in the hundreds of hazardous operations conducted daily throughout the DOE defense nuclear complex. The Board relies on a focused and well-executed human capital program that uses all available tools to attract and retain the technical talent necessary to accomplish the Board's congressionally mandated mission. The Board has determined that its technical staff requires scientists and engineers with extensive backgrounds in technical disciplines, such as nuclear-chemical processing, conduct of operations, facility safety analysis, conventional and nuclear explosive technology and safety, nuclear weapons safety, storage of nuclear materials, nuclear criticality safety, and waste management. Virtually all technical staff personnel have technical master's degrees; those personnel who do not are actively pursuing graduate degrees. Approximately 25 percent of the technical staff members have doctoral degrees. Because the Board's health and safety recommendations and other advisories to the Secretary of Energy are based on in-depth technical information and detailed safety analyses, recruitment and retention of scientific and technical staff members with outstanding qualifications continues to be critical to successful accomplishment of the Board's mission.

The technical staff comprises approximately 75 percent of the Board's budgeted total workforce, with the remainder comprised of administrative and legal staff. Between FY 2007 and FY 2013, the technical staff increased by 24 people. During this same period, administrative support and legal staff positions remained constant. The obligations attributable to the technical staff, which amount to approximately 80 percent of the Board's budget, are comprised of salaries, benefits, travel, training, and technical expert contractors who provide technical expertise in specialty areas, as well as a portion of the operating costs (e.g., rent, building security).

Remaining mindful of the past hiring success of entry level, mid-career, and senior level engineers, the Board will continue an effective approach to maintain the current workforce. For example, the Board will continue recruiting to replace employees upon separation due to resignation, transfer, or retirement. The combination of an aging workforce and high demand for experienced scientists and engineers by other organizations will remain a challenge for the Board. Approximately 17 percent of the Board's technical staff is eligible for regular retirement today. Competition for scientists and engineers with the Board's required expertise continues to be stiff due to the demands of the commercial nuclear power industry, the consequent need for increased technical expertise by the Nuclear Regulatory Commission, the Department of Defense's emphasis on combating weapons of mass destruction, and DOE's nuclear weapons complex activities. Consequently, the Board expects to continue devoting resources as necessary toward recruiting highly qualified technical personnel in an increasingly competitive job market.

In addition to maintaining an experienced scientific and engineering staff, as well as filling vacancies as they occur, the Board will continue to focus on attracting the next generation of scientists and engineers. The Board will continue its highly competitive three-year Professional Development Program, which brings entry-level technical talent into professional positions within the Board straight from college. Through a technical mentor, individuals are provided a series of individually tailored developmental assignments, formal academic schooling, and a one-year, hands-on field assignment. The Professional Development Program employees have a three-year service commitment to the Board. The Board plans to recruit three additional people into the program in FY 2015.

### **Health and Safety Oversight Resource Requirements**

In order to maintain an effective, independent oversight program over a vast array of DOE defense nuclear programs and projects in geographically dispersed locations, the Board must continually balance and redirect its health and safety oversight resources with careful consideration of the following factors:

- Nuclear safety oversight activities are prioritized on the bases of risks to the public and the workers, the types and quantities of nuclear and hazardous material at risk, and the process and setting of the operations involved.
- Identifying potential accident conditions and mitigating their consequences are very important for risk management. Safety is assured by working to understand and reduce the likelihood of events that adversely affect safety and by limiting the consequences of events if they do occur, i.e., "prevention" and "mitigation." In addition, safety is assured through robust systems that employ defense-in-depth, i.e., using multiple layers of protection such that no single layer is depended upon to ensure safety. The Board is actively working to identify "leading indicators" that can be used to prevent accidents.
- "Safety-in-design" requires integration of safety considerations early in the design and construction process of DOE defense nuclear facilities. The result of DOE adhering to this concept should be decreased project costs associated with retrofitting or redesigning safety systems into facilities as they are constructed, coupled with increased operating efficiency achieved by avoiding unplanned shutdowns to address latent safety issues.



- Equally important to safety-in-design is ensuring that facility safety systems will meet the functional design requirements through careful oversight of the quality assurance practices and testing programs as the facilities are built and placed into operation. Evaluating the transition of a facility from construction to operation requires additional oversight during the startup process and into operation.
- Another key facet to a facility's nuclear safety posture is the proper development of Technical Safety Requirements during the design and construction phase. Typically, Technical Safety Requirements are only preliminary when construction commences; as the facility approaches operation, these key safety provisions are fully developed and implemented in the facility's safety basis, which is basically a license to operate a facility per the requirements of DOE's *Nuclear Safety Management Rule*. Technical Safety Requirements must be conservatively determined based on a thorough understanding of the safety features in the design and properly implemented during the transition to facility operation; otherwise, the facility will not achieve the required level of safety in operation.

In preparing this budget request, the Board reviewed its current resources and capabilities against the projected workload depicted in the FY 2014 Budget Request, which was derived from three sources: congressional direction, current DOE programs and projects, and new DOE projects and programs. The Board has also reviewed the President's priorities regarding nuclear weapons for applicability to the Board.

### **Prioritization of Work**

The Board's safety oversight activities are prioritized predominantly on the basis of risk to the public and workers, types and quantities of nuclear and hazardous material at hand, and hazards of the operations involved. Four types of oversight are underway at all times.

- Evaluation of DOE's organizational policies and processes. These reviews evaluate topics such as technical competence of DOE and contractor personnel, adequacy of safety requirements and guidance, and the presence of a strong safety culture.
- Evaluation of actual hazardous activities and facilities in the field. These reviews focus on identifying the hazards and evaluating controls put in place to mitigate those hazards. The Board prioritizes these reviews based on the risk, complexity, maturity, and significance of the activities underway or planned by DOE.
- Expert-level reviews of the safety implications of DOE's actions, decisions, and analysis.
- Identification of new safety issues otherwise unknown in the DOE complex. Since, by definition, these safety issues would not have been addressed but for the Board's efforts, this may be the area in which the Board has the largest impact on the safety of DOE's highly hazardous operations. Examples of new safety issues identified by the Board during FY 2013 include (1) deficiencies in criticality safety and conduct of operations at Los Alamos National Laboratory's Plutonium Facility, as detailed in a

Board letter to DOE dated July 15, 2013; and (2) vulnerabilities associated with long-term storage of spent nuclear fuel at the Savannah River Site's L-Reactor Disassembly Basin, as detailed in a Board letter to DOE dated January 3, 2013.

The Board uses its Strategic Plan and its Annual Performance Plan to ensure that its resources remain focused on the most significant safety challenges. This approach gives the Board confidence that its staff and budget are dedicated to the highest risk activities under the Board's jurisdiction.

### **Congressional Concerns about Facilities and DOE Operations**

Congress has continued to express its concern, both during hearings and in legislation, with DOE's ability to manage its nuclear programs. With its well-recognized technical expertise and cost-effective methods for conducting nuclear health and safety oversight, the Board's operations assist DOE in meeting mission requirements because safety and mission execution are closely coupled.

### **Increased Activity at DOE Defense Nuclear Facilities**

The risks and challenges facing DOE continue to grow. DOE is pursuing numerous major design and construction projects to build defense nuclear facilities for programmatic work and cleanup activities (Exhibit A), about a dozen of which are of particular concern to the Board. The Board is required by law to review DOE's design and construction projects to ensure that adequate protection of the health and safety of the public is addressed before construction begins and periodically thereafter. In FY 2015, the Board will be required to expend considerable resources to review ongoing design efforts, as well as construction and startup activities.

### **Review of DOE Directives**

Members of the Board's staff review newly proposed DOE directives and revisions to directives of interest to the Board including DOE technical standards and NNSA supplemental directives. The staff must evaluate new directives and proposed changes to existing directives to ensure requirements and guidance that affect safety will continue to provide adequate protection of the public, workers, and environment. Members of the Board's staff closely evaluate any reduction of requirements and guidance that affects safety to ensure the reduction will not compromise safety. Once DOE approves new or revised directives, the staff assesses the implementation of these DOE directives in the field to ensure requirements and guidance is implemented effectively. Historically, the staff has reviewed approximately 35 directives per year.

The Secretary of Energy defined a new framework for development, revision, and review of all DOE directives in a memorandum entitled *Enterprise Risk Management (ERM) Framework for Directives* on July 9, 2012. Each new or revised DOE directive will be reviewed to determine the likelihood, magnitude, and potential costs of the risks it seeks to mitigate; whether any external requirements or standards are available to address the risks; whether other DOE directives address the risks; and lastly, whether to accept the remaining risks or to include controls in the new or revised directive to mitigate the risks. The Board will be reviewing new

and revised DOE directives and evaluating proposed changes to nuclear safety requirements based on the ERM process.

In addition, DOE has developed draft DOE Standard, *Probabilistic Risk Assessment for Nuclear Safety Applications*, which DOE will likely publish in FY 2014. DOE identified the Hanford Waste Treatment and Immobilization Plan (WTP) as a potential pilot application for this draft standard, and the Board expects to review DOE's Probabilistic Risk Assessment Plans for specific WTP applications. The Probabilistic Risk Assessment Plans will include a statement of the issue, the probabilistic risk assessment approach, anticipated results, intended use of the results, probabilistic risk assessment technical adequacy, and the peer review approach. Ultimately, the Board expects to review the probabilistic risk assessments for various WTP applications.

### **Additional Staffing Requirements**

The President's FY 2014 Budget of \$29,915,000 included funding for 120 FTEs for the Board to execute its oversight mission of ensuring adequate protection of public health and safety at DOE's defense nuclear facilities. The FY 2014 enacted appropriation of \$28,000,000 will allow the Board to fund 116 FTEs. Thus, for FY 2015 the Board requires additional funding for four FTEs to match the level included in the President's FY 2014 Budget.

In addition, the NDAA for FY 2013 (Pub. L. No. 112-239) included several new provisions that increase staff workload. The Board staff must now support formal risk assessments by the Board for new recommendations to the Secretary of Energy. The recommendation process was also modified to require the production of a draft recommendation and an opportunity for the Secretary of Energy to comment before the recommendation is made final. Additional staff workload is anticipated in the analysis of and response to Secretarial comments. Finally, the NDAA for FY 2013 required that the Board enter into an agreement with an agency of the Federal government having expertise in the Board's mission to procure the services of the IG of such agency in accordance with the Inspector General Act of 1978. Subsequently, the Consolidated Appropriations Act for FY 2014 assigned the IG of the NRC to also serve as the Board's IG, and directly appropriated \$850,000 to the NRC Office of the Inspector General (OIG) for that effort. The NRC is proposing to dedicate five fulltime employees (to be located at the Board's headquarters) to perform IG services for the Board. Having a dedicated, on-site staff of five employees from the NRC-OIG performing IG services will generate significant additional workload for the Board. Without additional FTEs, the Board will have to absorb that workload to address IG concerns within its existing FTEs. Consequently, the FTEs directly performing the Board's safety oversight mission will decrease.

Traditional high-risk administrative areas that the NRC-OIG is likely to focus on include purchase and travel cards, time and attendance procedures, property accountability, and control of classified information. The NRC-OIG has also preliminarily indicated a potential focus on the following technical performance areas: processes for safety oversight, construction oversight, oversight of decommissioning, public meetings, oversight of controls to prevent inadvertent criticality, and oversight of fire protection. Communicating and coordinating with the IG staff, responding to requests for data, explaining and documenting work processes, reviewing draft

reports, etc., will significantly increase workload in both the Board's administrative and direct mission areas.

For FY 2015, the Board requires additional staffing of five FTEs over the level included in the President's FY 2014 Budget in the following areas:

- A senior level employee to serve as the Board's sole interface with the NRC IG staff. Duties would include receiving and reviewing requests for data from the IG staff to support audits and other reviews, coordinating meetings, communicating data requests to appropriate staff for response, reviewing responses provided to the IG staff, maintaining a tracking log of pending and completed data requests, etc.
- Two mid-level employees in administrative areas to support the additional workload generated from administrative audits and reviews.
- Two mid-level engineers or technical specialists to support the additional workload generated by formal risk assessments and Secretarial comments on draft recommendations, as well as the additional workload generated from technical performance audits and reviews.

### **Additional Funding Needs**

Actual obligations for FY 2013, projected obligations for FY 2014 and the Board's Budget Request for FY 2015 are presented by object class (OC) accounts in Exhibit C.

In addition to the \$1,890,000 in funding needed for the increased 9 FTEs required to fully fund 125 positions (these additional FTEs are estimated to require \$210,000 on average in obligations including salaries, benefits, and other miscellaneous expenses), the Board's budget request includes additional funding of \$260,000 to pay for increased salary and personnel benefits costs to fund the President's proposed FY 2015 civilian pay raise of 1.0 percent, as well as a projected increase in the agency's contribution percentage toward employee FERS retirement.

## Conclusion

The Board's mandate is to provide vital, independent, technical health and safety oversight of DOE's defense nuclear facilities and activities in order to protect the health and safety of the public and workers. To accomplish this mission in FY 2015, the Board is requesting a total of \$30,150,000 in new budget authority, and 125 FTEs. The Board provides oversight to DOE programs in the Office of Environmental Management and the National Nuclear Security Administration.

The Board seeks to avoid costly post-construction modifications to complex DOE defense nuclear facilities, due to the late identification of significant design flaws that could impact public and worker health and safety. Such modifications would require significantly more resources than the Board's budget. DOE plans to spend more than \$20 billion in design and construction of new defense nuclear facilities. Based upon prior experience, the Board's oversight early in the design phase provides a way to avoid hundreds of millions of dollars of increased program cost. In this regard, the Board's requested funding is an inexpensive insurance policy to address Presidential and congressional priorities. *But even more importantly, the Board works with DOE to prevent a nuclear accident that would be catastrophic to public and worker safety and adversely impact DOE's national security mission.*

The Board's budget request of \$30,150,000 in new budget authority and 125 FTEs is necessary to provide the scientific and technical resources required to oversee the safety of the DOE cleanup program and the modernization of the weapons complex.

The Fukushima Dai-ichi and Deepwater Horizon accidents yielded an important lesson learned—inadequate independent oversight in a hazardous industry carries significant risks for the public, the workers, and the environment. In the case of DOE's defense nuclear complex, the potential hazards would clearly dwarf the impacts of the oil rig disaster. A major accident at a DOE defense nuclear facility would have intolerable safety, programmatic, and economic impacts that could rival those of the accident at Japan's Fukushima Dai-ichi nuclear station and have significant adverse consequences on DOE's national security mission.

## Exhibit A: Planned or Underway DOE Design/Construction Projects

SITE	FACILITY	TOTAL PROJECT COST (\$M)	STATUS – December of 2013		
			Critical Decision Approved	Design Completion <sup>1</sup>	Construction Completion <sup>2</sup>
<b>Hanford Site</b>	<b>Waste Treatment and Immobilization Plant</b>	12,263			<i>(Operational 2019)</i>
	a. Pretreatment Facility		CD-3	85% (Final Design)	43%
	b. High-Level Waste Facility		CD-3	89% (Final Design)	43%
	c. Low-Activity Waste Facility		CD-3	78% (Final Design)	68%
	d. Analytical Laboratory Facility		CD-3	77% (Final Design)	84%
	e. Balance of Facilities		CD-3	80% (Final Design)	77%
	<b>K-Basin Closure Project Sludge Treatment</b>	280	Phase 1: CD-1  Phase 2: CD-0	Phase 1: 95% (Final Design)  Phase 2: 33% (Conceptual Design)	Phase 1: 15% <i>(Operational 2015)</i>  Phase 2: <i>(Operational to be determined)</i>
	<b>Waste Feed Delivery System</b>	660	Not formally implementing CD process.	Various degrees of completion.	Various degrees of completion and operations
	<b>Tank Waste Supplemental Treatment Project</b>	110-310	Not formally implementing CD process.	100% (Conceptual Design)	<i>(Operational 2018)</i>
	<b>Interim High-Level Waste Storage Project</b>	90-240	Not formally implementing CD process	80% (Conceptual Design)	<i>(Operational 2020-2021)</i>
<b>Idaho National Laboratory</b>	<b>Calcine Disposition Project</b>	900-2,000	CD-0	< 30% (Conceptual Design)	<i>(Operational 2022)</i>

<sup>1</sup> The statistics referenced on this table were provided by DOE and are reported in the Board's December 26, 2013 Periodic Report to Congress.

<sup>2</sup> Ibid.

**Exhibit A: Planned or Underway DOE Design/Construction Projects (Cont.)**

SITE	FACILITY	TOTAL PROJECT COST (\$M)	STATUS – December of 2013		
			Critical Decision Approved	Design Completion <sup>1</sup>	Construction Completion <sup>2</sup>
<b>Los Alamos National Laboratory</b>	<b>Chemistry and Metallurgy Research Replacement Project - Nuclear Facility<sup>3</sup></b>	3,710-5,860 (Undergoing DOE Review)	CD-1	70% (Final design)	Some ground work ( <i>Operational to be determined</i> )
	<b>Plutonium Facility (PF-4) Seismic Upgrades</b>	Building structure: 15-20  Fire suppression system: 6  Active confinement ventilation system: 60-145	Not formally implementing critical decision process	Various degrees of completion	Various degrees of completion
	<b>Radioactive Liquid Waste Treatment Facility Upgrade Project—Transuranic Waste Processing Facility</b>	62-96	CD-1	100% (Conceptual design)	<i>(Operational 2020)</i>
	<b>Transuranic Waste Facility Project</b>	106.9	Phase A: CD-4  Phase B: CD-2	Phase A: 100% (Final Design)  Phase B: 90% (Final Design)	Phase A: 100%  Phase B: <i>(Operational 2016)</i>
<b>Oak Ridge National Laboratory</b>	<b>Transuranic Waste Processing Center Sludge Project</b>	> 100	CD-1	20% (Final Design)	<i>(Operational 2020)</i>
<b>Savannah River Site</b>	<b>Salt Waste Processing Facility</b>	1,340	CD-3	99% (Final Design)	71% <i>(Operational 2015, under DOE review)</i>

<sup>3</sup> NNSA has deferred the CMRR-NF construction project for at least five years as stated by the Acting Undersecretary for Nuclear Security/Acting Administrator of NNSA, U.S. Department of Energy, before the Subcommittee on Energy and Water Development, House Committee on Appropriations, February 14, 2013.

## Exhibit A: Planned or Underway DOE Design/Construction Projects

SITE	FACILITY	TOTAL PROJECT COST (\$M)	STATUS – December of 2013		
			Critical Decision Approved	Design Completion <sup>1</sup>	Construction Completion <sup>2</sup>
<b>Savannah River Site</b>	<b>Waste Solidification Building</b>	414.1	CD-2/3	100% (Final Design)	93% <i>(Operational 2015)</i>
<b>Y-12 National Security Complex</b>	<b>Uranium Processing Facility</b>	4,200-6,500	CD-1	76% (Final Design)	<i>(Operational 2025)</i>



## **Exhibit B: The Board's Legislative Mandate**

The Board's specific duties and responsibilities are delineated in its enabling statute, 42 U.S.C. § 2286a(b), which states:

- The Board shall review and evaluate the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy (including all applicable Department of Energy orders, regulations, and requirements) at each Department of Energy defense nuclear facility. The Board shall recommend to the Secretary of Energy those specific measures that should be adopted to ensure that public health and safety are adequately protected. The Board shall include in its recommendations necessary changes in the content and implementation of such standards, as well as matters on which additional data or additional research is needed.
- The Board shall investigate any event or practice at a Department of Energy defense nuclear facility which the Board determines has adversely affected, or may adversely affect, public health and safety.
- The Board shall have access to and may systematically analyze design and operational data, including safety analysis reports, from any Department of Energy defense nuclear facility.
- The Board shall review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and shall recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety. During the construction of any such facility, the Board shall periodically review and monitor the construction and shall submit to the Secretary, within a reasonable time, such recommendations relating to the construction of that facility as the Board considers necessary to ensure adequate protection of public health and safety. An action of the Board, or a failure to act, under this paragraph may not delay or prevent the Secretary of Energy from carrying out the construction of such a facility.
- The Board shall make such recommendations to the Secretary of Energy with respect to Department of Energy defense nuclear facilities, including operations of such facilities, standards, and research needs, as the Board determines are necessary to ensure adequate protection of public health and safety. 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.

## EXHIBIT C: FY 2015 Congressional Budget Request by Object Class

BUDGET ACCOUNT -- (OC) -----	FY 2013 OBLIGATIONS (Actual) -----	FY 2014 FINANCIAL PLAN -----	FY 2015 BUDGET REQUEST -----
PERSONNEL SALARIES -- (11)	\$14,808,434	\$15,277,759	\$16,947,701
PERSONNEL BENEFITS -- (12)	\$ 4,352,509	\$ 4,705,526	\$ 5,227,625
BENEFITS FOR FORMER PERSONNEL -- (13)	\$ 2,513	\$ 0	\$ 0
TRAVEL -- (21)	\$ 626,992	\$ 900,000	\$ 1,150,000
TRANSPORTATION OF THINGS -- (22)	\$ 51,876	\$ 110,000	\$ 150,000
RENTAL PAYMENTS TO GSA -- (23.1)	\$ 2,260,781	\$ 2,228,682	\$ 2,217,928
COMMUNICATIONS & UTILITIES (23.3)	\$ 245,308	\$ 260,000	\$ 260,000
PRINTING & REPRODUCTION -- (24)	\$ 32,501	\$ 46,500	\$ 48,500
ADVISORY & ASSISTANCE SERVICES -- (25.1)	\$ 273,882	\$ 900,000	\$ 900,000
OTHER SERVICES -- (25.2)	\$ 2,223,683	\$ 2,500,000	\$ 2,500,000
GOVERNMENT SERVICES -- (25.3)	\$ 805,072	\$ 1,000,000	\$ 875,000
OPERATION & MAINT. OF FACILITIES -- (25.4)	\$ 6,000	\$ 25,000	\$ 30,000
OPERATION & MAINT. OF EQUIPMENT -- (25.7)	\$ 41,359	\$ 80,000	\$ 100,000
SUPPLIES & MATERIALS -- (26)	\$ 227,806	\$ 300,000	\$ 300,000
ACQUISITION OF ASSETS -- (31)	\$ 293,317	\$ 750,000	\$ 500,000
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*** TOTAL OBLIGATIONS ***	\$26,252,034	\$29,083,467	\$31,206,754
NEW BUDGET AUTHORITY	\$26,785,695	\$28,000,000	\$30,150,000
UNOBLIGATED BALANCE - PREV. FY	\$ 852,548	\$ 2,115,159	\$ 1,481,692
RECOVERY OF PRIOR YR OBLIGATIONS	\$ 771,523	\$ 450,000	\$ 225,000
	-----	-----	-----
TOTAL BUDGETARY RESOURCES	\$28,409,766	\$30,565,159	\$31,856,692
EST. UNOBLIGATED BAL. - CUR. FY	\$ 2,157,733	\$ 1,481,692	\$ 649,938
OUTLAYS	\$27,951,417	\$28,501,798	\$30,582,619

## **Exhibit C Summary**

Exhibit C presents actual obligations for FY 2013, planned obligations for FY 2014, and the Board's Budget Request for FY 2015 by object class accounts. The Board proposes to utilize the budget resources requested in the following manner:

### **Salaries and Personnel Benefits (Object Class 10)**

The FY 2015 request includes funding of \$22,175,326 to support the projected salary and personnel benefit costs for 125 FTEs. The funding for salaries and benefits represents 71 percent of the Board's FY 2015 estimated obligations. In calculating the projected salary and benefits needs of the Board, the following Federal pay adjustment and benefits factors for Executive Branch employees are used:

- Pay increase of 1.0 percent beginning in January 2014.
- Pay increase of 1.0 percent beginning in January 2015.
- Employee benefits of 27.9 percent of salaries, or \$35,982 per FTE in FY 2014.

Note personnel benefit (Object Class 12) costs also include other costs (e.g., change of station, public transit subsidies).

In establishing the Board, Congress sought to bring the best talent available to focus on health and safety oversight questions associated with the design, construction, operation, and decommissioning of DOE defense nuclear facilities. The recruitment and retention of scientific and technical staff with outstanding qualifications are the key components in the Board's human capital strategy if we are to be successful in accomplishing the Board's mission. The Board has assembled a small and highly talented technical staff with extensive backgrounds in science and engineering disciplines such as nuclear-chemical processing, conduct of operations, general nuclear safety analysis, conventional and nuclear explosive technology and safety, nuclear weapon safety, storage of nuclear materials and nuclear criticality safety, and waste management. Virtually all of the technical staff has technical master's degrees, and approximately 25 percent hold doctoral degrees. Many of the Board's technical staff members possess practical nuclear experience gained from duty in the U.S. Navy's nuclear propulsion program, the nuclear weapons field, or the civilian reactor industry. In order to accomplish the Board's highly technical mission, it is of paramount importance that the Board receives funds to meet the salary and benefit requirements of the staff.

The Board enhances its on-site safety oversight of defense nuclear facilities by assigning experienced technical staff members to fulltime duty at priority DOE sites. Currently, ten full-time Site Representatives are stationed at five DOE sites: 1) Pantex Plant to oversee nuclear weapons activities, including the weapons stockpile stewardship and weapons disassembly programs; 2) Hanford Site to monitor waste characterization and stabilization and facility deactivation; 3) Savannah River Site to monitor DOE's efforts to deactivate facilities, stabilize waste materials, and store and process tritium; 4) Oak Ridge's Y-12 National Security Complex to monitor safety and health conditions at Y-12 and other defense nuclear facilities in the area; and 5) LANL to advise the Board on overall safety and health conditions at LANL, and to participate in Board reviews and evaluations related to the design, construction, operation, and decommissioning of LANL defense nuclear facilities.

The Site Representatives Program provides a cost-effective means for the Board to closely monitor DOE activities, and to identify health and safety concerns promptly by having on-site staff conducting first-hand assessments of nuclear safety management at the priority sites to which they have been assigned. Site representatives regularly interact with the public, union members, congressional staff members, and public officials from federal, state, and local agencies.

### **Travel (Object Class 21)**

The Board requests \$1,150,000 to support the official travel of Board Members and staff, the same level as requested in President's FY 2014 Budget (any travel for the additional 5 FTEs would be absorbed within that amount). Extensive travel is necessary to the various DOE defense nuclear facilities located throughout the United States in order for Board Members and staff to conduct first-hand assessments of operations and associated health and safety issues. The Board is required to react to incidents at DOE defense nuclear facilities that may affect public health and safety, requiring unplanned travel expenditures to support its work at these sites. During FY 2013, Board Members, technical staff, and the Board's outside technical experts made 103 team visits to defense nuclear sites in support of its high priority public health and safety oversight mission.

The Board is also authorized to station staff members at DOE sites or facilities to assist in carrying out its functions. The Board has assigned technical staff teams to round-the-clock monitoring of major startup, testing, or restart activities at various DOE sites. The presence of its technical staff has proved to be invaluable in providing the Board with firsthand information on the demonstrated readiness, capabilities, and performance of DOE and its contractors for ensuring safety in the conduct of such activities. During the coming FYs, the Board anticipates a continued need for technical staff teams to monitor construction and startup of new DOE defense nuclear facilities, such as the Salt Waste Processing Facility in Aiken, South Carolina, the Waste Treatment and Immobilization Plant in Richland, Washington, and the Uranium Capabilities Replacement Project (formerly the Uranium Processing Facility) in Oak Ridge, Tennessee.

Travel funds are also used to pay for Board expenses associated with public hearings and meetings at or near DOE sites, where any interested persons or groups may present comments, technical information, or data concerning health and safety issues under Board purview.

### **Transportation of Things (Object Class 22)**

The Board has included \$150,000 in its FY 2015 Budget Request for the shipment of household goods for employees relocating to the Washington, DC area and/or to become site representatives at DOE facilities, the same amount included in the President's FY 2014 Budget.

### **Rental Payments to GSA (Object Class 23.1)**

The Board requests funds totaling \$2,217,928 to reimburse the General Services Administration (GSA) for projected office rental costs. This overhead expense represents approximately seven percent of the Board's FY 2015 Budget Request. GSA negotiated a ten-year lease for the Board effective in March 2006.

### **Communications and Utilities (Object Class 23.3)**

The Budget Request includes \$260,000 for projected communications support costs, the same amount included in the President's FY 2014 Budget. Funds in this account will be used for telephone (local, long distance, and cellular) services, Internet access charges, postage and overnight delivery costs, and special messenger services. Contracts for emergency communications services for the Board Headquarters, site representatives, and the Board's alternate Continuity of Operations Facility (COOP) are also included in this account.

### **Printing and Reproduction (Object Class 24)**

The Budget Request includes \$48,500 for reimbursing the U.S. Government Printing Office for publication of required legal notices in the *Federal Register*. Routine printing and copying charges for Budget Requests, the Board's Annual Report to Congress, Performance Accountability Report (PAR), and technical reports, are also included in this account.

### **Advisory and Assistance Services (Object Class 25.1)**

The Board maintains a highly skilled staff, but it is not economically feasible to maintain multiple permanent staff in very specialized technical disciplines. Therefore, it is necessary to have the funds available to immediately contract for this expertise when needed. Advisory and assistance services obligations include training costs for the Board's engineers and scientists as well as contracting costs for outside experts. For example, extensive use of technical consultants has been necessary to review the complex design and construction of the Waste Treatment and Immobilization Plant at Hanford. This includes the review of seismic analysis, structural loading, and construction plans to ensure the safety of this more than \$12 billion project. The Board obtains specialized contractor expertise in a variety of technical disciplines to augment its internal review capability and avoid any unnecessary impact on DOE's construction schedule.

The Board plans to continue contracting for technical expert services in highly specialized disciplines such as geotechnical investigation and seismic/structural engineering. Should an unexpected imminent or severe threat to public health and safety be identified, this expertise may be required for short durations. Each technical expert that the Board employs will continue to be carefully screened for possible conflicts of interest.

The FY 2015 Budget Request includes \$900,000 for both training of Board engineers and scientists and for advisory and assistance support contracts to assist the Board in its health and safety reviews, the same amount included in the President's FY 2014 Budget.

### **Other Services (Object Class 25.2)**

The budget request includes \$2,500,000 to fund a wide range of recurring administrative support needs of the Board in FY 2015 such as the independent audit of the Board's financial statements, physical and cyber security, training for administrative and legal employees, recruitment, information technology (IT) support, court reporting, and drug-free workplace testing and support. This amount is consistent with the amount requested in the President's FY 2014 Budget adjusted for projected escalation under the Board's main support contract and increased training due to the higher number of budgeted employees.

### **Government Services (Object Class 25.3)**

The Board's budget request includes \$875,000 for reimbursable support agreements with other Federal agencies, the same amount as included in the President's FY 2014 Budget. The Board utilizes cross-service providers for accounting and payroll processing services consistent with government-wide lines of business objectives, and also utilizes cross-servicing arrangements for services such as physical security, health unit, employee background investigations for security clearances, Employee Assistance Program (EAP) services, the Library of Congress FedLink for legal and legislative research, and Defense Contract Auditing Agency (DCAA) services to assist in determination of fair and reasonable contracting costs.

### **Operation and Maintenance of Facilities (Object Class 25.4)**

The Board requests \$30,000 for maintaining Board facilities (e.g., HVAC maintenance, building alterations and plumbing repairs outside the scope of the building lease); the same amount included in the President's FY 2014 Budget.

### **Operation and Maintenance of Equipment (Object Class 25.7)**

The Board requests \$100,000 for maintaining and repairing Board equipment (e.g., copier maintenance agreements, repair of office equipment, etc.), and for storage of household goods for relocated personnel, the same amount included in the President's FY 2014 Budget.

### **Supplies and Materials (Object Class 26)**

The Board requests \$300,000 for continued access to numerous technical standards databases, legal research services, maintenance of the technical reference information for its library, and for general office supplies and materials, the same amount included in the President's FY 2013 Budget.

### **Acquisition of Assets (Object Class 31)**

The Board requests \$500,000 acquisition of assets, the same amount included in the President's FY 2014 Budget. This includes \$450,000 for recurring software licenses/maintenance agreements supporting the Board's operations, to replace outdated office equipment such as printers and copiers, and to make minor enhancements to existing software systems. In addition, the Board requests \$50,000 in non-recurring obligations for anticipated mandatory IT initiatives.

The Board's budget request for assets does not otherwise include funding for any new systems. It does include less than \$100,000 for potential enhancements to existing systems. The priority for system enhancements will be to ensure that existing security requirements are maintained and/or addressed as part of the enhancement (e.g., no funds will be spent on systems enhancement without first ensuring systems meet existing security requirements or will meet them as a result of the enhancement).

## 5. ANNUAL PERFORMANCE PLAN

### Agency and Mission Information

**Overview.** The Board’s FY 2015 Annual Performance Plan and Annual Performance Report are included here as an integral part of the FY 2015 Budget Request to Congress. Introductory material regarding the Board, its legislative authority, mission, staffing, and budget may be found in sections 1–4 of the Budget Request.

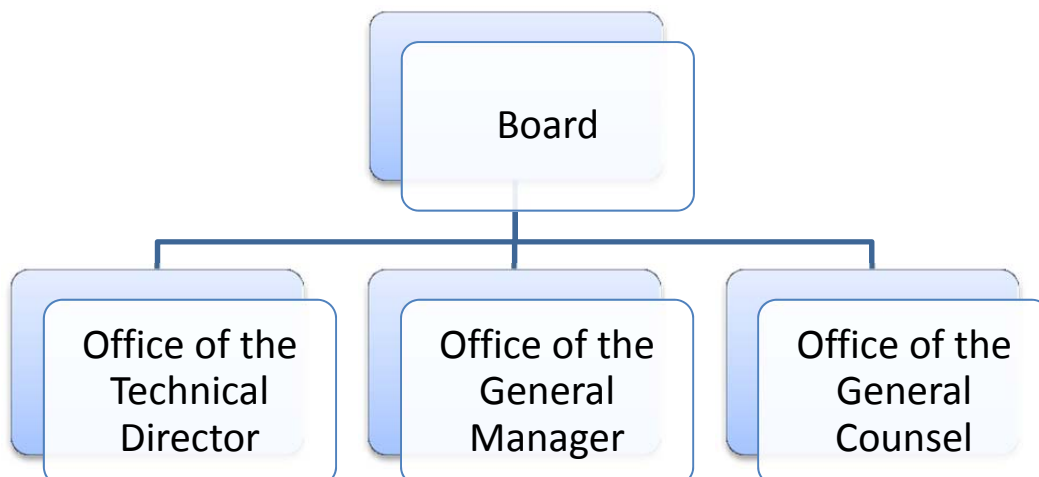
The Board’s FY 2015 Annual Performance Plan reflects a new format this year to conform to Office of Management and Budget guidance. The Performance Plan aligns with the Board’s *Defense Nuclear Facilities Safety Board Strategic Plan, FY 2014–2018*, summarized below. The Board has developed new Performance Goals that align with the agency’s Strategic Goals and Objectives.

The Board’s Annual Performance Report follows the format used in previous years to show the alignment of accomplishments with the annual Performance Objectives set in FY 2013 and in previous years. Next year, the Board plans to transition the Annual Performance Report to a new format that will align with the new Performance Goals published in this plan.

**Mission Statement.** Per the Board’s enabling legislation (42 U.S.C. § 2286a(a)), 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.

**Organizational Structure.** The Board is composed of 120 budgeted Federal FTEs arranged in a relatively flat management structure. More than 80 FTEs are assigned to the Office of the Technical Director (OTD), where they directly carry out the mission of the Board, supported by the Office of General Manager (OGM) and the Office of the General Counsel (OGC).



## **Strategic Goals and Strategic Objectives**

Based on the mission noted above, the Board proposed the following Strategic Goals and Strategic Objectives. These Goals and Objectives are also repeated in the section of this report entitled “Performance Goals” to show the alignment of the Performance Goals with the Strategic Goals and Strategic Objectives.

- **Strategic Goal 1, Improve Safety of Operations:** Perform independent oversight of operational safety of DOE’s defense nuclear facilities to develop analysis, advice, and recommendations that will inform the Secretary of Energy in providing adequate protection of public health and safety at such defense nuclear facilities.
  - Strategic Objective 1.1—Accomplish independent and timely oversight to strengthen safety of operations involved in the maintenance of the nuclear weapons stockpile and in weapons-related research, development, and testing.
  - Strategic Objective 1.2—Accomplish independent and timely oversight to strengthen safety of operations in cleanup of legacy defense nuclear wastes and facilities.
- **Strategic Goal 2, Strengthen Safety Standards:** Recommend and promote effective safety standards for the Secretary of Energy to apply in providing adequate protection of public health and safety at such defense nuclear facilities.
  - Strategic Objective 2.1—Accomplish independent oversight to strengthen the development, implementation, and maintenance of DOE regulations, requirements, and guidance for providing adequate protection of public health and safety at defense nuclear facilities.
  - Strategic Objective 2.2— Accomplish independent oversight to improve the establishment and implementation of safety programs at defense nuclear facilities.
- **Strategic Goal 3, Strengthen Safety in Design:** Recommend and promote safety in design for new and modified defense nuclear facilities.
  - Strategic Objective 3.1—Accomplish independent oversight to strengthen the early integration of safety requirements in the design and construction of DOE’s new defense nuclear facilities and major modifications to existing facilities.
  - Strategic Objective 3.2—Accomplish independent safety oversight to enhance the clear and deliberate implementation of the principles and core functions of integrated safety management in the design, construction, and upkeep of safety systems in defense nuclear facilities.
- **Strategic Goal 4, Achieve Excellence in Board Management and Communication with Stakeholders:** Operate in a manner that is accountable to the public and achieves the mission efficiently and effectively.



- Strategic Objective 4.1—Improve internal management controls to achieve the Board’s mission efficiently and effectively.
- Strategic Objective 4.2— Improve the alignment of human capital management strategies with agency mission, goals, and objectives through workforce analysis, planning, investment, measurement, and management.
- Strategic Objective 4.3—Improve and sustain effective, transparent two-way communications between the Board and its stakeholders on safety issues in DOE’s defense nuclear complex and on the Board’s operations.

**Next Steps for Strategic Objectives.** The Board will implement a new set of Strategic Objectives and corresponding Performance Goals for FY 2014 and FY 2015. This process includes the development and implementation of new metrics by which to measure the achievement of the Performance Goals. The Board will monitor the implementation of the new Goals, progress against the Goals, and will assess the feasibility and effectiveness of these Goals. If adjustments to or replacement of Goals is found to be necessary, the Board will make those changes and will incorporate them into the next Annual Performance Plan.

**Goal Leaders for Strategic Objectives.** Agency officials responsible for achieving the Strategic Objectives are listed in the relevant section below entitled “Performance Goals.”

## **Performance Goals**

The Board’s Performance Goals for FY 2014 and FY 2015 are provided below, showing alignment with the agency’s Strategic Goals and Strategic Objectives. Senior managers within the agency are identified as “Goal Leaders” for each of the Board’s Strategic Objectives.

### **Strategic Goal 1, Improve Safety of Operations**

Goal: Perform independent oversight of operational safety of DOE’s defense nuclear facilities to develop analysis, advice, and recommendations that will inform the Secretary of Energy in providing adequate protection of public health and safety at such defense nuclear facilities.

**Strategic Objective 1.1**—Accomplish independent and timely oversight to strengthen safety of operations involved in the maintenance of the nuclear weapons stockpile and in weapons-related research, development, and testing.

**Leader: Group Lead for Nuclear Weapon Programs, OTD**

**Performance Goal 1.1.1** – Conduct effective oversight through formal, well-planned safety reviews at the National Nuclear Security Administration’s (NNSA) defense nuclear facilities engaged in maintenance of the nuclear weapons stockpile and in weapons-related research, development, and testing.

Indicator: Number of reviews completed that comply with the Board’s new Technical Staff Instructions, Operating Procedures, and Internal Controls.

FY 2014 Target: 8

FY 2015 Target: 10

Actual Results: New Goal/Indicator – no previous data available.

<b>Performance Goal 1.1.2</b> - Conduct effective oversight through formal, well-planned reviews of NNSA’s nuclear explosives safety activities.	
Indicator: Number of reviews completed that comply with the Board’s new Technical Staff Instructions, Operating Procedures, and Internal Controls.	
FY 2014 Target:	3
FY 2015 Target:	4
Actual Results:	New Goal/Indicator – no previous data available.

<b>Performance Goal 1.1.3</b> – Notify NNSA of potential safety issues at NNSA defense nuclear facilities and in nuclear weapons operations.	
Indicator: Percentage of Board letters regarding potential safety deficiencies sent to NNSA that result in a positive NNSA response to assess the safety issues.	
FY 2014 Target:	80%
FY 2015 Target:	85%
Actual Results:	New Goal/Indicator – no previous data available.

<b>Performance Goal 1.1.4</b> – Maintain a near-continuous oversight presence at each of the following sites: Los Alamos National Laboratory (LANL), Y-12 National Security Complex (Y-12), and Pantex.	
Indicator: Number of days per year that a Site Representative or a member of the Board Technical Staff conducts safety oversight at each site (LANL, Y-12, and Pantex).	
FY 2014 Target:	220
FY 2015 Target:	220
Actual Results:	New Goal/Indicator – no previous data available.

**Strategic Objective 1.2**—Accomplish independent and timely oversight to strengthen safety of operations in cleanup of legacy defense nuclear wastes and facilities

**Leader: Group Lead for Nuclear Materials Processing and Stabilization, OTD**

**Performance Goal 1.2.1** – Conduct effective oversight through formal, well-planned safety reviews at DOE-Office of Environmental Management operating defense nuclear facilities and facilities undergoing decommissioning and decontamination.

Indicator: Number of reviews completed that comply with the Board’s new Technical Staff Instructions, Operating Procedures, and Internal Controls.

FY 2014 Target: 8

FY 2015 Target: 10

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 1.2.2** – Notify DOE of potential safety issues at DOE defense nuclear facilities and in nuclear waste remediation operations.

Indicator: Percentage of Board letters regarding potential safety deficiencies sent to DOE that result in a positive DOE response to assess the safety issues.

FY 2014 Target: 80%

FY 2015 Target: 85%

Actual Results: New Goal/Indicator – no previous data available.

<b>Performance Goal 1.2.3</b> – Maintain a near-continuous oversight presence at the Hanford Site and Savannah River Site (SRS).	
Indicator: Number of days per year that a Site Representative or a member of the Board Technical Staff conducts safety oversight at each site (Hanford Site and SRS).	
FY 2014 Target:	220
FY 2015 Target:	220
Actual Results:	New Goal/Indicator – no previous data available.

## Strategic Goal 2, Strengthen Safety Standards

Goal: Recommend and promote effective safety standards for the Secretary of Energy to apply in providing adequate protection of public health and safety at defense nuclear facilities.

**Strategic Objective 2.1**—Accomplish independent oversight to strengthen the development, implementation, and maintenance of DOE regulations, requirements, and guidance for providing adequate protection of public health and safety at defense nuclear facilities.

**Leader: Group Lead for Nuclear Programs and Analysis, OTD**

**Performance Goal 2.1.1** – Strengthen DOE’s Directives by providing timely oversight and comments to improve revised and newly issued DOE Directives (as noted on the list of “Orders of Interest to the Board”).

Indicator: Percentage of DOE Directives entering the review-comment period for which the Board provides comments on or before the Review Date Deadline.

FY 2014 Target: 90%

FY 2015 Target: 95%

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 2.1.2** – Conduct effective oversight of the implementation of DOE Directives (as noted on the list of “Orders of Interest to the Board”) through formal, well-planned safety reviews at DOE defense nuclear facilities.

Indicator: Number of reviews of the implementation of DOE Directives completed that comply with the new Technical Staff Instructions, Operating Procedures, and Internal Controls.

FY 2014 Target: 2

FY 2015 Target: 3

Actual Results: New Goal/Indicator – no previous data available.

**Strategic Objective 2.2**— Accomplish independent oversight to improve the establishment and implementation of safety programs at defense nuclear facilities

**Leader: Group Lead for Nuclear Programs and Analysis, OTD**

**Performance Goal 2.2.1** – Conduct effective oversight through formal, well-planned reviews of DOE’s establishment and implementation of safety programs at defense nuclear facilities.

Indicator: Number of reviews completed that comply with the Board’s new Technical Staff Instructions, Operating Procedures, and Internal Controls.

FY 2014 Target: 3

FY 2015 Target: 4

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 2.2.2** – Notify DOE of potential actions to improve establishment and implementation of safety programs at DOE defense nuclear facilities.

Indicator: Percentage of Board letters regarding potential safety deficiencies sent to DOE that result in a positive DOE response to assess the safety issues.

FY 2014 Target: 80%

FY 2015 Target: 85%

Actual Results: New Goal/Indicator – no previous data available.

### Strategic Goal 3, Strengthen Safety in Design

Goal: Recommend and promote safety in design for new and modified defense nuclear facilities.

**Strategic Objective 3.1**—Accomplish independent oversight to strengthen the early integration of safety requirements in the design and construction of DOE’s new defense nuclear facilities and major modifications to existing facilities.

**Leader: Group Lead for Nuclear Facilities Design and Infrastructure, OTD**

**Performance Goal 3.1.1** – Promote and strengthen the early integration of safety into the design and construction of DOE’s defense nuclear facilities by reviewing the adequacy of safety design basis documents at major project Critical Decision milestones.

Indicator: Percentage of significant Hazard Category 2 projects achieving a Critical Decision milestone (CD-1, 2, 3, 4) for which the Board’s Technical Staff completes and documents in a staff report a review of the associated safety design basis document.

FY 2014 Target: 100%

FY 2015 Target: 100%

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 3.1.2** – Provide early notification to DOE of safety issues at DOE design and construction projects by issuing project letters in advance of major Critical Decision milestones to document the Board’s assessment of the project’s safety strategy and readiness to proceed with the next project stage.

Indicator: Percentage of significant Hazard Category 2 projects achieving a Critical Decision milestone (CD-1, 2, 3, 4) for which the Board issues a project letter to DOE in advance of the Critical Decision milestone.

FY 2014 Target: 100%

FY 2015 Target: 100%

Actual Results: New Goal/Indicator – no previous data available.



**Strategic Objective 3.2**—Accomplish independent safety oversight to enhance the clear and deliberate implementation of the principles and core functions of integrated safety management in the design, construction, and upkeep of safety systems in defense nuclear facilities.

**Leader: Group Lead for Nuclear Facilities Design and Infrastructure, OTD**

**Performance Goal 3.2.1** – Conduct effective oversight through formal, well-planned reviews of the design, construction, and upkeep of safety systems at DOE’s defense nuclear facilities.

Indicator: Number of reviews of safety systems completed that comply with the Board’s new Technical Staff Instructions, Operating Procedures, and Internal Controls.

FY 2014 Target: 6

FY 2015 Target: 8

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 3.2.2** – Notify DOE of potential safety issues regarding design and construction projects at defense nuclear facilities.

Indicator: Percentage of Board letters regarding potential safety deficiencies sent to DOE that result in a positive DOE response to assess the safety issues.

FY 2014 Target: 80%

FY 2015 Target: 85%

Actual Results: New Goal/Indicator – no previous data available.

## Strategic Goal 4, Achieve Excellence in Management and Communication with Stakeholders

Goal: Operate in a manner that is accountable to the public and achieves the mission efficiently and effectively.

**Strategic Objective 4.1**—Improve internal management controls to achieve the Board’s mission efficiently and effectively

**Leader: Technical Director, OTD; General Manager, OGM; General Counsel, OGC**

**Performance Goal 4.1.1** – Within OTD, develop and implement formal procedures and Internal Controls prescribing effective and efficient safety oversight of DOE defense nuclear facilities.

Indicator: Percentage completion of implementation of new procedures.

FY 2014 Target: 100% complete for Phase 1 procedures

FY 2015 Target: 100% complete for Phase 2 procedures

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 4.1.2** – Within the Office of the General Manager, develop and implement formal procedures and Internal Controls prescribing effective and efficient support of the Board’s mission.

Indicator: Percentage completion of implementation of new procedures.

FY 2014 Target: 33% complete

FY 2015 Target: 66% complete

Actual Results: New Goal/Indicator – no previous data available.

<b>Performance Goal 4.1.3</b> – Within the Office of the General Counsel, develop and implement formal procedures and Internal Controls prescribing effective and efficient support of the Board’s mission.	
Indicator: Percentage completion of implementation of new procedures.	
FY 2014 Target:	40% complete
FY 2015 Target:	80% complete
Actual Results:	New Goal/Indicator – no previous data available.

**Strategic Objective 4.2**— Improve the alignment of human capital management strategies with agency mission, goals, and objectives through workforce analysis, planning, investment, measurement, and management

**Leader: General Manager, OGM**

<b>Performance Goal 4.2.1</b> – Achieve a more results-oriented performance culture.	
Indicator: Number of employees operating under a performance-based appraisal system.	
FY 2014 Target:	Develop a revised GS performance management system to ensure higher standards and employee accountability by August 31, 2014.
FY 2015 Target:	Measure the effectiveness of the SES, DN (Technical), and GS performance management systems compared to their previous systems and determine the percentage of improved performance and accountability by June 30, 2015.
Actual Results:	New Goal/Indicator – no previous data available.

<b>Performance Goal 4.2.2</b> – Address human capital gaps identified in critical mission functions.	
Indicator: Number of unfulfilled critical missions functions.	
FY 2014 Target:	Critical mission functions are defined within each position (entry-, mid-, and senior-career level) by June 30, 2014.
FY 2015 Target:	Develop management plan to address human capital gaps identified in the critical mission functions and execute 30% of the plan.
Actual Results:	New Goal/Indicator – no previous data available.

**Strategic Objective 4.3**—Improve and sustain effective, transparent two-way communications between the Board and its stakeholders on safety issues in DOE’s defense nuclear complex and on the Board’s operations

**Leader: General Manager, OGM; General Counsel, OGC; Technical Director, OTD**

**Performance Goal 4.3.1** – Provide timely communications of safety observations obtained through direct oversight and maintaining cognizance of nuclear facilities at DOE’s nuclear weapons sites.

Indicator: Percentage of Site Representative Weekly reports documenting direct oversight posted to the Board’s public webpage within 35 days of the date of the report.

FY 2014 Target: 80%

FY 2015 Target: 85%

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 4.3.2** – Inform the Congress and other stakeholders of potential safety issues early in the design and construction phases of DOE defense nuclear facilities.

Indicator: Number of *Reports to Congress on the Status of Significant Unresolved Technical Differences between the Board and the Department of Energy on Issues Concerning the Design and Construction of DOE’s Defense Nuclear Facilities* published and submitted to Congress.

FY 2014 Target: 3

FY 2015 Target: 3

Actual Results: New Goal/Indicator – no previous data available.

**Performance Goal 4.3.3** – Effectively communicate safety issues by conducting public hearings in communities near DOE defense nuclear facilities and in Washington, DC.

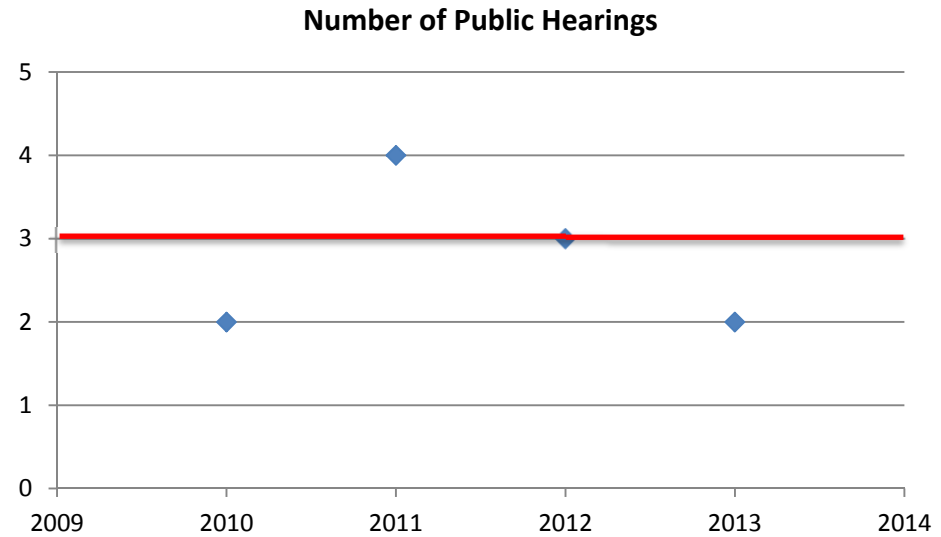
Indicator: Number of public hearings.

FY 2014 Target: 3

FY 2015 Target: 3

Actual Results:

FY 2013: 2  
FY 2012: 3  
FY 2011: 4  
FY 2010: 2



## **Other Information**

**Major Management Priorities and Challenges.** The Board is pursuing several agency-wide initiatives in FY 2014 and FY 2015 to address recently identified challenges and new direction provided through congressional legislation. These initiatives include addressing opportunities for improving in the agency's internal processes and procedures, preparing for the addition of inspector general services, and adding a new process for providing draft recommendations to the Secretary of Energy.

### *Improving Internal Processes*

Early in FY 2013, the Board commissioned an independent staffing analysis and an independent review of its internal processes and internal controls programs. These reviews highlighted several areas for improvement. The Board is addressing these areas by instituting new programs that will improve the effectiveness, efficiency, and long-term viability of the Board. The Board has taken aggressive action to meet these challenges. The most significant of these efforts, continuing through FY 2014 and FY 2015, include development of:

- Board operating practices and procedures;
- Formal procedures and internal controls for the Office of the Technical Director (Performance Goal 4.1.1);
- Formal procedures and internal controls for the Office of the General Manager (Performance Goal 4.1.2);
- Formal procedures and internal controls for the Office of the General Counsel (Performance Goal 4.1.3);
- An executive leadership development program; and
- An SES performance management system capable of receiving OPM certification.

### *Inspector General*

The Consolidated Appropriations Act for FY 2014 assigned the NRC's IG to also serve as the Board's IG in FY 2014 and FY 2015. The Board will be developing and implementing policies, practices, and procedures to address the mandate. This is expected to be a significant effort, and additional staff resources will be required to support the audits and requests for information by the NRC-OIG. Further details of the expected resource requirements are provided in Section 4 of the FY 2015 Budget Request.

**Evaluation and Research.** As a small agency in the Executive Branch, the Board does not maintain research or evaluation divisions. In early FY 2013, the Board contracted for two independent external evaluations: a staffing analysis by Booz Allen Hamilton, Inc., and an assessment of internal processes and procedures by Moseley & Associates. These evaluations provided valuable observations to the Board, highlighting areas in need of improvement. The

Board factored the results of these evaluations into the development of its new Strategic Plan, strategic goals, and performance goals. In particular, the Board added performance goals for:

- Improving the formality of agency procedures and internal controls (Performance Goals 4.1.1 and 4.1.2).
- Improving performance management systems (Performance Goal 4.2.1).
- Identifying and addressing critical staffing shortages (Performance Goal 4.1.2).

Throughout FY 2014 and FY 2015, the Board will assess progress against the new performance goals and determine if additional formal evaluations will be necessary to address performance challenges or shortfalls.

**Data Validation and Verification.** The Board will establish new performance goals for FY 2014 and FY 2015, including new indicators that will demonstrate progress against these goals. Previous years' performance plans did not include quantitative goals or metrics; therefore, no evaluation of performance data could be conducted.

As the agency implements new goals and indicators, the Board will establish data needs, data sources, and requirements for quality, accuracy, and reliability of the data. The Board will also establish a formal system for tracking and recording the necessary data.

## **6. ANNUAL PERFORMANCE REPORT**

The APR is provided in a format consistent with previous years' performance reports to describe accomplishments that align with previous years' performance goals. This is the last year the performance report will be submitted in this format. Future reports will reflect the new performance goals and alignment with the new strategic goals and strategic objectives.



## A. PERFORMANCE GOAL 1: SAFE NUCLEAR WEAPONS OPERATIONS

**DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.**

**OUTCOME:** DOE will have acknowledged, acted upon, and/or resolved the health and safety issues raised by the Board, and will operate its defense nuclear facilities to approved safety standards, rules, orders, and directives. Follow-up technical evaluation of DOE's nuclear stockpile activities will verify necessary improvements in safety.

### FY 2013 Performance Objectives

The Board and its staff will verify the safety of DOE's defense nuclear facilities and activities relating to the maintenance, storage, and dismantlement of the nuclear weapon stockpile, quality assurance of the stockpile, as well as its associated research and development, and the capability to test nuclear weapons and disposition damaged or improvised nuclear devices (such as a terrorist device). The Board and its staff will conduct assessments of DOE's efforts to develop and implement safety management systems for stockpile management activities. The Board's evaluations will be split between DOE efforts to develop safety systems (e.g., system and process designs, safety bases, control schemes, and administrative programs) and DOE efforts to implement safety management systems. These reviews will focus on activities at the Pantex Plant, Y-12, Savannah River Site (SRS) tritium facilities, LANL, LLNL, SNL, and NNSS. Representative areas for review include:

- Development, implementation, and refinement of site-wide and facility-specific safety analyses and controls for nuclear facilities and activities (e.g., safety analysis reports and annual updates developed per 10 C.F.R. Part 830).
- Cross-cutting functional areas such as legacy material disposition, nuclear criticality safety, fire protection, nuclear explosive safety, seismic design, conduct of operations, work planning, training and qualification, maintenance, and configuration management.
- Special studies of unique or significant hazards at DOE nuclear facilities (e.g., classified projects, process technology alternatives, and disposition of special items and by-product materials).
- Weapon-specific safety analyses and controls identification and implementation for nuclear weapon activities (e.g., W76, W84, and W88).
- Nuclear explosive operations at Pantex (e.g., conduct of operations, procedures, lightning protection, electrostatic discharge controls), and adequacy of the Nuclear Explosive Safety Study process.
- Laboratory support of nuclear explosive operations at Pantex (e.g., sensitivity testing of high explosives, electrostatic discharge and lightning protection studies, and weapon response evaluation and documentation).
- Uranium chemical processing and component assembly/disassembly operations at Y-12 (e.g., conduct of operations, work planning and control, criticality safety, fire protection, and operation and maintenance of vital safety systems).
- Safety basis for the waste storage facilities at LLNL.
- Corrective actions to strengthen institutional safety programs and infrastructure at LANL, LLNL, and SNL including reviews of the adequacy of vital safety system assessments and the implementation of conduct of operations and engineering at various LANL facilities.
- Readiness to dispose of damaged nuclear weapons or improvised nuclear devices at NNSS.
- Subcritical experiments at NNSS.
- Potential nuclear explosive operations at the Device Assembly Facility at NNSS.
- Operation of the National Criticality Experiments Research Center at NNSS.
- Confinement ventilation and fire suppression system improvements at NNSS Device Assembly Facility.
- Development and implementation of upgrades to address seismic vulnerabilities identified by the Seismic Analysis of Facilities and Evaluation of Risk analyses for the LANL Plutonium Facility, and implementation of Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*.
- NNSA's transition from Technical Business Practices, the Development and Production Manual, and Engineering Procedures to the new Requirements Modernization and Integration system for the weapon lifecycle.
- Safety basis for the Annular Core Research Reactor at SNL.
- Implementation of controls related to the Auxiliary Hot Cell Facility at SNL.

While performing its reviews, the staff will assess the effectiveness of integrated safety management implementation and the safety controls identified for ongoing operations as well as any new weapon system surveillance, life extension, or dismantlement projects at Pantex, Y-12, or NNSS that start in FY 2013.

**Performance Goal 1**

**Safe Nuclear Weapons Operations.** DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

**FY 2013 Performance Accomplishments**

**LANL Plutonium Facility Seismic Vulnerabilities.** DOE, in its September 2012 response to the Board’s July 18, 2012 letter committed to conduct an alternate nonlinear seismic analysis of the plutonium facility. The Board’s staff has closely observed this substantial effort since its start in October 2012. Completion of this analysis is a critical step in determining the risk associated with a post-seismic collapse and fire accident scenario. The Board’s July 17, 2013 letter emphasized the importance of the analysis and requested a schedule that supports timely completion.

**Safety Basis at the LANL Plutonium Facility.** Following identification of new collapse mechanisms at the Plutonium Facility, DOE directed the LANL contractor to develop a Safety Basis Addendum to justify continued operations. The Board issued its January 3, 2013 letter urging DOE to consider additional compensatory measures including reduction of nuclear material inventory, robust containerization and increased emphasis on emergency preparedness. DOE issued the Addendum and responded to the Board on March 27, 2013, reporting that the Secretary of Energy’s review of consequence and frequency indicated it was safe to continue operations. The Board reported that it could not reach this conclusion until the above mentioned alternate seismic analysis was complete.

**Nuclear Criticality Safety at LANL.** In a July 15, 2013 letter to NNSA, the Board expressed concern with long-standing issues associated with LANL’s implementation of its Criticality Safety Program. Concerns include: a significant shortage of contractor criticality safety staff that has hindered their ability to address criticality deficiencies; most criticality safety controls are not incorporated into operating procedures; operators typically do not utilize written procedures when performing work; fissile material labels do not list parameters relevant to criticality safety (e.g., mass); some fissile material operations lack criticality safety evaluations (CSE); and some CSEs do not analyze all credible abnormal conditions. Most fissile material operations in the Plutonium Facility have been paused since June 27, 2013. In response to the Board letter, NNSA briefed the Board on September 24, 2013, and intends to release an approved resumption plan prior to restarting full operations with fissile materials.

**Continued Operations of Y-12 Aging Infrastructure.** In a letter to NNSA dated March 13, 2007, the Board identified concerns regarding NNSA’s ability to safely operate the 9212 Complex for an extended period of time and established an annual reporting requirement to evaluate the physical condition of the building’s systems, structures, and components. In February 2012, NNSA deferred transition of the operations in Buildings 9215 and 9204-2E from the scope of the planned Uranium Capabilities Replacement Project. Given this change, the Board emphasized the need for NNSA and the Y-12 contractor to more vigilantly monitor the condition of these facilities during the October 2, 2012, Public Hearing in Knoxville. On August 26, 2013, NNSA briefed the Board on the Continued Safe Operations Oversight Team’s review, which was expanded this year to incorporate Buildings 9215 and 9204-2E.

**Y-12 Training and Qualification Program.** In a letter to NNSA dated June 5, 2012, the Board identified numerous areas for improvement related to the Y-12 Training and Qualification Program. During FY 2013, the Y-12 contractor took action to address the Board’s concerns by formalizing a continuing training strategy within its production organization and making improvements to its systematic approach to training. The staff provided feedback to the Y-12 contractor regarding this strategy and continues to actively track progress towards implementing the new training program.

**Y-12 Work Planning and Control.** In a letter to NNSA dated December 29, 2011, the Board identified concerns with the planning, control, execution, and oversight of work at Y-12. The Y-12 contractor briefed the Board on April 24, 2013, regarding an independent contractor assessment of the effectiveness of corrective actions taken through the comprehensive Work Planning and Control Performance Improvement Plan. A number of weaknesses continue to persist and the Y-12 contractor committed to actions to sustain key initiatives and further improve in this area.

**Pantex Emergency Preparedness.** In October 2012, members of the Board’s staff conducted a review of the Pantex emergency preparedness program, observed an emergency exercise, and provided immediate feedback regarding a lack of personnel training and the adequacy of exercises and drills. On March 14, 2013, the Board conducted a public meeting and hearing in Amarillo, Texas, that included discussions of the weaknesses in the program. As a result, NNSA recognized the weaknesses and initiated corrective actions for the emergency preparedness program at the Pantex Plant.

**Pantex Fire Protection.** On February 25, 2013, the Board issued a letter to NNSA documenting its concern regarding maintenance and operation issues with the fire protection systems at Pantex. NNSA responded by taking immediate actions to address issues with the fire suppression systems and maintenance procedures and committed to prioritizing long-term improvements to the fire protection system.

**Pantex Probabilistic Seismic Hazard Analysis (PSHA) Update.** Beginning in August 2012, and throughout FY 2013, members of the Board's staff reviewed the seismic qualifications of the Pantex site and noted a lack of compliance with DOE Order 420.1B, *Facility Safety*; specifically the requirement to evaluate the need to update the site seismic hazard analysis every ten years. NNSA and its contractor responded by publishing plans to address the seismic hazard at Pantex and updating the seismic source characterization model.

**Pantex Documented Safety Analysis.** On January 28, 2013, the Board received a briefing by NNSA regarding its continuing efforts to bring the Pantex documented safety analysis (DSA) into compliance with NNSA directives. Particular shortcomings were originally documented in a Board letter issued July 2, 2010. The Board reviewed the new plan and implementation efforts presented by NNSA and provided immediate feedback. NNSA utilized the Board's input and published an updated DSA Improvement Plan, which was published in July 2013.

**Pantex Safety Culture.** On March 2, 2012, the Board issued a letter describing major shortcomings in the Pantex safety culture that led to operations being performed that exceeded the approved nuclear explosive safety boundaries. NNSA initiated multiple efforts to address this significant concern including a B&W Pantex investigation of the nuclear explosive safety change evaluation process, an NNSA assessment of the same process, and an HSS investigation of Pantex safety culture. The Board further investigated how its concerns were being addressed at a public meeting and hearing held on March 14, 2013. NNSA is continuing to take corrective actions to increase safety of nuclear explosive operations and, in particular, to improve communication between management and workers.

**Nuclear Explosive Safety (NES) at Pantex.** The Board's staff observed several NES evaluations and raised a number of key issues:

- NNSA has allowed ongoing nuclear explosive operations to continue without correcting or mitigating critical safety concerns raised by these evaluations.
- NNSA does not provide adequate staffing levels of qualified federal personnel needed to conduct these evaluations.
- NNSA does not ensure that these evaluations are revalidated as required by the directives.

These and other issues were the subject of a Board public hearing in March 2013 in Amarillo, Texas. During the preparation phase for this public hearing, NNSA restructured the nuclear explosive safety program to address many of the concerns that had been raised informally via technical interchanges between the Board's staff and the NNSA staff. The Board received assurances from NNSA that these changes would improve the visibility and the independence of the current process and should lead to improvements in all of these areas.

**LLNL Safety Basis Processes.** On August 30, 2012, the Board issued a letter expressing concern that there were systemic deficiencies in the development, review, and approval of safety control strategies at LLNL. In response to the Board's letter, NNSA and the contractor each conducted an independent, external review of their respective nuclear safety basis processes during FY 2013. The Board evaluated the results of these reviews and will assess the effectiveness of the associated corrective actions as part of the Board's oversight process.

**LLNL Waste Storage Facilities Safety Basis.** A review team from the Board's staff assessed the LLNL Waste Storage Facilities Documented Safety Analysis for compliance with DOE Standards and noted a number of deficiencies and errors within the analysis. The staff review team communicated these deficiencies to the Livermore Field Office, which then directed the contractor to formally resolve the staff comments. One of the identified deficiencies led the LLNL contractor to declare that a potential inadequacy in the safety analysis existed. The contractor is working to address the staff review team comments. The staff is planning a follow up review of the Waste Storage Facilities Safety Basis once the contractor has completed updating the analysis.

**NNSS National Criticality Experiments Research Center (NCERC)—Safety Basis and Instrumentation and Control.** The Board’s staff continued to evaluate NNSA’s efforts to improve operations at NCERC—efforts that NNSA began in response to a Board letter dated August 5, 2010. Areas of concern included the adequacy of the safety analysis, classification of controls, and the reliability of instrumentation and control systems. In response, NNSA identified corrective actions for each of the Board’s concerns and in FY 2013, NNSA implemented several improvements to the safety analysis and controls at NCERC.

**NNSS Device Assembly Facility (DAF) Fire Suppression System.** The Board and its staff have long noted deficiencies in the DAF fire suppression system that should be corrected before beginning more hazardous operations. In response, NNSA initiated a project to assess the condition of the system, analyze and prioritize needed improvements, develop improvement options, and begin improvements to the system. In FY 2013, NNSA approved a new comprehensive project plan that should address the full scope of the deficiencies.

**Fire Protection and Life Safety for Subcritical Experiments at NNSS.** The Board’s staff reviewed plans and improvements to fire protection and life safety in the underground tunnel complex for subcritical experiments at NNSS. As a result of staff-to-staff interactions, NNSA identified more appropriate requirements for safety and health in underground facilities at NNSS.

**Performance Goal 1**

**Safe Nuclear Weapons Operations.** DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

**FY 2012 Performance Accomplishments**

**Safety Basis and Controls at LANL.** The Board identified concerns with the quality and timeliness of the safety basis update process across the laboratory during its public hearing held in Santa Fe, NM, in November 2011. Based on reviews of updates to both the Plutonium Facility Documented Safety Basis and the Area G Basis for Interim Operations, the Board issued a letter June 18, 2012 outlining its concerns with the safety basis for the Plutonium Facility. DOE is working to address the deficiencies identified by the Board.

**LANL Plutonium Facility Confinement Ventilation.** DOE's Implementation Plan for the Board's Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, committed to provide seismically qualified fire suppression and active confinement ventilation systems. DOE has committed to provide a Project Execution Plan that describes its plan to implement these improvements by November 2012.

**LANL Plutonium Facility Seismic Vulnerabilities.** An update to the Probabilistic Seismic Hazards Analysis for the laboratory issued in 2007 indicated that the likelihood of high seismic ground motion (particularly in the vertical direction) was much greater than previously believed. Further analysis identified nine facility vulnerabilities that could lead to loss of building confinement or structural collapse. NNSA completed physical upgrades to address these new vulnerabilities. The Board noted additional vulnerabilities and continued working with NNSA personnel as they conducted a static nonlinear analysis of the facility. The Board communicated its concerns with technical basis and acceptance criteria for this analysis in a July 18, 2012, letter. NNSA subsequently provided the Board with the initial results of this analysis, which identified more structural weaknesses in the building. On September 28, 2012, the Deputy Secretary of Energy replied to the Board's July 18 letter, committing to further analyses and continued cooperation with the Board.

**Nuclear Criticality Safety at LANL.** In August 2011, a significant violation of nuclear criticality safety requirements occurred at the Plutonium Facility. The Board evaluated the corrective action plan, its adequacy, and its applicability to other LANL facilities. Nuclear criticality safety concerns also arose in May 2012 at Technical Area 35 regarding the inventory and control of special nuclear materials. The Board has closely followed NNSA's involvement in this area, including observation of a Nuclear Criticality Safety Group assessment at LANL in February 2012.

**Emergency Preparedness at LANL.** The Board conducted a review of Emergency Preparedness in October 2011, and emphasized several weaknesses during its public hearing at Santa Fe in November 2011. Of particular concern were the wildland fire mitigation program and LANL's preparations to confront site-wide or cascading natural phenomena events. LANL responded with increased effort and has initiated an exercise program focused on these kinds of accident scenarios.

**Nuclear Explosive Safety at Pantex.** The Board issued a letter on November 7, 2011, detailing concerns on how NNSA addresses nuclear explosive safety issues that are identified during studies of proposed and ongoing nuclear explosive operations. NNSA has committed to improving the management review of findings and documenting the technical justification for not addressing findings prior to beginning or continuing operations.

Additionally, the Board issued a letter on March 2, 2012, documenting concerns with the effectiveness of the nuclear explosive safety program at the Pantex Plant. NNSA took immediate action to change the Pantex management structure to prevent conflicts of interest between nuclear explosive safety and production. NNSA and DOE's Office of Health, Safety and Security are also conducting reviews of the safety culture at Pantex.

**Pantex Hazard Analysis Reports.** In April 2011, NNSA approved the Pantex Documented Safety Analysis Upgrade Initiative which will bring Pantex Hazard Analysis Reports into compliance with the applicable DOE directives. In October 2011, the first safety analysis document was drafted with the intent of meeting the upgraded requirements. In December 2011, the Board presented NNSA with concerns and comments regarding this draft document; NNSA is currently making revisions.

**Implementation of DOE Standard 3016, Hazard Analysis Reports for Nuclear Explosive Operations.** During FY 2012, the Board followed up on its April 5, 2011, letter to NNSA that identified shortcomings with NNSA oversight of the development and documentation of weapon response (an input to the safety basis for the explosive operations at the Pantex Plant in accordance with DOE Standard 3016. In response to the Board's letter, NNSA managers committed to evaluate implementation of the standard at each of the three weapon design agencies. The Board observed all of these reviews, the last of which was conducted in August 2012. The preliminary findings and weaknesses identified by the NNSA team are consistent with the concerns raised in the Board's letter. The NNSA review team will develop a final report and recommend corrective actions during FY 2013.

**Pantex Chemical Control Program.** In December 2011, the Board conducted an onsite review of the Pantex chemical control program and identified concerns with the categorization of hazardous chemicals and the technical basis of methods used for dispersion calculations. These concerns were transmitted to NNSA through staff to staff teleconferences and are being addressed.

**Pantex Conduct of Operations and Technical Procedures.** In February 2012, the Board conducted a review of the conduct of nuclear explosive operations at Pantex and provided immediate feedback to NNSA on areas for improvement. NNSA issued an updated Writer's Guide for technical procedures in March 2012; implementation of this guide has begun. The issues leading to improvements in the Writer's Guide and technical procedures were originally documented in a Board letter dated October 15, 2009.

**Pantex Technical Safety Requirements Calculations.** The Board issued a letter on March 2, 2012, documenting its review of the technical information and calculations Pantex used to develop its Technical Safety Requirements. The Board discussed a number of discrepancies with NNSA, and NNSA is taking action to address the concerns.

**Pantex Fire Protection System.** In July 2012, the Board conducted a review of the Pantex Fire Protection system and provided feedback NNSA on several areas for improvement.

**Pantex Hazard Analysis Task Teams.** In August 2011, the Board conducted a review of the operation of Hazard Analysis Task Teams at Pantex which are used to identify hazards, develop safety controls, and complete the Hazard Analysis Reports for nuclear explosive operations. NNSA has committed to reviewing its processes and documenting them through its Requirements Modernization and Integration initiative.

**Highly Enriched Uranium Materials Facility (HEUMF) Safety Analysis.** In response to the Board's letter to DOE dated April 20, 2011, the Y-12 contractor re-incorporated the analysis of chemical and toxicological hazards into the facility safety basis in June 2012.

**Y-12 Work Planning, Conduct of Operations, and Procedures.** The Board continued to evaluate actions in response to its letter to DOE dated August 19, 2011, that identified concerns regarding the Y-12 contractor's failure to adhere to conduct of operations principles during nuclear operations and inconsistencies in the quality of operating procedures. During this fiscal year, the Y-12 contractor implemented a comprehensive Conduct of Operations Improvement Plan and significantly improved the quality of technical procedures and operator adherence to these procedures. Additionally, NNSA evaluated the effectiveness of the Y-12 contractor's corrective actions and briefed the Board on the improvements to date.

In a letter to DOE dated December 29, 2011, the Board identified concerns with the planning, control, execution, and oversight of work at Y-12. The Y-12 contractor identified corrective actions to address the Board's concerns, which are being implemented through execution of a comprehensive Work Planning and Control Performance Improvement Plan, and have led to improvements in the content and format of work packages and added management attention on work planning activities. DOE and the contractor performed assessments of the effectiveness of these actions and noted improvements, but concluded that continued attention by DOE and contractor management is required to ensure improvements continue to mature and are consistently implemented.

**Y-12 Fire Protection.** The Board identified concerns related to the Y-12 contractor's decision to test aged sprinkler heads in defense nuclear facilities rather than replace them when the 50-year operating lifetime was exceeded. As a result, the Y-12 contractor decided to adopt an appropriately conservative approach and began replacing the aged sprinkler heads in 2012, improving the safety posture of the Y-12 facilities.

**Y-12 Training and Qualification Program.** In a letter to NNSA dated June 5, 2012, the Board identified numerous areas for improvement related to the Y-12 Training and Qualification Program. The Y-12 contractor has taken action to improve the content of several training courses to improve operator performance for nuclear operations, and has committed to a more comprehensive plan with additional corrective actions by November 1, 2012.

**Continued Operations of the 9212 Complex at Y-12.** In a letter to DOE dated March 13, 2007, the Board identified concerns regarding NNSA's ability to safely operate the 9212 Complex for an extended period of time and established an annual reporting requirement to evaluate the physical condition of the building's systems, structures, and components. On July 24, 2012, DOE briefed the Board on the Continued Safe Operations Oversight Team's review, which fulfilled the annual reporting requirement. The Board continues to track the safety of operations in the 9212 Complex and advocate for necessary maintenance and repairs until these operations can be transferred to the planned Uranium Capabilities Replacement Project.

**LLNL Safety Basis Development, Review, and Approval.** On March 29, 2011, the Board issued a letter expressing concern over the changes proposed in the contractor's annual update to the Tritium Facility safety basis, particularly with the selection of credited controls. The Board has further reviewed recent updates to the Plutonium Facility safety basis and is concerned that there is a trend toward decreasing rigor and conservatism in the development, review, and approval of important safety basis documents. The Board conveyed these concerns to NNSA in a letter dated August 30, 2012, and will monitor the response and any improvements in the safety basis process.

**Safety System Design, Functionality, and Maintenance at LLNL.** The Board issued a letter on December 13, 2011, which questioned the ability of two Plutonium Facility safety systems—wooden high-efficiency particulate air filter enclosures and the fire detection and alarm system—to perform their defined safety functions under all operating conditions. As a result, the laboratory is reviewing options for replacing the wooden enclosures, has made software improvements to the fire detection system to increase its reliability in some conditions, and is addressing the Board's concerns with additional Plutonium Facility systems (e.g., Hydrogen Gas Control System and Glovebox Exhaust System).

**NNSS National Criticality Experiments Research Center (NCERC)—Safety Basis and Instrumentation and Control.** In 2010 and 2011, the Board evaluated NNSS's readiness to begin operations at NCERC. In an August 5, 2010, letter to NNSA, the Board identified concerns with the safety analysis, classification of controls, and the reliability of instrumentation and control systems. In response, NNSA identified corrective actions for each of the Board's concerns that contributed to the safe startup of NCERC. In FY 2012, NNSA implemented compensatory measures for the start-up of critical assembly machines and experiments.

**Readiness to Dispose of a Damaged Nuclear Weapon or Improvised Device at NNSS.** For several years, NNSA completed life safety and tunnel infrastructure improvements and developed a plan for implementation of safety controls and upgrades for the facility at NNSS (G-Tunnel) that would be used in disposition of an improvised nuclear device. In FY 2012, NNSA abandoned G-Tunnel due to structural stability concerns. NNSA moved the planned location for such operations to a newer, more stable, and safer tunnel.

**Formality of Operations for Subcritical Experiments at NNSS.** The Board reviewed improvements to several safety management programs at NNSS nuclear facilities related to previous concerns with formality of operations. As a result of interactions with the Board through 2012, NNSA implemented compensatory measures to improve the conduct of operations, work planning, and configuration of safety systems at nuclear facilities at NNSS.

**Annular Core Research Reactor at SNL.** In letters to NNSA dated February 28, 2012, and April 18, 2012, the Board identified issues with the safety analysis, the reliability of some safety systems, and quality assurance (including software quality assurance) for the Annular Core Research Reactor. In response, NNSA and SNL established compensatory measures to limit material at risk, evaluated the Board's issues, and developed an improvement plan.



**Performance Goal 1**

**Safe Nuclear Weapons Operations.** DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

**FY 2011 Performance Accomplishments**

**Safety of Continued Operation of the LANL Chemistry and Metallurgy Research Facility.** In response to Board letters dated October 23, 2007, and May 16, 2008, which questioned DOE’s decision to operate the 55-year-old Chemistry and Metallurgy Research facility an estimated six years past the previously planned shutdown date of 2010, LANL agreed to limit the radioactive material-at-risk in the facility to reduce the design basis accident consequence to below the Evaluation Guideline.

**Integrated Nuclear Planning at LANL.** The Board identified that DOE had not demonstrated formal mechanisms to ensure that design requirements and interfaces for pit manufacturing at LANL were appropriately managed and controlled across the suite of projects that contribute to the future plutonium processing infrastructure. In response, DOE developed an Integrated Nuclear Planning process to improve coordination among its projects as national security mission requirements are refined. The Board has continued to participate in these Integrated Nuclear Planning workshops, including two this fiscal year. This process continues to be effective.

**Transuranic Waste Operations at LANL.** In a letter dated January 18, 2007, the Board urged NNSA to promptly develop a viable pathway for shipping high-activity transuranic waste drums from LANL to the Waste Isolation Pilot Plant for disposal. In response, DOE has bolstered waste disposition work at LANL by facility infrastructure upgrades, new safety basis documents, and training and qualification of operators. During FY 2011, the Board evaluated LANL’s preparations to re-establish the capability to vent waste drums potentially containing flammable gases.

**LANL Material Disposition Area-B.** The Board’s oversight of an American Recovery and Reinvestment Act activity to de-inventory the open pit disposal area at LANL’s Technical Area-21 is nearly complete. Ninety-eight percent of the waste has been uncovered and packaged for disposal. Sixty-five percent has been shipped off site to disposal.

**LANL Plutonium Facility Confinement Ventilation.** As part of DOE’s implementation plan for the Board’s Recommendation 2004-2, *Active Confinement Systems*, NNSA and its contractor evaluated the facility’s confinement strategy in parallel with an effort to develop a new safety basis for the facility. In its June 16, 2009, report to the Board, NNSA asserted that some modifications identified as needed in the confinement ventilation evaluation may not be needed to meet the overall safety strategy and goals under the final approved documented safety analysis. As a result, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, on October 26, 2009, to which DOE responded with an Implementation Plan on July 13, 2010. The Board is closely following the implementation of near-term improvements in the facility’s safety posture and NNSA’s development of a strategy for long-term improvements in the facility’s safety systems.

**LANL Plutonium Facility Seismic Vulnerabilities.** In 2007, the Probabilistic Seismic Hazards Analysis was updated indicating that the likelihood of high seismic ground motion (particularly in the vertical direction) was much greater than previously believed. Analysis identified nine facility vulnerabilities that could lead to loss of building confinement or structural collapse. In response, LANL declared a Potential Inadequacy of the Safety Analysis and submitted a Justification for Continued Operations that was approved by the NNSA site office in July 2011. LANL and NNSA are aggressively pursuing physical upgrades to address these new vulnerabilities. The Board believes additional vulnerabilities exist and is working with LANL and NNSA to ensure they are adequately addressed.

**LANL Weapons Engineering Tritium Facility.** In October 2008, LANL ceased operations at the tritium facility due to a Technical Safety Requirement violation and problems with the pressure safety program. These issues were initially identified by a Board review in July 2007 and communicated to DOE by letter on October 16, 2007. To comply with the facility’s safety basis, the laboratory made changes to the piping system, pressure relief components, and the facility’s pressure safety procedures. The Board carefully tracked these changes and questioned the laboratory’s plan (viewed as acceptable by the NNSA site office) to restart operations without a formal readiness review. As a result, NNSA headquarter held discussions with its site offices and the laboratory, ultimately resulting in the decision to perform formal contractor and federal Operational Readiness Reviews. LANL divided the restart into three phases. The Phase I readiness review authorizing low pressure operations was successfully completed in



June 2010. The remaining phases were completed in FY 2011.

**Nuclear Criticality Safety at LANL.** In a September 10, 2007, letter to NNSA, the Board expressed concern that a software tool (MASS) was being relied upon by operators as a control to ensure compliance with criticality safety limits without appropriate software quality assurance. LANL took actions to strengthen the safety posture, and the schedule for bringing the nuclear criticality safety program into full compliance with industry standards and DOE directives appears acceptable. LANL began implementing a new software tool (MARTracker) in FY 2010. The Board anticipates greater oversight and involvement in FY 2012, including reviewing progress on criticality safety programmatic improvements and software upgrades.

**Nuclear Explosive Safety.** The Board evaluated 8 Nuclear Explosive Safety Studies and change evaluations conducted at Pantex during FY 2011, including the B53 dismantlement Nuclear Explosive Safety Study and the B61 and W87 Operational Safety Reviews.

**Quality of Safety-Related Information for Nuclear Explosive Operations.** In FY 2011, the Board completed a comprehensive review of the design laboratories' implementation of DOE Standard 3016, *Hazard Analysis Reports for Nuclear Explosive Operations*, and issued a letter on April 5, 2011, informing DOE that the standard had not been adequately implemented and that the technical information used by the laboratories could not be verified to be technically accurate. NNSA is in the process of responding to the Board's concerns.

**Pantex Procedures.** In 2009, the Board completed a series of onsite reviews and provided immediate feedback to Pantex on areas where improvements could be made in nuclear explosive operating procedures. On October 15, 2009, the Board issued a letter detailing shortcomings in the process for developing and implementing technical procedures at Pantex. In 2011, the Board continued observation of Pantex nuclear operations, providing feedback on shortcomings of procedures. In response to Board concerns, Pantex corrected implementation of immediate action procedures and is working on upgrades to the Writer's Guide for procedures.

**Pantex Hazard Analysis Task Teams.** In August 2011, the Board conducted a review of the operation of Hazard Analysis Task Teams at Pantex which are used to identify hazards, develop safety, and complete the Hazard Analysis Reports for nuclear explosive operations. NNSA has committed to reviewing its processes and documenting them through its Requirements Modernization and Integration initiative.

**Pantex Hazard Analysis Reports.** The Board issued a letter on July 6, 2010, detailing specific issues concerning Pantex's compliance with DOE Standard 3016 in developing Hazard Analysis Reports and establishing sufficient controls. On April 28, 2011, NNSA issued guidance for use of the standard. In March 2011, the Board participated in a workshop with NNSA to update guidance for the Pantex Documented Safety Analysis Upgrade Initiative which will bring Pantex Hazard Analysis Reports into compliance with the applicable DOE directives.

**Pantex Technical Safety Requirements Calculations.** The Board reviewed the technical information and calculations Pantex used to develop its Technical Safety Requirements. The Board discussed a number of discrepancies with NNSA, and NNSA is taking action to address the concerns.

**Y-12 Non-Material Access Area Storage.** In a letter to DOE dated February 4, 2011, the Board raised questions regarding the safety issues that were considered and the rationale used to evaluate the proposed new mission for an aging structure, Building 9720-5, to be used for storage of enriched uranium and other materials. Through subsequent interactions, the Y-12 contractor committed to (a) reduce combustible loading in the facility by over packing wooden containers of depleted uranium over the next four years and (b) conduct a programmatic and safety evaluation five years after material consolidation is complete.

**Highly Enriched Uranium Materials Facility Safety Analysis.** In a letter to DOE dated April 20, 2011, the Board raised concerns regarding the elimination of chemical and toxicological hazards from the safety analysis for the Highly Enriched Uranium Materials Facility (HEUMF). After several interactions and a briefing to the Board, NNSA directed the Y-12 contractor to ensure all non-radiological hazards are evaluated and appropriate controls are identified in the Documented Safety Analyses for both HEUMF and the Uranium Processing Facility (UPF). The Board also identified concerns regarding the basis for the potential downgrading of some safety related controls in HEUMF, specifically the lack of bounding analysis for certain fire scenarios. DOE subsequently directed the Y-12 contractor to provide more detailed analyses for fire scenarios.

**Special Material Capability Glovebox Project at Y-12.** The Board observed the contractor Readiness Assessment for startup of the new Special Material Capability Glovebox Project. The assessment was thorough, and the facility demonstrated readiness to operate the new glovebox. However, the Board was concerned that issues identified in the area of conduct of operations were likely not limited to operation of the new glovebox, and could indicate facility or site-wide weaknesses. The Board conducted a review of Y-12 technical procedures and conduct of operations in April 2011 to evaluate this concern.

**Conduct of Operations at Y-12.** In a letter to DOE dated August 19, 2011, the Board identified concerns regarding the Y-12 contractor's failure to adhere to conduct of operations principles during some nuclear operations and inconsistencies in the quality of some operating procedures. The Y-12 contractor has since identified several corrective actions to address the Board's concerns, which are being implemented through execution of a comprehensive Conduct of Operations Improvement Plan. In its letter, the Board requested that DOE provide a report in six months that evaluates the effectiveness of these corrective actions.

**Y-12 Fire Protection.** Following a component failure, the Board identified concerns regarding the operability of the HEUMF fire suppression system. Through subsequent discussions, DOE and the Y-12 contractor identified numerous lessons learned, which will improve the availability and reliability of vital safety systems at Y-12 once implemented. The Board has also initiated interactions with Y-12 regarding testing to determine operability of aged sprinkler systems in other facilities.

**Y-12 Nuclear Criticality Safety.** The Board continued to evaluate actions taken in response to the Board's January 23, 2009, letter to NNSA, which raised concern over the adequacy of some criticality safety evaluations. The Y-12 contractor has since implemented a Criticality Safety Program Improvement Plan and upgraded several of its Criticality Safety Evaluations. These actions address weaknesses in both programmatic processes and documentation.

**Y-12 Activity-Level Work Planning.** The Board conducted a review of Y-12 activity-level work planning and control in August 2011. This review followed a 2008 review, the results of which were transmitted to DOE in a letter dated January 22, 2009. Final results of this follow-on review are pending, but preliminary concerns have been identified with the planning, control, execution, and oversight of work, similar to the issues identified in 2008. Y-12 issued several standing orders as a preliminary corrective action.

**Continued Operations of the 9212 Complex.** In a letter to DOE dated March 13, 2007, the Board identified concerns regarding NNSA's ability to safely operate the 9212 Complex for an extended period of time and established an annual reporting requirement on the physical condition of the building's systems, structures, and components. On May 17, 2011, DOE briefed the Board on the Facility Risk Review Follow-on Study, which fulfilled the annual reporting requirement. The Board will continue to track the safety of operations in the 9212 Complex and advocate for necessary maintenance and repairs until the transition of these operations to the Uranium Processing Facility.

**LLNL Tritium Facility Safety Posture.** On March 29, 2011, the Board issued a letter expressing concern over the changes proposed in the contractor's annual update to the safety basis, particularly with the selection of credited controls to protect workers from fires and breaches in tritium confinement. NNSA responded to most of the Board's concerns and imposed several conditions of approval when it acted on the contractor's proposed safety basis; however, the Board remains concerned with the lack of a credited fire suppression system.

**LLNL Activity Level Work Planning.** LLNL implemented some improvements to address weaknesses identified by the Board in the processes used to plan and execute work. In 2010, the Board assessed that the laboratory guidance was vague and that the work planning process suffered as a result. NNSA continues to strengthen oversight in this area and has directed the contractor to undertake long-term improvements to these processes.

**Worker Training at LLNL.** The Board issued a letter on April 1, 2011, identifying areas where training of nuclear facility workers could be improved to enhance the safety of operations at LLNL. NNSA and the contractor are addressing these areas as they implement the revised DOE directive on training.

**NNSS Device Assembly Facility (DAF) Fire Suppression System.** In 2008, the Board determined that the DAF fire suppression system had significant deficiencies that should be corrected before beginning more hazardous operations. In response, NNSA initiated a project to assess the condition of the system, analyze and prioritize

needed improvements, developed improvement options, and began improvements to the system. In FY 2011, NNSA approved Critical Decision-0 (approval of mission need) for a project to replace the fire suppression system's lead-in piping. The contractor hired additional fire protection engineers to assist in performing walk-downs of the as-built condition of the fire suppression system and re-compute hydraulic calculations, is working toward replacing strainers to filter debris from the system, and is procuring a standalone fire suppression unit for installation in DAF.

**NNSS Criticality Experiments Facility (CEF) Safety Basis and Instrumentation and Control.** In 2010 and 2011, the Board evaluated NNSS's readiness to begin operations at CEF. The Board identified concerns with the safety analysis, classification of controls, and the reliability of instrumentation and control systems. The Board communicated these issues to NNSA in staff-to-staff discussions. In response, NNSA identified corrective actions for each of the Board's concerns that contributed to the safe startup of CEF.

**Readiness to Dispose of a Damaged Nuclear Weapon or Improvised Device at NNSS.** NNSA developed a plan for implementation of safety controls and upgrades appropriate for the scope of operations for the facility at NNSS (G tunnel) that would be used in disposition of an improvised nuclear device. As a result of the Board's interactions and discussions in FY 2011, NNSA planned for operational safety improvements and conducted training and exercises.

**Formality of Operations for Subcritical Experiments at NNSS.** The Board reviewed several safety management programs at NNSS nuclear facilities. In a March 28, 2011, letter to NNSA, the Board identified a number of deficiencies related to work planning and control. As a result of interactions with the Board, NNSA implemented compensatory measures to improve the conduct of operations, work planning, and configuration of safety systems at nuclear facilities at NNSS.

**Exemption to Nuclear Safety Management rule at SNL.** The Board assessed the adequacy of the controls to process Hazard Category 3 quantities of waste at the Radioactive and Mixed Waste Management Facility at SNL. NNSA granted SNL an exemption to the Nuclear Safety Management rule (10 C.F.R. Part 830) for the processing of this waste. The Board found that the operation could be accomplished safely under the controls that had been implemented.

**SRS Tritium Facilities.** On August 19, 2011, the Board issued a letter that communicated deficiencies in both the safety basis and the effectiveness of the Emergency Preparedness program at the SRS Tritium Facilities. These deficiencies include the lack of adequate conservatism in input parameters for the consequence analysis, a change in safety philosophy that replaced several safety-related preventive controls with mitigative or administrative controls, and failure to demonstrate that the Emergency Preparedness program could perform its credited function. NNSA is developing its response to the issues identified by the Board and has already begun addressing some of the deficiencies with the Emergency Preparedness program. For example, Tritium Facilities personnel participated in field drills and underwent classroom training in order to bolster the effectiveness of the program.

## Performance Goal 1

**Nuclear Weapon Operations.** DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

### FY 2010 Performance Accomplishments

**Continued Operation of the LANL Chemistry and Metallurgy Research Facility.** In letters dated October 23, 2007, and May 16, 2008, the Board questioned DOE's decision to operate the 55-year-old Chemistry and Metallurgy Research facility an estimated six years past the previously planned shutdown date of 2010. Given the age, material condition, nuclear material inventory, and seismic fragility of the facility, the Board encouraged DOE to assess these risks promptly and evaluate alternative means of accomplishing programmatic requirements. In May 2009, the Board reviewed LANL's proposed safety basis for operations beyond 2010, identified inconsistent or inadequate assumptions in the safety analysis, and pointed out opportunities to improve safety by reducing the radioactive material at risk. LANL is revising the proposed safety basis. The Board reviewed an updated version of the safety basis in August 2010 and is preparing a response at this time.

**Integrated Nuclear Planning.** The Board identified that DOE had not demonstrated formal mechanisms to ensure that design requirements and interfaces for pit manufacturing at LANL were appropriately managed and controlled across the suite of projects that contribute to the future plutonium processing infrastructure. In response, DOE developed an Integrated Nuclear Planning process to improve coordination among its projects as national security mission requirements are refined. The Board has participated in three Integrated Nuclear Planning workshops this fiscal year and believes the process is effective.

**Transuranic Waste Operations at LANL.** In a letter dated January 18, 2007, the Board urged NNSA to promptly develop a viable pathway for shipping high-activity transuranic waste drums from LANL to the Waste Isolation Pilot Plant for disposal. In response, DOE has bolstered waste disposition work at LANL by facility infrastructure upgrades, new safety basis documents, and training and qualification of operators. By April 2008, NNSA had remediated all of the high-activity drums then available for processing. LANL continues to accelerate offsite shipment of transuranic waste in an effort to comply with a Consent Order agreement with the state of New Mexico that mandates closure of the current LANL transuranic waste site by 2015.

**Nuclear Criticality Safety at LANL.** In a September 10, 2007, letter to NNSA, the Board expressed concern that a software tool (MASS) was being relied upon by operators as a control to ensure compliance with criticality safety limits without appropriate Software Quality Assurance. Overall, the actions that were taken by LANL in response resulted in a strengthened safety posture, and the schedule for bringing the nuclear criticality safety program into full compliance with industry standards and DOE directives appears acceptable. LANL began implementing a new software tool (MARTracker) in FY 2010. LANL has experienced twelve criticality safety infractions thus far in FY 2010, up from eight in FY 2009.

**LANL Plutonium Facility Confinement Ventilation.** The decade-old safety basis for the Plutonium Facility credited a passive confinement strategy instead of active confinement ventilation as a safety-class control to protect the public from postulated accidents. As part of DOE's implementation plan for the Board's Recommendation 2004-2, *Active Confinement Systems*, NNSA and its contractor evaluated the facility's confinement strategy in parallel with an effort to develop a new safety basis for the facility. In its June 16, 2009, report to the Board, NNSA asserted that some modifications identified as needed in the confinement ventilation evaluation may not be needed to meet the overall safety strategy and goals under the final approved documented safety analysis. The NNSA response contained inconsistencies regarding the course of action to address the scenario of a seismic event followed by a fire, and the revised safety basis approved by NNSA accepted accident consequences that far exceeded the applicable evaluation guidelines for dose to the public. As a result, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, on October 26, 2009, to which DOE responded with an Implementation Plan on July 13, 2010. The Board is closely following the implementation of near-term improvements in the facility's safety posture and NNSA's development of a strategy for long-term improvements in the facility's safety systems.

**LANL Plutonium Facility Vault Water Bath.** The Board identified issues with the storage of plutonium-238 materials in the cooling water bath in the LANL Plutonium Facility's storage vault. Many of the containers lacked manufacturing pedigree and data on the condition of their contents and were vulnerable to rupture if cooling was lost. In response, the laboratory developed a plan to repack or overpack all questionable containers into robust packaging by June 2010. LANL completed these operations as scheduled in June 2010, thereby eliminating a significant hazard.

**LANL Weapons Engineering Tritium Facility.** In October 2008, LANL ceased operations at the tritium facility due to a Technical Safety Requirement violation and problems with the pressure safety program. These issues were initially identified by a Board review in July 2007 and communicated to DOE by letter on October 16, 2007. To comply with the facility's safety basis, the laboratory made changes to the piping system, pressure relief components, and the facility's pressure safety procedures. The Board carefully tracked these changes and questioned the laboratory's plan (viewed as acceptable by the NNSA Los Alamos Site Office) to restart operations without a formal readiness review. In response to the Board's concerns, NNSA-Headquarters held discussions with its site office and the laboratory, ultimately resulting in the decision to perform formal contractor and federal Operational Readiness Reviews. LANL's approach has been to divide the return to operation into three phases. The Phase I readiness review authorizing low pressure operations was successfully completed in June 2010. The remaining phases are planned for completion later this year.

**Nuclear Explosive Safety.** The Board evaluated 10 Nuclear Explosive Safety (NES) studies or change evaluations conducted at Pantex, including the B53 and W84 dismantlement NES studies and the W78 Operational Safety Review.

**Quality of Safety-Related Information for Nuclear Explosive Operations.** The Implementation Plan for Recommendation 98-2, *Safety Management at the Pantex Plant*, addressed the need for DOE to issue further guidance on its expectations for the evaluation and documentation of weapon response to potential accident environments and stimuli. The Board and DOE agreed that the revised DOE-STD-NA-3016-2006 would include the needed requirements for these analyses. In FY 2010, the Board began a comprehensive review of the design laboratories' implementation of the standard, identifying strengths and weaknesses of the program.

**Lightning and Electrostatic Discharge Protection at Pantex.** The Board issued a letter on March 30, 2007, identifying work that was needed to address the hazards posed by the indirect effects of a lightning strike on Pantex facilities. DOE responded by forming the Nuclear Security Enterprise Electromagnetic Committee to analyze both lightning and electrostatic discharge (ESD) hazards. The committee is systematically addressing the Board's concerns and is improving the safety of operations at Pantex relative to lightning and ESD hazards. The Board has engaged experts in the field of lightning effects to verify DOE's analyses. In FY 2010, the Board met with the committee and presented the findings of lightning experts, verifying the DOE results and highlighting areas that needed further study and clarification.

**Pantex Procedures.** In 2009, the Board completed a series of onsite reviews and provided immediate feedback to Pantex on areas where improvements could be made in nuclear explosive operating procedures. On October 15, 2009, the Board issued a letter detailing shortcomings in the process for developing and implementing technical procedures at Pantex. Pantex is making improvements in the areas identified by the Board.

**Processing Anomalous W76-1 Units.** In June 2009, Pantex stopped processing W76-1 units due to safety concerns with an anomalous component. In a letter dated January 25, 2010, the Board detailed concerns with the failure to ensure that the safety implications of the anomalies were communicated by the design laboratory to Pantex. NNSA directed an extensive review of the event and is instituting measures to prevent such communication breakdowns.

**Hazard Analysis Reports.** The Board issued a letter on July 6, 2010, detailing specific issues concerning Pantex's compliance with DOE-NA-STD-3016-2006 in developing Hazard Analysis Reports and establishing sufficient controls. NNSA is working to respond to the Board's issues.

**Y-12 Nuclear Criticality Safety.** The Board completed a review of nuclear criticality safety evaluations that found that certain evaluations failed to meet select requirements, potentially compromising the safety margin for fissionable material operations. In response to the Board's January 23, 2009, letter documenting the review, the contractor took actions to strengthen the evaluations and correct any weaknesses identified during an extent-of-condition review. The Board noted that the approach planned on the extent-of-condition reviews included only a small sampling of the active criticality safety evaluations. In response, NNSA committed to review all active criticality safety evaluations.

**Highly Enriched Uranium Materials Facility Readiness.** The Board observed the NNSA Operational Readiness Review for startup of the new Highly Enriched Uranium Materials Facility. The operations will involve receipt, re-containerization, and storage of enriched uranium materials. NNSA completed packaging and moving all enriched uranium from the old warehouse to the new facility, which represents a major improvement in storage conditions.

**Special Capability Glovebox Project at Y-12.** The Board's review of the Special Capability Glovebox design in 2007 found no major design issues but identified questions regarding administrative controls. The Board continued its review in FY 2010 and found no issues that would impact the plan to begin operations in late calendar year 2010.

**Conduct of Operations at Y-12.** After several operational events, the Board urged NNSA to consider action to achieve consistent, disciplined operations. NNSA developed and began to implement corrective actions to address these issues including additional periodic training. The Board also noted that procedure use practices were inconsistent and that poor procedural compliance had been a contributor to many operational events. NNSA issued a Y-12 procedure use policy and is making progress toward reviewing all procedures authorized for use during nuclear operations for potential improvements, including identifying the appropriate use category for each procedure.

**Y-12 Activity-Level Work Planning.** The Board provided the results of its review of Y-12 activity-level work planning in a letter to DOE dated January 22, 2009. The Board identified several weaknesses with the planning, control, and oversight of work. In response to the Board's concerns, the contractor placed some work activities on hold until work planning problems could be resolved and corrected.

**Continued Operations of the Enriched Uranium Operations Building.** Due to concerns over NNSA's ability to safely operate the Enriched Uranium Operations Building for an extended period of time, the Board advocated that NNSA regularly assess the physical condition of the building in a letter dated March 13, 2007. Per the Board's request, NNSA has provided the Board with three annual reports (in March 2008, March 2009 and April 2010) that included specific actions NNSA has planned and taken to improve the safety posture of the Enriched Uranium Operations Building.

**Freeze Protection Program at Y-12.** In 2008 and 2009, fire suppression systems in nuclear facilities at Y-12 were compromised during periods of extended freezing weather. The Board urged NNSA to clearly define freeze protection responsibilities for operations managers of nuclear facilities and to preplan facility-specific actions to be taken during the onset of freezing weather (e.g., verifying actuation of heaters). NNSA has revised applicable site procedures to incorporate these improvements. Facility-specific plans and checklists have been developed.

**LLNL Tritium Process Station Startup.** On January 27, 2010, the Board issued a letter which communicated deficiencies in the safety basis of the Tritium Process Station, including weaknesses in the hazard analysis and the associated safety controls. As a result of the letter, LLNL committed to revising the hazard analysis in the annual update to the Documented Safety Analysis as well as implementing additional managerial oversight in operations.

**Work Planning and Control at LLNL.** The Board issued a letter on June 14, 2010, conveying concern over the activity-level work planning and control processes utilized at LLNL. The Board assessed that the laboratory guidance was vague and that the work planning process suffered as a result. Guidance issued by NNSA in 2006 concerning work-planning best practices was not being utilized by the laboratory, and the Livermore Site Office was not enforcing the guidance. NNSA is developing its response to the issues identified by the Board.

**NNSS Device Assembly Facility (DAF) Fire Suppression System.** In 2008, the Board determined that the DAF fire suppression had significant deficiencies that should be corrected before beginning more hazardous operations. In response, NNSA initiated a project to assess the condition of the system and analyze and prioritize needed improvements, developed improvement options, and began improvements to the system. In FY 2010, NNSA installed new debris strainers in fire suppression system piping, initiated a procurement to repair the water supply tank, initiated procurement of a standalone fire suppression unit to potentially replace or augment the suppression system, and submitted line item requests to replace the water tank and lead-in pipes.

**Readiness to Dispose of a Damaged Nuclear Weapon or Improvised Device at NNSS.** NNSA developed a plan for implementation of safety controls and upgrades appropriate for the scope of operations for the facility at NNSS (G tunnel) that would be used in disposition of an improvised nuclear device. As a result of the Board's interactions and discussions in FY 2010, NNSA completed tunnel ventilation improvements and began preparing for operational safety improvements.

**Conduct of Operations and Configuration Management at NNSS.** Previously the Board addressed concerns with the state of vital safety systems and safety management programs of nuclear facilities at NNSS, particularly at the Device Assembly Facility. In 2009 and 2010 there were numerous reports of issues with the conduct of operations and the configuration of safety systems. As a result of interactions with the Board, in FY 2010 NNSA implemented

compensatory measures to improve the conduct of operations and configuration of safety systems at nuclear facilities at NNSA.

**Hazard Categorization of Sandia National Laboratories Z Machine.** On May 21, 2010, the Board issued a letter detailing concerns regarding the hazard categorization of the Z Machine at Sandia National Laboratories. In response, Sandia National Laboratories performed additional calculations and is planning to write a new hazard categorization position paper to justify the categorization of the Z Machine.

**Auxiliary Hot Cell Facility at Sandia National Laboratories.** The Board evaluated start-up activities for the Auxiliary Hot Cell Facility at Sandia National Laboratories. The facility will be used to repackage radioactive waste for shipment off-site. In response to issues identified by the Board, NNSA committed to implement additional controls to ensure adequate confinement of radiological materials. The Board will assess the implementation of these controls.

## B. PERFORMANCE GOAL 2: SAFE PROCESSING AND STABILIZATION OF NUCLEAR MATERIAL

**The processing, stabilization, and disposition of DOE's defense nuclear materials and facilities are performed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.**

**OUTCOME:** DOE will have acknowledged, acted upon, and/or resolved the health and safety issues raised by the Board. Follow-up technical evaluation of DOE's nuclear materials management and facility disposition activities will verify necessary improvements in safety, as DOE meets its commitments to the Board to stabilize and dispose of hazardous nuclear materials.

### FY 2013 Performance Objectives

The Board and its staff will conduct assessments of DOE's efforts to characterize, stabilize, process, and safely store plutonium, uranium, and other actinides, residues, spent nuclear fuel, and wastes from the nuclear weapons program to ensure that these efforts are performed safely and that the risks posed by these materials are addressed in a timely manner. These reviews will be conducted using the principles of Integrated Safety Management and will include assessments of the design of new facilities, facility readiness to safely begin new operations, the safety of ongoing operations, and the suitability of long-term storage and disposal facilities. Representative areas for review include:

#### Implementation of Recommendation 2000-1:

- Stabilization and disposal of plutonium-bearing residues at LANL.
- Installation of systems to remove spent nuclear fuel sludge in the K-West Basin at the Hanford Site.
- Analysis of methods to treat K-West Basin sludge at the Hanford Site.

#### Safe management of spent nuclear fuel:

- Long-term storage of spent nuclear fuel at SRS that no longer has a disposition path.
- Monitoring and characterization of degrading metal fuels at SRS.
- Processing of spent nuclear fuel in H-Canyon at SRS.
- Efforts to consolidate, store, and dispose of spent nuclear fuel at Idaho National Laboratory (INL).

#### Safe management of surplus nuclear materials:

- H-Canyon and HB-Line processing campaigns and life extension activities.
- Operation of plutonium blending and packaging systems at HB-Line.
- Startup and operation of plutonium oxide production at H-Canyon and HB-Line.
- Long-term storage of neptunium oxides at INL.
- Disposal of U-233 inventory in Building 3019 at ORNL.
- Complex-wide consolidation and disposition of nuclear materials.

#### Safe management of high-level wastes:

- Removal and processing of salt waste from HLW tanks at SRS and preliminary startup preparations for the Salt Waste Processing Facility.
- Operation of HLW facilities at SRS including Saltstone and the Defense Waste Processing Facility.
- Bulk waste removal and cleaning of HLW tanks at Hanford and SRS.
- HLW tank structural integrity at the Hanford Site and implementation of corrosion controls.
- Conduct of operations and work planning in the tank farms at the Hanford Site and SRS.
- Design and testing of waste feed mixing and delivery systems at Hanford tank farms.
- Design of supplemental processing and treatment of waste from Hanford tanks.
- Ventilation system upgrades to Hanford double-shell tanks.
- Operations at the Integrated Waste Treatment Unit at INL.
- Maintenance program at the Waste Encapsulation and Storage Facility.

#### Safe management of transuranic wastes:

- Retrieval, characterization, and packaging of TRU wastes at Hanford, LANL, ORNL, SRS, and INL.
- TRU waste disposal operations at WIPP.

#### Deactivation and decommissioning activities:

- Deactivation and decommissioning work at defense nuclear facilities.
- Preparations for material at risk reduction and deactivation of 235-F (Recommendation 2012-1).



## Performance Goal 2

**Safe Processing and Stabilization of Nuclear Material.** The processing and disposition of DOE defense nuclear materials and facilities are performed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

### FY 2013 Performance Accomplishments

**Maintenance Program at the Waste Encapsulation and Storage Facility (WESF).** DOE provided a corrective action plan to address the Board's letter dated October 6, 2011, relating to the Waste Encapsulation and Storage Facility (WESF) maintenance program. Members of the Board's staff reviewed the closure packages associated with the plan and observed a contractor review of the effectiveness of the plan. As a result of the original letter and associated follow-up reviews, DOE made improvements in the areas of formal periodic monitoring and surveillance of design features, the quality/use of technical procedures, facility-specific system training, and the effectiveness of contractor oversight.

**Installation of Systems to Remove Spent Nuclear Fuel Sludge in the K-West Basin at the Hanford Site.** Members of the Board's staff reached an agreement with DOE on the path forward associated with design issues identified in a project letter dated July 31, 2012. DOE agreed to remove non-conservative assumptions implicit in the accident analysis and is specifying industry consensus standards for the design of safety-related instrumented control systems.

**Recommendation 2012-2, Hanford Tank Farms Flammable Gas Safety Strategy.** On September 28, 2012, the Board issued Recommendation 2012-2 to address the need to take action to reduce the risk posed by flammable gas events at the Hanford Tank Farms. The Secretary of Energy accepted the recommendation on January 7, 2013, and submitted an Implementation Plan on June 6, 2013, which the Board accepted. Members of the Board's staff began reviewing DOE's near-term actions to improve the flammable gas controls.

**Safety Basis of Hanford Tanks with Deep Sludge.** Members of the Board's staff questioned DOE regarding the potential for large spontaneous flammable gas release events in the tanks receiving sludge waste and accumulating deep sludge layers. DOE declared a potential inadequacy in the safety analysis and, in March 2013, approved a Justification for Continued Operation. The staff members reviewed this justification and identified deficiencies. The staff passed on observations to DOE that the deep sludge issue was inadequately characterized, and the compensatory measures described are not sufficiently defined.

**Integrity of High-Level Waste Tanks and Transfer System at Hanford.** DOE addressed a number of the performance and maintenance issues related to the waste transfer system identified in a Board letter dated April 26, 2011. The Board encouraged DOE to continue laboratory and in-situ testing of corrosion mechanisms for the high-level waste tanks. These efforts are important in determining whether DOE's tanks and transfer pipelines can continue to perform for an anticipated 30 or more years. Members of the Board's staff continue to monitor progress in this area. The staff also reviewed DOE's analyses of potential leaks of high-level wastes from a single-shell tank and a double-shell tank at Hanford.

**Activity Level Work Planning and Control at the Plutonium Finishing Plant (PFP).** Members of the Board's staff conducted an on-site review of activity-level work planning and control at the Plutonium Finishing Plant and noted that the quality of work packages was enhanced by the consistent reinforcement of high expectations from PFP senior management and persistent, focused work planning and control oversight from DOE. The staff members continued to monitor work planning and execution at PFP.

**Long Term Storage of Spent Nuclear Fuel at SRS.** The Board issued Technical Report 38, regarding the storage conditions of reactive metal fuels in L-Basin at SRS. In this report, members of the Board's staff identified that the reactive metal fuels are vulnerable to degradation, and that degradation is already occurring. As the fuel degrades, it becomes more difficult to handle, repackage, and/or process in the future. The Board encouraged DOE to give more attention to the disposition of these materials.

**Plutonium Processing at H-Canyon and HB-Line.** Members of the Board's staff reviewed the safety basis developed by the contractor to support the resumption of plutonium processing in HB-Line. The staff identified weaknesses in the safety strategy, which may have put the facility workers at risk in case of a fire, or led to vessel explosions in the case of a loss of power. DOE responded to these concerns by deciding to maintain a fire detection, alarm and notification system, and diesel generator as safety significant equipment.

**Operations at SRS High Level Waste Facilities.** Members of the Board's staff monitored operations in the Tank Farms and the Defense Waste Processing Facility (DWPF). In December 2012, a fire affected a transformer in DWPF. The staff reviewed the actions being taken by DOE to prevent a recurrence. These actions are reasonable, but the staff continues to monitor the situation. In January 2013, a fire in a Tank Farms trailer occurred near nuclear facilities and near a storage area for hazardous chemicals. The staff encouraged DOE to analyze the potential for fires in such structures to impact nuclear facilities or the workers operating those facilities.

**Recommendation 2012-1, Savannah River Site Building 235-F Safety.** In FY 2012, the Board issued Recommendation 2012-1, identifying the need for DOE to remove or immobilize the residual plutonium-238 contamination located within Building 235-F because of the material's physical form, its significant quantity, and the more than 1000 site workers located nearby. As a result, during FY 2013 DOE took action to improve the safety posture of this facility by reducing transient combustibles and conducting emergency response drills. In addition, DOE developed a deactivation plan and began development of a safety basis to support initiation of deactivation activities and the removal of the residual contamination.

**Neptunium Oxide Storage at INL.** Members of the Board's staff reviewed the storage of neptunium oxide at the Fuel Manufacturing Facility vault. DOE's Office of Nuclear Energy plans to conduct surveillance of six storage containers during 2014. A specially designed glovebox is being procured by INL to facilitate the surveillance and repackaging. The staff reviewed the design of the glovebox and raised questions to DOE regarding the adequacy of the planning for handling the containers for insertion into the glovebox. DOE is working to respond to the staff's concerns.

**Integrated Waste Treatment Unit at INL.** DOE developed a corrective action plan in response to the June 2012 over-pressurization event at IWTU. Members of the Board's staff reviewed DOE's development and initial implementation of this plan. The staff members noted several vulnerabilities in the corrective action plan, which they communicated to DOE. DOE acted to address the staff's concerns. The staff continues to monitor the project's progress.

**Transuranic Waste Operations at INL.** Members of the Board's staff continued to review TRU waste operations at the Advanced Mixed Waste Treatment Project (AMWTP). In July 2013, the staff observed the much-delayed verification of Phase II implementation of Integrated Safety Management (ISM) Systems by the new contractor at AMWTP. The staff raised questions as to the absence of procedural compliance during a maintenance operation requiring step-by-step compliance. DOE incorporated the staff's observations in the closeout report.

**Uranium-233 Disposition at ORNL Building 3019.** Members of the Board's staff raised several safety and design-related concerns to DOE associated with the U-233 Disposition Project's "Phase II," in which U-233 materials will be processed for disposal. DOE intends to work toward addressing the staff members' concerns as it develops its Phase II plans.

**WIPP Maintenance Program.** On June 27, 2012, the Board issued a letter identifying safety issues associated with the formality and rigor of work planning and control for the maintenance program at WIPP. DOE and the contractor began to address the identified deficiencies. Members of the Board's staff followed these efforts to fully address the deficiencies.

**Performance Goal 2**

**Safe Processing and Stabilization of Nuclear Material.** The processing and disposition of DOE defense nuclear materials and facilities are performed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

**FY 2012 Performance Accomplishments**

**Hanford Waste Encapsulation and Storage Facility (WESF).** In October 2011, the Board sent DOE a letter documenting issues identified during a review of the facility’s maintenance program and conduct of operations. The contractor completed numerous corrective actions and, with oversight from DOE, initiated a management assessment of nuclear operations at WESF and the Canister Storage Building in the fall of 2011. Subsequently, the contractor accomplished similar evaluations at some of its other defense nuclear facilities through the institution of a Nuclear Safety and Performance Evaluation Board. The contractor also rearranged the waste capsules in WESF to better distribute the heat load in the storage pools; thereby extending the time capsules would maintain their integrity after a seismically-induced loss of basin water accident.

**Hanford Canister Storage Building.** The Board evaluated the contractor readiness assessment for the restart of receiving multi-canister overpack containers from K Basin cleanout work. The Board identified a number of minor issues with procedures and conduct of operations that were addressed by the contractor. The Board also identified, that contrary to the requirements in DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, DOE did not perform a readiness assessment of its own. The Board discussed adherence to DOE’s directives with DOE Richland Operations Office personnel and contractors.

**Hanford Processing of K-Basin Wastes.** The Board evaluated preparations at the K-West Basin and Cold Vacuum Drying Facility to process knock out pot material from the K-West Basin for safe interim storage at the Canister Storage Building. It was evident that the extensive testing and operator training for the operations was very helpful. The contractor initially planned to restart the Cold Vacuum Drying Facility for these operations without a formal readiness assessment to ensure the equipment and personnel were ready to resume operations safely. Subsequent to discussions with the Board’s staff, the contractor completed a formal readiness assessment prior to authorizing facility operation. As a result of the thorough preparations, the knock out pot material was successfully removed from the K-West Basin, processed at the Cold Vacuum Drying Facility, and is now safely stored away from the Columbia River in the Canister Storage Building.

**Hanford K-West Basin Sludge Retrieval and Disposition Project.** The Board reviewed DOE’s conceptual and preliminary designs for systems to remove radioactive sludge from the K-West Basin at Hanford and noted several design issues. As a result, DOE has included control of public access to the Columbia River as part of the safety control set, resolved design issues regarding the structural details of K-West Basin Modified Annex, agreed to remove non-conservative assumptions implicit in the accident analysis, and is specifying industry consensus standards for the design of safety-related instrumented control systems.

**Safety Basis at Hanford Tank Farms.** In response to a Board letter dated August 5, 2010, DOE committed to amend the safety basis to restore the safety-significant classification of the primary ventilation systems of the double-shell tanks to better prevent flammable gas events. Continued review and emphasis by the Board has been needed because DOE continues to defer execution of these commitments. On September 28, 2012, the Board issued Recommendation 2012-2, *Hanford Tank Farms Flammable Gas Safety Strategy*, to address the need to take action to reduce the risk posed by flammable gas events at the Hanford Tank Farms.

**Integrity of High-Level Waste Tanks and Transfer System at Hanford.** DOE addressed some of the performance and maintenance issues of the waste transfer system identified in a Board letter dated April 26, 2011, in a Fitness for Service Program that DOE is evaluating to implement at the Hanford Tank Farms. The Board is closely following the development of the Fitness for Service test plan, and encouraged DOE to continue laboratory and in-situ testing of corrosion mechanisms for the high-level waste tanks. These efforts are important in determining whether DOE’s tanks and transfer pipelines can continue to perform for an anticipated 30 or more years. The Board is closely following DOE’s recent efforts to determine if a double-shell tank has started to leak, as well as associated contingency plans and evaluations of other tanks containing similar wastes.

The Board’s letter identified deficiencies in the methodology used by the Tank Farms contractor for extending the service life of hose-in-hose transfer lines. DOE began to develop a test plan for studying the aging of such lines and other common polymer components under environmental conditions at the Tank Farms. The Board

continues to review progress in this area.

**Conduct of Operations at Hanford Tank Farms.** The Board reviewed DOE's corrective actions in response to conduct of operations issues at the Tank Farms identified in a letter to DOE dated March 30, 2011, and assessed whether various elements of the conduct of operations program were adequately implemented. The Board found that DOE had made progress in correcting deficiencies in some areas, but that further actions are needed in other areas. The Board is working with DOE to address the remaining deficiencies.

**618-10/-11 Burial Ground Vertical Pipe Unit (VPU) Remediation Project at Hanford.** The Board reviewed the design and process activities for retrieval of the radioactive wastes in the VPUs. This review identified safety issues and questions that are being addressed by the DOE and its contractor. Of particular importance were the need for greater rigor in providing a capability to confine potential releases of hazardous materials and implementation of As Low As Reasonably Achievable (ALARA) radiological safety principles. Subsequently, the contractor expanded active confinement capability and has committed to perform an ALARA review earlier in design than originally planned.

**Recommendation 2012-1, Savannah River Site Building 235-F Safety.** The Board issued Recommendation 2012-1 on May 9, 2012, identifying the need for DOE to take action to reduce the hazards associated with the large amounts of residual plutonium-238 contamination within defunct process equipment in Building 235-F. On July 10, 2012, the Secretary of Energy accepted the recommendation. DOE's Implementation Plan for the recommendation is due to the Board in October 2012.

**Recommendation 2001-1, High Level Waste Management at the Savannah River Site.** The Board closed Recommendation 2001-1 on December 7, 2011, because DOE has made satisfactory progress in meeting the intent of the recommendation. Ongoing high-level waste operations will be evaluated through the Board's normal oversight processes.

**Emergency Preparedness at SRS.** The Board continued its review of DOE's emergency preparedness programs at SRS. In large part due to the Board's encouragement at its June 2011 public meeting at SRS, DOE conducted two large-scale, multi-facility, multi-contractor exercises to evaluate the site's ability to respond to a major accident. DOE is using the lessons learned from these exercises to improve emergency preparedness at SRS.

**Savannah River Fire Protection Water Supplies.** The Board reviewed the fire protection water supplies for A- and K-areas at SRS. The Board found that the systems were not maintained in compliance with applicable standards and documented these observations in a letter to DOE on March 27, 2012. DOE has made progress correcting the deficiencies in K-area and is developing modifications for the fire protection systems in A-area.

**Transuranic Waste Operations at SRS.** The Board reviewed the safety of transuranic waste remediation operations in E-area, F-Canyon and H-Canyon. The Board encouraged DOE to make improvements in worker protection, fire suppression systems, and tool use.

**Long Term Storage of Spent Nuclear Fuel at SRS.** The Board assessed the safety of long term storage of spent nuclear fuel in L-area at SRS. DOE no longer has an ultimate disposition path for much of this nuclear material, and its storage time may increase dramatically. The Board identified concerns with several categories of materials stored in the basin, particularly reactive fuels stored in isolation cans. The Board is working with DOE to ensure that items undergoing degradation are properly addressed.

**Processing of Spent Fuel in SRS H-Canyon.** In February 2011, the Board sent a letter to DOE regarding the shutdown of H-Canyon and the fate of spent nuclear fuel and other surplus nuclear materials. In FY 2012, DOE decided to process vulnerable sodium reactor experiment fuel in H-Canyon to eliminate that material from storage in L area. The Board reviewed the process and startup preparations for this activity and found them to be satisfactory.

**Planned Plutonium Processing in SRS H-Canyon and HB-Line.** DOE is planning a new plutonium processing mission in H-Canyon and HB-Line in support of the Mixed Oxide Fuel Fabrication Facility under construction at SRS. The Board is reviewing the safety basis documentation and facility modifications supporting this new mission.

**Neptunium Oxide Storage at INL.** The Board reviewed the storage of neptunium oxide at the Fuel Manufacturing Facility vault. No radiological contamination has been found outside the containers. However, O-ring seals in the containers have been in place since 2004 and are approaching the end of their design lifetime. The Board will continue to monitor DOE's management of this material.

**Integrated Waste Treatment Unit at INL.** The Board reviewed the contractor and DOE readiness assessment activities and found that they adequately conformed to the relevant DOE directives. During startup of the facility prior to processing radioactive waste, the facility suffered a process upset that will require significant corrective actions, including design changes. The Board continues to follow this project closely.

**Transuranic Waste Operations at INL.** The Board continued to review transuranic waste operations conducted at the Advanced Mixed Waste Treatment Project (AMWTP). In June 2012, the staff reviewed site's health physics program and found that it adequately conformed to DOE directives. The Board's staff continues to monitor activities at AMWTP as it begins to process waste forms more complex than previously encountered.

**Uranium-233 Disposition at ORNL Building 3019.** A Board review of the technical basis for the radiation protection program revealed weaknesses that were addressed by DOE and the contractor. The contractor subsequently improved the peer review process used to review technical documents associated with the program. DOE successfully transferred two categories of uranium-233 materials out of Building 3019, is preparing to conduct a third transfer campaign, and is developing plans to process the uranium-233 materials stored in Building 3019 that cannot be disposed of directly. The Board will continue to monitor the safety of the transfer of materials and will review safety-related aspects of DOE's uranium-233 processing plans as they are developed.

**Oak Ridge Transuranic Waste Processing Center Cask Processing Enclosure.** The Board observed startup activities for the Cask Processing Enclosure. DOE was reluctant to conduct an independent readiness assessment; however, through discussions with the Board, DOE determined that an independent DOE readiness assessment was required by DOE directives. The contractor and DOE readiness assessments were successfully completed in June 2012, and the Cask Processing Enclosure is now operational.

**Fire Protection at WIPP.** The Board reviewed the fire protection program at WIPP and noted a number of deficiencies in a letter dated June 24, 2011. DOE acknowledged these problems and agreed to take corrective action. The Board's staff continues to follow implementation of the corrective actions.

**WIPP Maintenance Program.** On June 27, 2012, the Board issued a letter identifying safety issues associated with the formality and rigor of work planning and control for the maintenance program at WIPP. DOE and the contractor have taken steps to address the identified deficiencies.

**Recommendation 2005-1, Nuclear Material Packaging.** The Board issued Recommendation 2005-1 to increase protection for workers involved in the storage and handling of nuclear materials. In 2012, the Board continued to work with DOE to ensure that the SAVY-4000 containers developed at LANL are approved by the Los Alamos Site Office as meeting the requirements of DOE Manual 441.1-1, *Nuclear Material Packaging Manual*. The Board also worked with DOE to ensure that procedures are established to certify these containers for storage of plutonium-based materials at DOE sites other than LANL.

## Performance Goal 2

**Safe Processing and Stabilization of Nuclear Material.** The processing and disposition of DOE defense nuclear materials and facilities are performed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

### FY 2011 Performance Accomplishments

**Nuclear Materials Stabilization.** DOE dramatically changed its plans for stabilization of surplus nuclear materials. DOE did not authorize the operation of the H-Canyon facility at SRS to process spent nuclear fuel, leaving the fate of the fuel and other materials in question. The Board sent a letter to DOE on February 28, 2011, outlining associated safety concerns. DOE responded by providing new disposition paths for a significant portion of the nuclear materials but has not developed a new strategy for spent nuclear fuel.

**Public Hearing at the Savannah River Site.** The Board held a public hearing at SRS on June 16, 2011, to discuss safety matters related to liquid waste processing, emergency preparedness, and nuclear materials disposition. The Board obtained commitments from DOE to develop a resumption plan for H-Canyon and to start performing emergency drills for seismic events that could impact multiple nuclear facilities. The hearing also drew increased DOE attention to integrated operations of liquid waste management facilities.

**Electrical Safety at H-Canyon.** In response to a Board letter dated February 6, 2009, DOE completed design and installation of a lightning protection system for the H-Canyon fan house at SRS.

**Hanford Sludge Retrieval and Disposition Project.** The Board reviewed DOE's conceptual design for systems to remove radioactive sludge from the K-West Basin at Hanford and noted several design issues. In response to a Board letter on the topic dated December 22, 2010, DOE is enhancing safety systems, improving its accident analysis, and developing a new capability to evacuate members of the public from the Columbia River in the event of a nuclear accident.

**Restart of the Cold Vacuum Drying Facility.** The Board reviewed the plans to restart operations at the Cold Vacuum Drying Facility. This facility will support K-West Basin clean up as well as sludge disposition. The Board suggested that DOE reconsider the planned level of rigor for restarting this inactive facility. DOE now plans to use a formal readiness assessment.

**Long Term Storage of Spent Nuclear Fuel at SRS.** The Board began assessing the safety of spent nuclear fuel in storage in L Basin at SRS. DOE no longer has an ultimate disposition path for much of this fuel, and its storage time may increase dramatically. After inquiries by the Board, DOE expanded surveillances of the spent nuclear fuel to examine the extent of fuel damage and needed remedial action.

**Recommendation 2001-1.** In a letter to DOE dated January 28, 2011, the Board accepted a new implementation plan for Recommendation 2001-1, *High Level Waste Management at the Savannah River Site*, to replace an interim plan from last year. In the new plan, DOE provided concrete interim goals to show progress in meeting the recommendation. To date, DOE has been successful in completing these new milestones.

**Structural Integrity of Hanford Tank C-105.** In response to a stakeholder's letter, the Board evaluated potential damage to the footing of single-shell Tank C-105 caused by a borehole-drilling rig. As noted in a letter dated June 9, 2011, to the stakeholder, the Board reviewed a DOE analysis that estimated the potential damage to Tank C-105. Although the energy imparted by the borehole-drilling rig would not be sufficient to damage the tank, the Board informed DOE that if radionuclide concentrations in the soil start to increase significantly, DOE should expeditiously remove the remaining waste from the tank.

**Safety Basis at Hanford Tank Farms.** In response to a Board letter dated August 5, 2010, DOE committed to amend the safety basis to restore the functional classification of the primary ventilation systems of the double-shell tanks to safety significant and identified physical improvements needed in the systems.

**HLW Transfer System at Hanford.** The Board reviewed the systems used to confine waste at the Tank Farms during waste transfer operations. In a letter dated April 26, 2011, the Board identified issues regarding the qualification, performance, and maintenance of the waste transfer system, as well as deficiencies in the safety basis. DOE is working with the Board to address these deficiencies.

**Conduct of Operations at Hanford Tank Farms.** The Board reviewed conduct of operations at the Hanford Tank Farms. In a letter to DOE dated March 30, 2011, the Board noted weaknesses in the formality

demonstrated by operators and supervisors while conducting nuclear operations. In response, DOE took action to address the issues.

**Hanford Waste Encapsulation and Storage Facility (WESF).** The Board reviewed the planning and conduct of maintenance at WESF and identified numerous deficiencies. Following the review, contractor managers began addressing the issues.

**Work Planning and Control at Hanford Plateau Remediation.** The Board reviewed work planning and control processes for work done by the plateau remediation contractor. In a letter dated September 23, 2010, the Board identified weaknesses in the contractor's activity-level hazard analysis process. During fiscal year 2011, the contractor piloted improvements to its work planning process.

**Work Planning and Control at Hanford's River Corridor Project.** On February 25, 2011, the Board sent a letter to DOE following the Board's review of the activity-level work planning and control process implemented by Washington Closure Hanford, LLC, noting improvements since a review in October 2008.

**Transuranic Waste Operations at INL.** The Board reviewed transuranic waste operations at INL. The Board discussed procedural compliance issues with DOE and its contractor, who took corrective actions. The Board tracked DOE's development of engineered controls to ensure the safe retrieval of degraded TRU waste boxes and drums at the Advanced Mixed Waste Treatment Project at INL. DOE and the Board identified problems with the contractor's implementation of controls during the DOE readiness assessment in September 2011.

**Transuranic Waste Operations at SRS.** The Board reviewed the startup of new phases of transuranic waste remediation operations in E-area, F-Canyon, and H-Canyon. The Board found that during the F-Canyon readiness assessments, operators and shift operations managers did not have a strong level of knowledge of topics such as safety basis requirements. DOE conducted remedial training for affected personnel.

**Fire Protection at WIPP.** The Board reviewed the fire protection program at WIPP and, in a letter dated June 24, 2011, noted a number of deficiencies. DOE acknowledged these problems and agreed to take corrective action. A DOE progress briefing to the Board is required by December 21, 2011.

**Work Planning and Control at WIPP.** The Board reviewed work planning and control programs for waste handling at WIPP. In a letter dated October 22, 2010, the Board identified problems in conduct of operations and site-wide safety culture. DOE acknowledged these issues and agreed to address them in a letter dated January 20, 2011. The Board has continued to track DOE progress in addressing these issues.

**Electrical Safety at WIPP.** The Board visited WIPP in March 2011 and discussed DOE progress on corrective actions for electrical safety issues noted previously by the Board. DOE continued to address these issues as noted in the DOE letter dated December 21, 2010, and completed all commitments by the end of FY 2011.

**Radiation Protection Program at WIPP.** In 2010, the Board noted weaknesses in the requalification process for radiological control technicians. DOE subsequently revised the process to correct the weaknesses. The Board confirmed that the revised process was implemented and effective during a visit to WIPP in March 2011.

**Tank W-1A Removal Action Project at ORNL.** The Board reviewed the safety basis and radiological controls for the Tank W-1A Removal Action Project at ORNL in December 2010. In response to issues identified by the Board's staff, DOE revised project documents to strengthen their technical bases and improved working-level documents prior to the DOE readiness review in August 2011. Project work began in September 2011.

**Plutonium Finishing Plant (PFP) Criticality Safety Controls.** During a review of PFP work planning documents, the Board noted that not all of the Criticality Prevention Specification (CPS) requirements were listed in the work instruction, which is contrary to nuclear consensus standards. This concern was communicated to DOE criticality safety personnel who, in turn, discussed the situation with the contractor. Subsequently, the contractor agreed to include the CPS requirements as an appendix to the work instruction.



**Performance Goal 2**

**Nuclear Material Processing & Stabilization.** The processing and disposition of DOE defense nuclear materials and facilities are performed in a manner that ensures adequate protection of the health and safety of the workers and the public.

**FY 2010 Performance Accomplishments**

**H-Canyon Life Extension.** The Board reviewed DOE's application of the Integrated Facilities Aging Management program to evaluate the life extension needs of the H-Canyon facility at SRS. The Board found that while the program successfully identifies aging issues, follow-up to address these issues is often lacking. The Board noted this concern in a letter to DOE dated April 29, 2010. In response, DOE and its contractor reviewed and prioritized needed facility repairs to maintain safe operations at H-Canyon.

**Recommendation 2001-1.** In letters dated January 7, 2010, and May 27, 2010, the Board accepted DOE's latest implementation plan for Recommendation 2001-1, *High-Level Waste Management at the Savannah River Site*, as an interim plan, but requested a new, more detailed plan. The Board suggested that DOE provide more definitive interim goals to show positive progress in meeting the recommendation. DOE began to revise the implementation plan to include more meaningful interim milestones.

**Fire Protection Systems at SRS.** The Board reviewed the fire protection program at SRS and identified weaknesses in equipment, management of exemptions and equivalencies, and staffing. In response to the Board's letter dated January 20, 2010, DOE addressed these weaknesses by purchasing new fire trucks and improving its fire protection management practices. Staffing remains an issue.

**H-Canyon Safety Basis Upgrade at SRS.** The Board reviewed the revised Documented Safety Analysis for the H-Canyon facility. This Documented Safety Analysis incorporates guidance from the latest DOE Standards. During the development of the new Documented Safety Analysis, the Board provided DOE with feedback regarding hydrogen explosions, Technical Safety Requirements, and ammonium nitrate explosions. DOE addressed many of the Board's comments in the approved document.

**Transuranic Waste Operations at SRS.** The Board reviewed startup of transuranic waste operations in F-Canyon and H-Canyon. In staff-to-staff discussions, the Board noted that the readiness preparations for H-Canyon did not adequately simulate the planned activities. In response, DOE extended the readiness activities to include additional simulations.

**Spent Nuclear Fuel Operations at SRS.** The Board reviewed spent nuclear fuel storage in L-Area as well as preparations for the movement of fuel from L- to H-Area to support spent fuel processing in the H-Canyon facility. The Board suggested that DOE reconsider the planned level of rigor for readiness activities for spent fuel restart. DOE now plans to use a more-formal contractor Readiness Assessment.

**HLW Tank Integrity Program at SRS.** The Board observed a DOE independent review of nondestructive examination techniques for HLW tanks. In a letter dated January 6, 2010, the Board suggested that DOE inspect a greater portion of HLW tank walls and explore faster inspection technologies. As a result, DOE revised its in-service inspection program at SRS to expand the scope of its inspections. DOE also plans to implement electromagnetic acoustic testing (a faster technology), after the technology is qualified at Hanford.

**Hazard Controls in Safety Basis Documents at SRS.** The Board reviewed corrective actions taken by DOE at SRS to address past concerns regarding the formality of hazard controls in facility safety bases. While DOE had corrected the safety basis at the Waste Solidification Building, DOE had not corrected site procedures to prevent recurrence of the problem. In a letter dated July 16, 2010, the Board highlighted this lack of proper guidance at SRS and noted the possibility of missing hazard controls from the safety bases of other facilities. DOE took action to address this issue and to assess the extent of this condition at other sites in the DOE defense nuclear complex.

**Work Planning and Conduct of Operations at Hanford Tank Farms.** The Board reviewed work planning and conduct of operations at the Hanford Tank Farms. The Board noted several deficiencies in DOE's analysis of hazards, revision of work documents, use of work instructions, and ability to provide feedback and improvement to prevent recurrence of mistakes. In response to a Board letter dated March 12, 2010, DOE made several improvements to work planning processes and conduct of operations.



**Safety Systems at Hanford Tank Farms.** The Board identified inadequate pressure-relieving devices in the waste transfer lines associated with double-shell Tank AN-101 at Hanford. Following staff-to-staff discussions, DOE reconfigured the system to include reliable safety features to prevent over-pressurization during waste transfer operations. DOE also revised the safety analysis to address this change.

**Safety Basis at Hanford Tank Farms.** The Board reviewed the newly revised safety basis at the Hanford Tank Farms. In a letter to DOE dated August 5, 2010, the Board noted a number of analytical and implementation deficiencies in the safety basis. These deficiencies would limit the effectiveness of the prescribed safety controls in the prevention and mitigation of certain postulated accident scenarios. As a result, DOE is working to resolve the weaknesses in the safety basis.

**Hanford Sludge Retrieval and Disposition Project.** The Board reviewed DOE's conceptual design for systems to remove radioactive sludge from the K-West Basin at Hanford. The Board is planning to provide several comments and concerns regarding the conceptual design. DOE is working with the Board to address these issues in a timely manner.

**Work Planning at Hanford.** The Board reviewed work planning and control for activities performed by the central plateau remediation contractor at Hanford. In a letter dated September 23, 2010, the Board noted weaknesses in the identification of activity-level hazards, tracking of controls in the work packages, and the conduct of pre-job briefings.

**Safety Analysis at Hanford Plutonium Finishing Plant (PFP).** The Board reviewed the PFP safety analysis and noted deficiencies in factors used to compute radiation dose for postulated accident scenarios. DOE's contractor subsequently identified that some dose conversion factors used to estimate dose consequences were contrary to consensus standards and potentially non-conservative. DOE and its contractor revised and approved the facility's safety analysis. DOE also noted this problem in the safety bases of other facilities and began corrective action.

**PFP Decontamination Agents.** The Board reviewed the safety of various chemical decontamination agents that DOE used or planned to use at PFP. In staff-to-staff discussions, the Board pointed out hazards associated with the decontamination agents. DOE conducted additional analyses of the agents to better understand the hazards and to develop appropriate hazard controls.

**Remote Handled Transuranic Waste Repackaging at Idaho.** The Board identified worker safety issues associated with loading high-radiation canisters of transuranic waste in Building CPP-666 at Idaho. After staff-to-staff discussions, DOE modified the crane that moves the canisters and incorporated a shielded transfer device into the process to reduce worker radiation doses.

**Radiation Protection Program at WIPP.** The Board continued an ongoing review of the radiation protection program at WIPP. In several staff discussions and a telephone conference, the Board noted weaknesses in the requalification process for radiological control technicians and in DOE's triennial audit program. DOE corrected the qualification process for technicians and improved its oversight program.

**Transuranic Waste Handling at WIPP.** The Board reviewed conduct of operations and work planning and control programs for waste handling at WIPP. The Board identified problems in conduct of operations and site-wide safety culture. DOE acknowledged these issues and agreed to address them.

**Electrical Systems at WIPP.** The Board reviewed the status of WIPP electrical systems and found several material and programmatic deficiencies. In a letter dated September 22, 2010, the Board noted the contractor's electrical safety program was weak, there was an inadequate training program for electrical workers, and there was no program for identifying parts and components that were not certified by a nationally recognized testing laboratory. DOE has agreed to address these issues.

### C. PERFORMANCE GOAL 3: SAFETY IN NUCLEAR FACILITIES DESIGN AND INFRASTRUCTURE

**DOE's new defense nuclear facilities and major modifications to existing facilities are designed and constructed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.**

**OUTCOME:** DOE will have acknowledged, acted upon, and/or resolved the safety-in-design issues raised by the Board. Follow-up technical evaluation will verify necessary improvements in the design and construction of DOE's new nuclear facilities and major modifications to existing facilities. New nuclear facilities will meet acceptable safety standards.

#### FY 2013 Performance Objectives

The Board and its staff will continue reviews of DOE's implementation of integrated safety management in design and construction activities. At least five reviews will be completed. In general, the reviews will evaluate the adequacy of geotechnical specifications and hazards analyses; the design of safety-related structures, systems, and components (SSCs); and the adequacy of SSC installation, startup, and operational readiness. Candidates for review include:

- Support and analyze the development and execution of implementation plans for the Board's recommendations, continue safety basis and design reviews, and initiate review of testing and turnover of safety systems for the Waste Treatment and Immobilization Plant at the Hanford Site.
- Review the design of the Chemistry and Metallurgy Research Replacement facility at LANL to determine if there are any significant changes to the project's safety strategy since the Board's certification review in 2009. If Congress directs the 5-year project delay identified in the President's Budget Request for FY 2013, the Board will obtain the project's archived design package for future use and review when DOE resumes the project.
- Work with DOE to resolve design issues identified by the Board during its review of the preliminary design and safety basis for the Transuranic Waste Facility project at LANL. Review final design and safety basis development activities for the project.
- Review the Safety Design Strategy for the Radioactive Liquid Waste Treatment Facility Upgrade Project at LANL. Monitor the development of the preliminary design for the low level waste treatment systems and development of the safety basis for the project.
- Review construction and development of the Technical Safety Requirements for the Salt Waste Processing Facility at the Savannah River Site.
- Review start-up activities for the Waste Solidification Building at Savannah River Site.
- Review the revised Project Execution Plan for the Uranium Capabilities Replacement Project. Review the revised Preliminary Safety Design Report and facility design to evaluate whether safety is adequately integrated at the Critical Decision-2 milestone. Conduct a public hearing at Y-12 in part to discuss outstanding and potential safety issues with the project.
- Continue systematic review of the adequacy of electrical safety programs at DOE nuclear sites.
- Review the adequacy of the DOE site probabilistic seismic hazard analysis for the Savannah River Site and Hanford.

As a result of these reviews, DOE will have acknowledged, acted upon, and/or resolved the health and safety issues raised by the Board. Follow-up technical evaluation will verify necessary safety improvement in the design and construction of DOE's new nuclear facilities and major modification to existing facilities. New nuclear facilities will meet acceptable safety standards.

### Performance Goal 3

**Safety in Nuclear Facilities Design and Infrastructure.** DOE's new defense nuclear facilities and major modifications to existing facilities are designed and constructed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

#### FY 2013 Performance Accomplishments

**Waste Treatment and Immobilization Plant (WTP) at the Hanford Site.** The Board continued its review of the design and construction of structures, systems, and components designated as important-to-safety in the WTP facilities. During this fiscal year, the Board did not identify any new safety issues with WTP. The Board's activities primarily consisted of evaluating potential safety issues and the adequacy of DOE's actions to resolve outstanding safety issues. Specific examples are cited below.

- On November 8, 2012, the Secretary of Energy informed the Board that DOE needed to revise its strategy for verifying key parts of the WTP design. This required DOE to revise the Implementation Plan for Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*. In a letter dated July 15, 2013, the Board expressed concern with DOE's delay in revising the design verification philosophy and development of the revised Implementation Plan. Members of the Board's staff have engaged with DOE on drafting a revision of the Implementation Plan.
- Because of DOE's new design verification strategy, the Board closed an outstanding safety issue with DOE's effort to verify and validate the FLUENT computational fluid dynamics model as it would no longer be used for mixing system design confirmation. The Board identified this issue in a letter to DOE dated April 3, 2012.
- Members of the Board's staff reviewed testing at Pacific Northwest National Laboratory that comprises DOE's efforts to resolve an issue with the methodology for assessing dose consequences from pressurized spray leaks involving radioactive liquids at WTP. The testing concluded that DOE's spray leak model is non-conservative. The Board first identified this safety issue in a letter dated April 5, 2011.
- The Board reviewed DOE's response to the Board's April 13, 2012, letter identifying safety issues with the design and construction of the electrical distribution system for WTP. The Board concluded that the response identified a reasonable plan for resolving these issues during the next several years.
- Members of the Board's staff reviewed the project's efforts to update the safety basis for the Low-Activity Waste (LAW) and HLW facilities and upgrade the hazard characterization for the LAW facility. The staff identified and communicated to DOE several deficiencies with the hazard analyses. DOE subsequently paused project hazard analysis efforts to correct the deficiencies.
- Members of the Board's staff reviewed the project's efforts to re-qualify black cell components as safety significant. As a result of interactions between DOE and the staff, the project revised a supporting calculation to demonstrate adequate structural performance of the black cell components.

**Waste Feed Mixing and Delivery Systems at Hanford.** Members of the Board's staff continued to observe DOE's efforts on a small-scale mixing demonstration for the Hanford double-shell tank waste feed delivery system. The staff's activities included reviewing DOE's plans for and subsequent results from mixing and sampling tests associated with the Hanford double-shell tank waste feed delivery system, and DOE's plans and analyses for the Hanford tank farm waste feed certification process. Based on these reviews, DOE decided to pursue a different capability for characterizing and sampling Hanford tank farm waste.

**Salt Waste Processing Facility (SWPF) at SRS.** The Board reviewed and closed the two remaining safety issues with the SWPF project related to shortcomings with process vessel air pulse agitator (APA) mixing system testing and modeling, and deficiencies in how the project analyzes accidents resulting from detonation and deflagration of flammable gas in process vessels and piping systems. The Board identified these safety issues in letters to DOE dated February 10, 2009, and October 15, 2009, respectively. As a result of these reviews, DOE demonstrated its APA mixing system safety functions using a credible testing program and created new flammable gas safety and administrative controls that meet applicable DOE requirements. Members of the Board's staff also reviewed the design and implementation of the Instrumentation and Control (I&C) System for the SWPF project. The review did

not identify any significant safety issues but did identify several concerns that the project team subsequently addressed to demonstrate that the I&C system will be designed to perform its safety function.

**Uranium Processing Facility (UPF) at the Y-12 National Security Complex.** During this fiscal year, the Board reviewed NNSA's actions to resolve issues identified in its April 2, 2012, letter to NNSA concerning the integration of safety into the UPF design. Notably, the Board and its staff reviewed major revisions of the project's Preliminary Safety Design Report and supporting design documentation. The Board's review determined that while NNSA has made progress in addressing prior issues, additional action is needed by NNSA to ensure that the project complies with DOE's nuclear safety requirements and to continue improving the integration of safety into the UPF design. The Board documented its concerns in a letter to NNSA dated August 26, 2013. The Board has worked with NNSA to establish approaches for resolving these new concerns. Members of the Board's staff also reviewed and found reasonable NNSA's plan for validating structural modeling assumptions and design techniques. NNSA developed the plan in response to the Board's September 6, 2012, letter that identified issues with the impact of modeling assumptions not yet validated by the project on localized building behavior during seismic loading.

On October 2, 2012, the Board conducted a public hearing at Y-12 to discuss UPF safety issues with NNSA. The hearing also addressed NNSA's plans to mitigate safety concerns that could arise from planned changes to the project's execution strategy and major redesign activities. Due to changes in the project's execution strategy, the UPF project did not issue a formal revision of the Project Execution Plan during this fiscal year. The Board will review the revised plan when available.

**Transuranic Waste Processing Center (TWPC) Sludge Processing Facility Buildouts (SL-PFB) Project at Oak Ridge National Laboratory (ORNL).** Members of the Board's staff reviewed the conceptual design and safety design strategy for the SL-PFB project. The review identified no safety issues that would preclude the project from advancing to the next design stage (preliminary design). However, the review identified concerns with accident modeling parameters, seismic design requirements for safety systems, and the project team's evaluation of accidents involving potential detonations in process piping. During the staff's review, the project team committed to addressing these concerns. The staff's review will support the Board's development of a project letter for Critical Decision-1 in the next fiscal year.

**Transuranic Waste Facility Project at LANL.** On October 9, 2012, NNSA responded to the Board's June 11, 2012, letter that identified issues associated with the design and safety basis of the new Transuranic Waste Facility (TWF) at LANL. These issues included: (1) the use of non-conservative values for accident analysis parameters; (2) inadequate bases for screening external man-made accidents such as large truck and aircraft crashes in the accident analysis; and (3) an inadequate definition of the boundary for a system supporting the operability of the safety-related fire suppression system. Members of the Board's staff reviewed NNSA's response and supporting material and discussed subsequent concerns with NNSA officials. In addition, the Board received and members of the Board's staff began reviewing the Preliminary Documented Safety Analysis (PDSA).

**Electrical Safety at DOE Facilities.** During this fiscal year, members of the Board's staff reviewed the adequacy of the electrical safety programs (ESPs) and electrical distribution systems (EDSs) at LANL's Plutonium Facility and at the Pantex Plant. These reviews indicated that the ESPs are well organized, supported, and integrated with site operations. The reviews also identified several safety concerns with the seismic qualification of certain EDS components and emergency lighting at LANL and with the design of the battery room ventilation system for diluting explosive hydrogen gas at Pantex. DOE has committed to addressing the staff's concerns, and the staff is monitoring DOE's actions.

During this fiscal year, DOE also issued a revision of the DOE Electrical Safety Handbook (DOE-HDBK-1092-2013). The revision adequately addresses concerns previously raised by members of the Board's staff with the handbook.

**Probabilistic Seismic Hazard Analysis (PSHA) for SRS and Hanford.** Members of the Board's staff observed activities associated with updating the PSHAs at SRS and Hanford. The staff reviewed the SRS seismic hazard calculations and draft report dated May 2013, and has engaged DOE to address concerns in the final report. The staff participated in the second workshop to update the Hanford PSHA and followed DOE's progress toward developing the final report which is anticipated in late FY 2014.

**Deficiencies with the System for the Analysis of Soil-Structure Interaction (SASSI) Computer Software.** The DOE complex uses the computer program SASSI to evaluate interaction effects between nuclear facility structures and

supporting soils. In an April 8, 2011, letter to DOE, the Board highlighted its concern that issues with the program could lead to erroneous conclusions that affect the safety-related structural design at DOE defense nuclear facilities. DOE responded to the Board in letters dated July 29, 2011, October 5, 2011, and December 27, 2011. DOE agreed with the Board's concerns and is taking actions to address both technical and quality assurance issues. DOE developed a SASSI Project Plan and Technical Work Plan that will result in an improved set of SASSI validation and verification problems. During this fiscal year, members of the Board's staff continued to monitor DOE's execution of these plans.

**Periodic Reports to Congress.** The Board issued two periodic reports to Congress on the status of significant unresolved technical differences between the Board and DOE on issues concerning the design and construction of DOE's defense nuclear facilities. These reports have been highly effective in communicating Board concerns to Congress, as well as to DOE senior management. The reports were issued December 24, 2012, and July 15, 2013, respectively.

### Performance Goal 3

**Safety in Nuclear Facilities Design and Infrastructure.** DOE's new defense nuclear facilities and major modifications to existing facilities are designed and constructed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

#### FY 2012 Performance Accomplishments

**Waste Treatment and Immobilization Plant (WTP) at the Hanford Site.** The Board has continued its review of the design and construction of important-to-safety structures, systems, and components in the WTP facilities. The Board's activities primarily consisted of the identification and evaluation of emerging safety issues and the resolution of previously identified safety issues. Specifically:

- The Board held three separate public meeting and hearing sessions concerning WTP on March 22, 2012, and May 22, 2012. The sessions addressed unresolved technical issues with pulse jet mixing in WTP vessels, erosion and corrosion of process component materials, misalignments between the design and safety bases, and resolution of concerns with safety culture.
- On January 12, 2012, the Board evaluated and accepted DOE's Implementation Plan for the Board's Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*. The recommendation addresses unresolved technical concerns with the WTP mixing and transfer systems.
- In a letter to DOE dated January 20, 2012, the Board identified safety issues with DOE's approach to resolving issues related to wear allowances for erosion/corrosion of piping and vessels at WTP.
- The Board evaluated and accepted DOE's Implementation Plan for Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*, with a request to take into account emerging information gained from DOE's assessment of safety culture at the WTP project.
- In a letter to DOE dated April 3, 2012, the Board identified safety issues with DOE's effort to verify and validate the FLUENT computational fluid dynamics model that will be used for mixing system design confirmation.
- In a letter to DOE dated April 13, 2012, the Board identified safety issues with the design and construction of the electrical distribution system for WTP.
- In a letter to DOE dated August 8, 2012, the Board expressed concern that the portions of the WTP piping design that transport slurries will not prevent the formation of sliding beds of solids along the bottom of process piping, posing a concern for erosion of the piping.

**Waste Feed Mixing and Delivery Systems at Hanford.** The Board observed DOE's efforts on a small-scale mixing demonstration for the Hanford double-shell tank waste feed delivery system. During development of the implementation plan for Recommendation 2010-2, the Board communicated to DOE the need to establish technical and safety requirements for the waste feed delivery system.

**Integrated Waste Treatment Unit at Idaho National Laboratory.** The Board reviewed the installation and testing of the safety-significant instrumentation systems that protect workers at Idaho National Laboratory from potential chemical and radiological hazards associated with operation of the Integrated Waste Treatment Unit. Additionally, the Board reviewed the project team's processes for system testing and evaluated the adequacy of the project team's efforts to resolve problems during component and system testing. The Board also reviewed the project's processes for training and preparing operators to safely operate the new facility. The Board observed both the contractor and DOE Operational Readiness Reviews and evaluated final integrated system testing to support the eventual introduction of radioactive waste into the facility for processing. Based on issues identified during the testing, waste processing is not expected to begin until April 2013.

**Chemistry and Metallurgy Research Replacement Project at Los Alamos National Laboratory (LANL).** DOE developed a set of activities necessary to substantially complete the Chemistry and Metallurgy Research Replacement Nuclear Facility design by the end of calendar year 2012. The Board monitored these design completion activities.

**Radioactive Liquid Waste Treatment Facility (RLWTF) Upgrade Project at LANL.** The Board resumed oversight of the RLWTF Upgrade Project after DOE finished an evaluation of alternatives to reduce project cost. Initial Board activities included a review of the project's draft Safety Design Strategy.

**Transuranic Waste Facility Project at LANL.** The Board completed its review of the preliminary design and safety basis for the Transuranic Waste Facility project. The Board's review identified several issues that could impact the identification, design, and functional classification of safety-related controls for protecting the public and workers. The Board formally communicated these issues to DOE in a letter dated June 11, 2012. These issues included: (1) the use

of non-conservative values for accident analysis parameters; (2) inadequate bases for screening external man-made accidents such as large truck and aircraft crashes in the accident analysis; and (3) an inadequate definition of the boundary for a system supporting the operability of the safety-related fire suppression system.

**Salt Waste Processing Facility (SWPF) at SRS.** As part of construction oversight, the Board reviewed the welding program at SWPF and concluded that the program met the appropriate requirements. The Board noted a high cumulative rejection rate (12 percent) of production piping welds during radiographic inspection. The Board observed that many of the piping welds were manual welds on small piping which are difficult to produce. The Board was especially concerned with welds joining piping and vessel nozzles on process vessels. The SWPF project is shifting from manual to orbital machine welding to reduce the rejection rate of piping welds.

The Board and DOE closed out a longstanding issue concerning operator actions following a seismic event. DOE implemented a number of design changes to ensure that operator actions required to prevent explosions following an earthquake could be accomplished, such as including seismically qualified interlocks to shut down large recirculation pumps to process vessels should waste temperatures exceed a specified limit. DOE also performed detailed calculations of the temperature rise of the liquid waste in process vessels if cooling is lost due to an earthquake. DOE will use these calculations to develop safety controls to prevent explosions. The Board reviewed these calculations and found them to be acceptable. The Board and DOE also closed one additional safety issue related to mixing system controls and made significant progress towards closing issues related to flammable gas control.

**Uranium Processing Facility (UPF) at the Y-12 National Security Complex.** DOE completed development of the safety documentation supporting the preliminary design of UPF in August 2011. The Board conducted a review of the project's safety design strategy and preliminary safety design report and concluded that they did not adequately implement DOE's requirements to integrate safety into the preliminary design. The Board documented these issues in a letter to DOE dated April 2, 2012. The Board subsequently worked with DOE to establish approaches to resolving the concerns identified in the letter.

In a letter to DOE dated September 6, 2012, the Board noted that the overall structural design of the main UPF building is adequate, but that the UPF project needed to validate a number of modeling assumptions in the structural analyses that could conceal issues with the performance of local areas of the structure.

The Board and NNSA closed issues related to the Board's letter to NNSA dated March 15, 2010, which identified concerns related to the geotechnical and structural analysis of UPF.

**Electrical Safety.** DOE is revising the DOE Electrical Safety Handbook (DOE-HDBK-1092-2004). The Board reviewed and provided DOE with comments on the draft revision. DOE expects to issue the revised standard in FY 2012.

**Central and Eastern United States (CEUS) Seismic Source Characterization (SSC) Project.** The CEUS SSC project was completed and published as NUREG-2115, *Central and Eastern United States Seismic Source Characterization for Nuclear Facilities* (January 2012). The CEUS SSC project was a cooperative effort sponsored by DOE, the Electric Power Research Institute (as the nuclear industry representative), and the United States Nuclear Regulatory Commission. The Board's staff participated as a member of the participatory peer review panel. The product of this effort was a regional CEUS SSC model that is widely applicable to the entire CEUS and will be used by DOE to update probabilistic seismic hazard analyses (PSHAs) at several DOE sites during the next few years.

**Probabilistic Seismic Hazard Analysis for SRS and Hanford.** The Board reviewed activities associated with updating the PSHAs at SRS and Hanford. The Board reviewed seismic source and ground motion inputs being used by DOE to update the SRS PSHA and is working with DOE to ensure that all technical issues are resolved prior to the final report, anticipated early in FY 2013. The Board participated in the kick off meeting and first workshop to update the Hanford PSHA, which is scheduled to be completed during the next two years.

**Deficiencies with the SASSI Computer Software.** The DOE complex uses the computer program SASSI (A System for the Analysis of Soil-Structure Interaction) to evaluate interaction effects between nuclear facility structures and supporting soils. In an April 8, 2011, letter to DOE, the Board highlighted its concern that issues with the program could lead to erroneous conclusions that affect the safety-related structural design at DOE defense nuclear facilities. DOE responded to the Board in letters dated July 29, 2011, October 5, 2011, and December 27, 2011. DOE agreed with the Board's concerns and is taking actions to address both technical and quality assurance issues. DOE has

developed a SASSI Project Plan and Technical Work Plan that will result in an improved set of SASSI validation and verification problems. The Board attended a DOE workshop on SASSI and continues to review DOE's efforts to develop an improved set of SASSI test problems. DOE also undertook two quality assurance audits of contractors who execute SASSI. The Board observed these audits and is working with DOE to ensure that all findings and corrective actions are appropriately identified and resolved.

**Periodic Reports to Congress.** The Board issued two periodic reports to Congress on the status of significant unresolved technical differences between the Board and DOE on issues concerning the design and construction of DOE's defense nuclear facilities. These reports have been highly effective in communicating Board concerns to Congress as well as DOE senior management. The reports were issued March 8, 2012 and June 25, 2012.



### Performance Goal 3

**Safety in Nuclear Facilities Design and Infrastructure.** DOE's new defense nuclear facilities and major modifications to existing facilities are designed and constructed in a manner that ensures adequate protection of the health and safety of the public, the workers, and the environment.

#### FY 2011 Performance Accomplishments

**Waste Treatment and Immobilization Plant (WTP) at the Hanford Site.** The Board has continued its review of the design and construction of important-to-safety structures, systems, and components in the Waste Treatment and Immobilization Plant facilities. The Board's activities primarily consisted of the evaluation of emerging issues and the resolution of previously identified issues. Specifically:

- The Board held three separate public meeting and hearing sessions during the period October 7–8, 2010, addressing concerns with pulse jet mixing in WTP vessels, changes in the design basis due to a reduced material-at-risk, and the design basis for hydrogen in pipes and ancillary vessels.
- The Board issued Recommendation 2010-2, *Pulse Jet Mixing at the Waste Treatment and Immobilization Plant*, on December 17, 2010, to address unresolved technical concerns with WTP's mixing and transfer systems.
- The Board identified safety issues in a letter dated April 5, 2011, with the methodology for assessing dose consequences from pressurized spray leaks involving radioactive liquids at WTP.
- The Board identified safety issues in a letter dated May 5, 2011, with the design of instrumentation and control systems for WTP.
- The Board identified safety issues in a letter dated June 27, 2011, with the use of the Low Order Accumulation Model (LOAM) to predict solids accumulation in WTP process vessels.
- The Board identified safety issues in a letter dated August 3, 2011, concerning the heat transfer calculations used to determine when engineered controls would be required to prevent flammable conditions from developing in WTP process vessels.
- The Board identified safety issues in a letter dated September 13, 2011, concerning chemical vapor releases at WTP.

**Integrated Waste Treatment Unit at Idaho National Laboratory.** The Board continued its review of the design and construction of the Integrated Waste Treatment Unit. The Board's most significant activities focused on evaluating the Technical Safety Requirements and Documented Safety Analysis and monitoring implementation of the safety basis. Additionally, the Board evaluated the design of the safety-significant instrumentation and worked with DOE to resolve issues associated with construction completion and system testing.

**Chemistry and Metallurgy Research Replacement (CMRR) Project at Los Alamos National Laboratory (LANL).** In December 2010, the Board learned that LANL requested that NNSA contemplate several changes to the CMRR Nuclear Facility safety strategy and design. These changes included the elimination of one or more major safety-related systems and revisions to the seismic design requirements for certain safety systems. As a result, the Board sent a letter to NNSA on February 8, 2011, expressing concern that any change to the CMRR Nuclear Facility safety strategy and design must be properly justified and documented. NNSA subsequently informed the Board that major changes to the CMRR Nuclear Facility safety strategy are no longer being pursued.

The Board continued its review of seismic analysis input assumptions and the project approach to soil structure interaction. The Board provided feedback on seismic analysis issues including time history development and the approach to defining foundation input seismic motions. The Board continued its review of the revised CMRR Preliminary Documented Safety Analysis and initiated reviews of updated System Design Descriptions, the facility Process Hazard Analysis, and the analysis to assess habitability concerns with the Entry Control Facility, the location where operators will respond to design basis accidents including earthquakes.

**Radioactive Liquid Waste Treatment Facility Upgrade Project at LANL.** The Board tracked DOE's evaluation of alternatives to reduce project cost. Board oversight activities will continue when NNSA decides upon a path forward.

**Transuranic Waste Facility Project at LANL.** The Board continued its review of the design and safety basis development activities for the Transuranic (TRU) Waste Facility project, focusing on resolution of outstanding safety issues from conceptual design, as well as the development of the preliminary safety design report and preliminary design documents. The Board observed that the project took positive actions during preliminary design to resolve safety issues previously identified by the Board. These actions included relocating the facility to an alternate site where

an aircraft crash event is not credible and modifying accident analysis parameters for the seismic evaluation to comply with DOE technical standards.

**Pit Disassembly and Conversion (PDC) Project at the Savannah River Site (SRS).** The Board reviewed the Safety Design Strategy, the Facility Design Description, the Conceptual Safety Design Report, Hazard Analysis, and the Risk and Opportunity Analysis Report and provided comments to NNSA. Major comments identified involved the potential for seismic soft zones, the development of safety-class gaseous fire suppression systems, the need to consider Seismic Design Category 4 (SDC-4) because of high unmitigated accident consequences, the use of a plutonium storage container as a safety-class component, and the definition of “backfit” process. Even though the PDC project is being redirected, the comments provided should have a timely impact on the revised project. This will allow NNSA to address some major issues early in conceptual and preliminary design.

**Salt Waste Processing Facility (SWPF) at SRS.** The Board reviewed calculations related to the heat-up of the SWPF process vessels including a calculation of the Time-to-Combined Lower Flammability Limit (CLFL). The Time-to-CLFL calculation showed that safety-significant controls are needed to shut down the large recirculation pumps. The SWPF project will utilize high process vessel temperature as the set point for shutting down recirculation pumps and air pulse agitators for selected process vessels. Other smaller pumps that impact vessel heat-up will be shut down manually after loss of cooling caused by an earthquake or other natural event. In addition, the Board obtained agreement from DOE to conduct additional tests to characterize mixing of process tanks, including additional rheology tests and 1/5 scale mixing tests. The testing piggybacked on tests already planned to evaluate an improved material for adsorbing actinides from the high-level salt waste.

**Waste Solidification Building at SRS.** The Board has been following the construction activities at the Waste Solidification Building. The Board reviewed the corrective actions related to an unplanned construction cold joint in the concrete structure. The project took the appropriate actions to repair the structure. The Board is currently working with the Waste Solidification Building project to ensure that appropriate lessons learned are developed and shared with other DOE construction projects.

**Uranium-233 Downblending at Oak Ridge National Laboratory.** The Board reviewed DOE's alternatives analysis process to develop a new pathway for disposal of the U-233 inventory in Building 3019 at Oak Ridge National Laboratory. The downblending project will no longer be accomplished which makes the Board's previous issues with the design no longer relevant. The Board is now reviewing the new plans for U-233 disposition.

**Uranium Processing Facility.** In response to Board concerns that the project's critical decision strategy did not facilitate verification that safety was integrated into the preliminary design, DOE decided to develop preliminary safety documentation along with a detailed safety control set. This information would serve as a technical basis to validate the integration of safety into the preliminary design. The Board identified concerns with the adequacy of the developed control set, and DOE determined that the control set was not adequate. DOE decided that the UPF project would need to fully follow the safety basis development process expected at preliminary design to correct the deficiencies.

The Board also identified safety concerns with the project's safety design strategy and other safety documentation to aid DOE in the development of an acceptable preliminary safety design report. The Board worked closely with the project to review and provide feedback on the calculations being developed that address the geotechnical and structural issues transmitted to DOE on March 15, 2010.

The Board has provided comments related to the long-lead procurement equipment design contracts. These comments are being updated or resolved as the overall facility safety documentation is developed to address the revised equipment requirements.

**Electrical Safety.** The Board reviewed the electrical safety program at the Waste Isolation Pilot Plant (WIPP) and Idaho Nuclear Technology and Engineering Center (INTEC). The Board issued a letter to DOE on September 22, 2010, identifying several areas of the electrical safety program at WIPP which did not meet guidance in DOE's Electrical Safety Handbook (DOE-HDBK-1092-2004). WIPP has subsequently improved its electrical safety program. The Board concluded that the INTEC site-wide electrical safety program appeared adequate and complied with the model provided in DOE's Electrical Safety Handbook with a few exceptions. The staff reviewed and commented on a revision of DOE's electrical safety handbook, expected to be issued by DOE in FY 2012.

**Filter Test Facility.** Nuclear-grade high-efficiency particulate air (HEPA) filters are used in essentially all new DOE

nuclear facilities and are tested in the Filter Test Facility to ensure the filters meet performance requirements. DOE continues to address deficiencies previously identified by the Board at the Filter Test Facility. In particular, the Board continues to monitor DOE corrective actions to address the continuing unacceptably high filter failure rates.

**Central and Eastern United States (CEUS) Seismic Source Characterization (SSC) Project.** The CEUS SSC project is a cooperative effort sponsored by the Department of Energy, the Electric Power Research Institute (as the nuclear industry representative), and the United States Nuclear Regulatory Commission. The Board's staff is participating as a member of the participatory peer review panel.

The final CEUS SSC model shows that locations with geologic and geotechnical evidence of repeated large magnitude earthquakes (magnitude greater than about 6.5) will have significantly higher seismic hazard compared to other seismic sources. Ground motion estimates using the CEUS SSC model are anticipated to show higher seismic hazard at most nuclear facility locations compared to historical probabilistic seismic hazard estimates. This may be significant for SRS, which is about 100 to 150 kilometers from the Charleston seismic source. DOE has deferred the probabilistic seismic hazard analysis update for SRS pending completion of this project.

**Probabilistic Seismic Hazard Analysis for SRS and Hanford.** The Board has been reviewing activities associated with the SRS probabilistic seismic hazard analysis update, which has been deferred pending completion of the CEUS SSC project. The Board participated in the initial discussions at Hanford as DOE decides whether an update to the current probabilistic seismic hazard analysis for Hanford is necessary.

**Deficiencies with the SASSI Computer Software.** The DOE complex uses the computer program SASSI (A System for the Analysis of Soil-Structure Interaction) to evaluate soil-structure interaction effects between nuclear facility structures and supporting soils. In an April 8, 2011, letter to DOE, the Board highlighted its concern that issues with the program could lead to erroneous conclusions that affect safety-related structural design at DOE defense nuclear facilities. DOE agreed with the concerns and is developing corrective actions.

**Periodic Reports to Congress.** The Board issued three periodic reports to Congress on the status of significant unresolved technical differences between the Board and DOE on issues concerning the design and construction of DOE's defense nuclear facilities. These reports have been highly effective in communicating Board concerns to Congress as well as DOE senior management. The reports were issued December 30, 2010, June 15, 2011, and September 23, 2011.

### Performance Goal 3

**Nuclear Facilities Design and Infrastructure.** New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of the health and safety of the workers and the public.

#### FY 2010 Performance Accomplishments

**Waste Treatment and Immobilization Plant at the Hanford Site.** The Board has continued its review of the design and construction of important-to-safety structures, systems, and components in the Waste Treatment and Immobilization Plant (WTP) facilities. The Board's activities primarily consisted of the evaluation of emerging issues and the resolution of previously identified issues. Specifically:

- DOE resolved issues identified by the Board in a letter dated December 2, 2009, regarding the adequacy of the structural steel designs for the Pretreatment, High-Level Waste, and Low-Activity Waste facilities.
- The Board identified safety issues in a letter dated January 6, 2010, that could arise as a result of inadequate mixing in process vessels.
- The Board encouraged DOE to complete an independent review of the revised safety design strategy for hydrogen in pipes and ancillary vessels. This review resulted in the identification of 32 findings related to the safety design strategy. DOE is in the process of addressing these issues.
- The Board identified that the methodology for evaluating the consequences of a spray leak from process piping in WTP was not technically correct. DOE agreed with the Board's conclusion and developed a new methodology for WTP. The Board is evaluating the revised approach and its application in WTP.
- The Board identified that DOE had selected a non-conservative value for the deposition velocity, which is a parameter used in the safety analysis to estimate how much radioactive material reaches the public following an accidental release of material.

DOE responded on September 8, 2010, to a set of questions regarding the Board's outstanding concerns. The Board held a public meeting and hearing in early October 2010 to discuss these issues further. The Board is evaluating DOE's responses to the questions and the testimony provided by DOE and its consultants and contractors at the public meeting and hearing. Based on this evaluation, the Board will determine what actions are necessary to ensure that WTP can carry out its important mission in a manner that protects the safety of the public and workers.

**Integrated Waste Treatment Unit at Idaho National Laboratory.** The Board continued its review of the design and construction of the Integrated Waste Treatment Unit. The Board's activities focused on the project team's selection and design of safety significant instrumentation that protect workers from chemical hazards. The Board reviewed the 90% design of the electrical system in April 2010 and identified issues related to the ampacity derating of long penetration seals and the seismic design and qualification of the emergency lights. Additionally, the Board worked with the project team to address the potential for corrosion of key components. Finally, the Board reviewed the safety basis documents for the facility and is working with DOE to resolve the resulting comments in a timely manner to support a DOE Operational Readiness Review in July of 2011, followed by facility startup in FY 2012.

**Chemistry and Metallurgy Research Replacement (CMRR) Project at Los Alamos National Laboratory (LANL).** The Board has continued its review of the enhanced preliminary design of the CMRR nuclear facility at LANL. The Board interacted with CMRR project personnel as they advanced the development of a detailed structural model for design. The detailed structural model will be directly used in the seismic analysis of the nuclear facility. The Board encouraged the development of this model so that the building's complex dynamic response can be adequately captured. The Board continued its review of seismic analysis input assumptions and the project approach to soil remediation. The Board provided feedback on seismic analysis issues including time history development and the approach to defining foundation input seismic motions. As a result of the Board's CMRR certification review, the project developed an approach to validate its design process. CMRR project personnel recently stated their intention to revise their approach to structural and seismic design; the Board is following these changes closely.

The Board initiated its review of the revised CMRR Preliminary Documented Safety Analysis. The Board's review will not be complete until the project finalizes updated System Design Descriptions and a complete Process Hazard Analysis. The Board identified habitability concerns with the Entry Control Facility (ECF), the location where

operators will respond to design basis accidents including earthquakes. Currently, the CMRR project does not plan to ventilate the ECF. As a result of Board concerns, the project is completing additional studies to assess the impacts on CMRR of releases from adjacent facilities in the event of the design basis accidents.

**Transuranic Waste Facility Project at LANL.** NNSA placed the Transuranic (TRU) Waste Facility project on hold in late 2008 to reevaluate mission need and examine alternatives. The delay was in part due to concerns raised by the Board regarding the project's safety strategy. The project resumed in FY 2010 with a reduced scope that eliminated capabilities to process TRU waste and prepare waste shipments for offsite disposal. The project maintains staging, storage, and characterization functions for TRU waste. Though the scope changes resolved the Board's initial concerns, the Board reviewed the revised conceptual design in FY 2010 and identified additional safety issues. The Board identified the absence of controls to mitigate the design basis aircraft crash accident, as well as incorrect application of accident analysis parameters from DOE technical standards to the seismic evaluation. The Los Alamos Site Office subsequently specified resolution of the Board's concerns as conditions of approval in the Conceptual Safety Validation Report. The Board will follow issue resolution during preliminary design.

**Radioactive Liquid Waste Treatment Facility Upgrade Project at LANL.** The Board confirmed that NNSA has resolved issues previously identified by the Board. Specifically, Federal oversight has improved, and the project team has successfully implemented improvements in its approach to achieving safety in design. The Board reviewed the 80% design of the facility. In addition to addressing specific issues related to confinement and system protection during design basis events, the Board helped identify cost-effective strategies to resolve issues regarding the design basis chemical hazard. The project is currently on hold while NNSA reviews alternatives to reduce project cost. Board oversight activities will continue when NNSA decides upon a path forward.

**Criticality Experiments Facility at NNSS.** NNSA moved the Criticality Experiments Facility from LANL and has been preparing for criticality experiment operations at the Device Assembly Facility. Previously the Board has reviewed and commented on the design for facility modifications and modification of the critical assembly machines, construction activities, and the re-build and testing of the four critical assembly machines. In FY 2010, the Board reviewed startup and acceptance testing, safety basis, instrumentation and control systems, and the readiness review process. The Board found deficiencies in the accident analysis, control set, and safety system design, and also identified the concern that adequate technical expertise had not been applied by NNSA and its contractors to evaluate and ensure safe operations. After resolution of these issues, criticality experiments should be ready to begin.

**Fire Protection for Final High-Efficiency Particulate Air (HEPA) Filters for Savannah River Site (SRS) Salt Waste Processing Facility.** The Board had previously determined that the design of the confinement ventilation system did not comply with DOE Standard 1066, *Fire Protection Design Criteria*, for protection of the final stage of HEPA filters. In response, the project has implemented a design change to include a manually activated deluge system upstream of the first HEPA filter stage. In addition, the project developed a crosswalk matrix documenting the technical justification for equivalency with the remaining DOE Standard 1066 requirements. The DOE Savannah River Operations Office approved the equivalency determinations. The Board believes the proposed design change with supporting equivalencies provide an adequate degree of fire protection for the confinement ventilation system.

**Mixing System Controls and Operational Parameters for SRS Salt Waste Processing Facility.** The Board reviewed the design, testing, and controls associated with the methods for mixing the contents of process vessels. The Board concluded that, given appropriate controls and operational parameters, the air pulse agitators should fulfill the functions assumed in the safety basis. However, the Board identified shortcomings with the testing and modeling that the project team should consider in the selection of controls and operational parameters. The project is taking action to address the Board's concerns.

**Waste Solidification Building at SRS.** The Board is currently reviewing the quality assurance program, including commercial grade dedication, at the Waste Solidification Building. Specifically, the Board's efforts are focused on the quality assurance aspects of the ongoing construction activities. In addition, the Board is planning to review the facility's instrumentation and control systems in the near future.

**Uranium-233 Downblending at Oak Ridge National Laboratory.** The Board reviewed the Preliminary Safety Design Report for the project and provided DOE with feedback indicating that the document did not fully address safety basis deficiencies noted in the Board's Periodic Report to Congress on issues concerning the design and construction of DOE's defense nuclear facilities. DOE has informed the Board that the next evolution in safety basis documentation would address the Board's concerns.

**Highly Enriched Uranium Materials Facility at Y-12.** To support the reviews for startup of operations, and as a follow-up to previous quality assurance reviews of the Highly Enriched Uranium Materials Facility, the Board initiated a review of the adequacy of a sample of Engineering Quality Requirement Document packages and corroborating vendor quality records or applicable quality documentation for completeness. The review determined that the document packages for the Secondary Confinement System and the Rackable Can Storage Boxes were complete. The Fire Suppression System document package was inadequate, lacking sufficient documentation to validate the commercial grade dedication activities and address all critical characteristics of a complete fire suppression system. Subsequent review of vendor records and purchase orders and interviews with quality assurance personnel by the project provided enough evidence that the system can meet safety expectations. The Board is encouraging DOE to share the lessons learned with the Uranium Processing Facility and other projects to help preclude recurrence of similar problems.

After the Y-12 contractor discovered non-safety wiring in a junction box that carries safety related wiring, the Board prompted a detailed technical evaluation of the nonconforming condition and a full extent-of-condition review. This extent-of-condition review is ongoing, and so far has discovered an additional nonconformance. Also during FY 2010, the Y-12 contractor performed a calculation that addresses issues previously raised by the Board regarding ampacity derating of cables passing through penetration seals.

**Uranium Processing Facility at Y-12.** The Board has continued to conduct reviews of project management, DOE oversight, safety system design, geotechnical and structural design, and technology development. The Board issued a letter on March 15, 2010, transmitting issues with the geotechnical and structural engineering for the project. Project personnel have identified acceptable resolution approaches for the issues and are finalizing design documents to provide verification that the issues are closed. The Board's staff assessed the 35% design of the electrical system in July 2010 and identified issues related to the lightning protection system and emergency lights.

The Board identified that the project strategy for combining critical decisions was not conducive to the verification of safety in the preliminary design. DOE has agreed with this concern and has initiated action to revise the project safety strategy. The Board identified that the long-lead procurement safety basis information was not complete to support a final design. DOE concurred with the findings and identified that the cause was the use of a design-build procurement approach for the long-lead equipment. DOE subsequently revised the strategy for long-lead equipment procurement to address this concern.

**Filter Test Facility.** Nuclear-grade high-efficiency particulate air (HEPA) filters are used in essentially all new nuclear facilities and are tested in the Filter Test Facility to ensure the filters meet performance requirements. In a letter dated March 17, 2008, the Board expressed concerns with degradation in quality of the nuclear filters as reported by the Filter Test Facility. On April 16, 2010, the Department of Energy (DOE) provided the Board with the final report documenting actions to identify and address quality problems with the manufacture of HEPA filters. While problems with manufacturer quality continue, DOE is more aggressively addressing the deficiencies. This is evidenced by audits of a key filter manufacturer that yielded comprehensive corrective actions and formal corrective action requests being developed in response to defects found by the Filter Test Facility. The Board will continue to monitor DOE corrective actions to address the continuing unacceptably high filter failure rates.

**Safety Classification of Fire Protection Systems.** Board Recommendation 2008-1, *Safety Classification of Fire Protection Systems*, identified the need for standards for the design and operation of fire protection systems being relied upon as a primary means of protecting the public and workers from radiological hazards. As part of the Implementation Plan to address the recommendation, DOE and NNSA issued interim guidance on design and operations of safety-related fire protection sprinkler systems in February and March 2010, respectively. Several projects are now using this guidance in preparing their designs. The Board issued a letter to DOE in July 2010 pointing out that, although the interim guidance provides useful information for current and future projects, it does not define the comprehensive set of attributes of safety-related fire protection systems which the Board recommended to be incorporated into the DOE directives. The Board is working with DOE to complete the effort.

## D. PERFORMANCE GOAL 4: EFFECTIVE NUCLEAR SAFETY PROGRAMS AND ANALYSIS

**DOE regulations, requirements, and guidance are developed, implemented, and maintained; and safety programs at defense nuclear facilities are established and implemented as necessary to adequately protect the health and safety of the public, the workers, and the environment.**

**OUTCOME:** DOE will have acknowledged, acted upon, and/or resolved the health and safety issues raised by the Board. In addition, follow-up technical evaluation of DOE's safety programs at defense nuclear facilities will verify necessary improvements in safety.

### FY 2013 Performance Objectives

- **DOE Directives.** The Board will assess DOE's implementation of newly revised directives at DOE's defense nuclear sites. With the completion of the *DOE 2010 Safety and Security Reform Plan*, the Board expects to review slightly fewer directives than the Board reviewed in 2011 and 2012. The Board will continue to review the adequacy of proposed revisions to DOE and NNSA directives to ensure that any revisions are technically supported, appropriate, and provide for adequate protection of the public, worker, and environment. The results of the Board's directives reviews will be provided to DOE for action. The Board anticipates that approximately 25 DOE and NNSA directives will require review because of their potential impact on public and worker health and safety. Of particular interest to the Board is DOE's proposed revision of DOE Standard 3009-94 Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*. This directive and five others are likely to require significant Board interaction to ensure satisfactory resolution of issues. The Board will continue its involvement in the efforts of NNSA to establish its supplementary directives system. As a result of the Board's review of DOE and NNSA directives, improved health and safety directives will be issued, resulting in enhanced safety requirements and guidance that provide for adequate protection of the workers and the public as well as the protection of the environment.
- **Conduct of Operations.** The Board plans to review conduct of operations at several DOE sites in FY 2013 where there are indications that the program may be experiencing significant challenges. The Board will also assess the maintenance programs at select DOE sites in FY 2013 to ensure those programs are being managed and implemented as effectively and safely as possible.
- **Federal Technical Capability Program (FTCP).** The Board expects that the acquisition, training, and qualification of DOE's workforce at defense nuclear facilities are at a level that ensures it is technically competent to manage and oversee the safe operation of its facilities and processes. The Board will continue to assist DOE in improving the technical competence of its workforce by participating in monthly meetings and reviewing FTCP documents. The Board will review the FTCP's FY 2013 Operational Plan and provide input on potential enhancements to all newly issued and revised Functional Area Qualification Standards.
- **Facility Representative Program.** The Board encourages DOE line management to continually improve oversight of operations, in particular with regard to safety. This includes key federal oversight positions such as facility representatives. The Board will ensure that the DOE facility representative program remains vibrant through participation in monthly meetings, periodic assessments, and working interactions with facility representatives during site visits.
- **Integrated Safety Management.** The Board will continue its reviews of DOE's implementation of ISM and associated nuclear safety programs. In addition, while the Board has noted considerable progress in the implementation of ISM, continued DOE efforts are necessary to maintain ISM systems and ensure continuous improvement across the complex. Specific functional areas will be sampled to a greater depth, with emphasis on implementation of ISM at the activity level of execution.
- **Safety Management Programs.** The Board will continue to address the ability of DOE sites to respond to beyond design-basis and severe events in its future site-specific public meetings, including its public meeting at Y-12. The Board will conduct reviews of emergency preparedness, response, and recovery at Pantex, LLNL, SRS, and SNL.



## Performance Goal 4

**Effective Nuclear Safety Programs and Analysis.** DOE regulations, requirements, and guidance are developed, implemented, and maintained; and safety programs at defense nuclear facilities are established and implemented as necessary to adequately protect the health and safety of the public, the workers, and the environment.

### FY 2013 Performance Accomplishments

**DOE Directives.** As part of its continuing review of new and revised DOE directives, members of the Board's staff evaluated more than 30 DOE directives including technical standards and NNSA supplemental directives. Members of the Board's staff provided constructive comments on directives being developed or revised, and evaluated the safety impact for directives that DOE proposed to cancel. Examples of reviews of DOE directives completed in FY 2013 include:

- DOE Standard 3014-2006, *Accident Analysis for Aircraft Crash into Hazardous Facilities* (Re-affirmation)
- DOE Handbook 3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* (Reaffirmation)
- DOE Standard 1150-YR, *Quality Assurance Functional Area Qualification Standard*
- DOE Standard 1174-YR, *Radiation Protection Functional Area Qualification Standard*

At year's end, members of the Board's staff were actively reviewing five revisions or reaffirmations of directives, including DOE Handbook 1132-99, *Design Considerations*. Members of the Board's staff were also working to reach resolution of issues regarding revisions or drafts of eight pending directives to improve the content, clarity, and consistency of safety requirements and guidance. These directives include draft DOE Standard 3009-YR, *Criteria and Guidance for Preparation of U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analysis*, and draft DOE Standard, SAFT-0132, *Probabilistic Risk Assessment for Nuclear Safety Applications*.

**Integrated Safety Management.** In August 2012, the Board issued technical report DNFSB/TECH-37, *Integrated Safety Management at the Activity Level: Work Planning and Control*. DNFSB/TECH-37 concluded that there was a lack of comprehensive requirements and guidance within DOE's directives system governing ISM at the activity level, and a lack of DOE and contractor oversight in this functional area. In October 2012, the Board's staff provided feedback to DOE during development of its response that DOE's planned actions did not include development of comprehensive guidance on contractor implementation of ISM at the activity level. Following this interaction, DOE submitted its response to DNFSB/TECH-37 that included actions to develop new and revised DOE directives providing comprehensive guidance on contractor implementation of ISM at the activity level, as well as on contractor and DOE oversight in this area. Per this response, DOE conducted a complex-wide workshop on ISM at the activity level to gain insights for the new guidance and has initiated an internal review of the new and revised DOE directives.

**Conduct of Operations.** The Board's staff performed follow-up reviews in FY 2013 of the maintenance programs at the Waste Isolation Pilot Plant (WIPP) and the Waste Encapsulation and Storage Facility (WESF) at Hanford to validate that safety concerns noted in prior Board letters had been resolved. The Board's staff noted improvements at WIPP in the post maintenance testing documentation, pre-job briefings, safety system walkdowns, and execution of maintenance activities. However, some weaknesses remain with respect to the quality of the work documents. Although the Board's staff noted some opportunities for improvement, significant progress was evident at WESF in the areas of maintenance training, periodic inspections of design features, contractor oversight of maintenance, and execution of work. The Board's staff communicated its observations related to operational activities at WIPP and WESF to key site personnel and will continue to evaluate DOE's efforts to improve conduct of operations and maintenance throughout the complex.

**Emergency Management.** The Board's staff continued to review emergency management programs at DOE sites with defense nuclear facilities. Key areas of concern included the ability of these programs to address severe events, multi-facility impacts, cascading or "connected" events, loss of utilities and supporting infrastructure, and the coordination of DOE and local response resources. The Board's staff conducted reviews of emergency management programs and the ability of DOE sites to respond to emergency events including severe events at Pantex, LANL, LLNL, Hanford, SNL, Y-12, and SRS. Emergency preparedness, response, and recovery at the Pantex site were key topics at the Board's public meeting/hearing held in Amarillo, TX, on March 14, 2013.



**Federal Technical Capability Program (FTCP).** The Board's staff participated in FTCP meetings and activities during FY 2013 to ensure DOE maintained a competent and highly capable federal workforce at its defense nuclear facilities. The Board's staff reviewed all newly issued and revised Functional Area Qualification Standards and provided extensive feedback to DOE on proposed safety improvements. DOE accepted many of the Board staff's comments that will ensure duties and responsibilities of site oversight personnel and the competencies documented in the Functional Area Qualification Standards are focused on technical and safety-related matters. In addition, an issue previously raised by the Board related to a lack of federal training on the human factors safety management program was resolved during FY 2013 with the development and implementation of a course at the National Training Center.

**Facility Representative Program.** The Board's staff ensured that the DOE facility representative program remained vibrant through participation in monthly meetings, periodic assessments, and working interactions with facility representatives during site visits. The Board's staff participated in facility representative program assessments at the Nevada Site Office and the Pantex NNSA Production Office and provided input to improve the assessment process.

**Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls.*** The Board's staff continued to follow DOE's efforts to verify the implementation of Recommendation 2002-3. DOE recently completed all of the commitments in its Implementation Plan for the Recommendation. The Board is reviewing closure of Recommendation 2002-3.

**Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities.*** The Board continued to monitor DOE's efforts in implementing Recommendation 2009-1 which identified the need for policies and guidance on the use of quantitative risk assessment methodologies at DOE defense nuclear facilities. DOE has shown a recent and renewed interest in applying risk assessment technology in nuclear safety applications. In this regard, members of the Board's staff reviewed DOE's proposed Standard on the use of risk assessment. The Board will continue to work toward improving DOE's safety posture with respect to the use of risk assessment methodologies.

**Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers.*** DOE has been working diligently on executing the Implementation Plan for Board Recommendation 2010-1. However, completion of this Implementation Plan proved to be more time consuming than DOE originally planned, and the schedule has been extended. DOE continues to work to make significant revisions to five essential DOE Standards that support implementation of DOE's Nuclear Safety Management Rule, 10 CFR Part 830. The Board's staff reviewed a draft of the first such Standard (DOE-STD-3009) and provided DOE with a significant number of comments to ensure consistency with the DOE Implementation Plan, as well as ensure that the workers and the public are adequately protected through a comprehensive set of clear and unambiguous requirements.

## Performance Goal 4

**Effective Nuclear Safety Programs and Analysis.** DOE regulations, requirements, and guidance are developed, implemented, and maintained; and safety programs at defense nuclear facilities are established and implemented as necessary to adequately protect the health and safety of the public, the workers, and the environment.

### FY 2012 Performance Accomplishments

**DOE Directives.** As part of its continuing review of new and revised DOE directives, the Board evaluated more than 30 DOE directives including technical standards and NNSA supplemental directives. The Board provided constructive comments on directives being developed or revised, and evaluated the safety impact for directives that DOE proposed to cancel. Examples of reviews of DOE directives completed in FY 2012 include:

- 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 Guide 226.1-2, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*
- DOE Standard 1066-YR, *Fire Protection*
- DOE Standard 1212-YR, *Explosives Safety*
- DOE Handbook 1092-YR, *Electrical Safety*

At year's end, the Board was in the process of resolving issues regarding revisions or drafts of nine pending directives to improve the content, clarity, and consistency of safety requirements and guidance. These directives include a proposed revision of DOE Standard 3009-94 Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, and draft DOE Standard 1020, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*.

**Readiness Reviews.** The Board evaluated Startup Notification Reports for defense nuclear facilities under its cognizance. The Board reviewed plans of action and implementation plans for the proposed startup and restart of defense nuclear facilities, and the Board reviewed startup and restart activities accordingly. Additionally, the Board continued to review DOE site offices' and contractors' local implementing procedures for DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, which requires site offices and contractors to develop local implementation procedures for readiness reviews. The Board provided constructive critiques of the local implementation procedures in an attempt to ensure clarity and consistency with DOE Order 425.1D and DOE Standard 3006-2010, *Planning and Conducting Readiness Reviews*.

**Conduct of Operations.** The Board reviewed conduct of operations at Hanford's Plutonium Finishing Plant and Tank Farms, as well as the Pantex Plant, and the maintenance programs at the Waste Isolation Pilot Plant (WIPP) and the Pantex Plant in FY 2012. The Board noted weaknesses in the quality and use of technical procedures, supervisory control of work activities, and execution of work. The Board formally communicated its concerns related to activities at Hanford and WIPP and will continue to evaluate DOE's efforts to improve conduct of operations and maintenance throughout the complex.

**Federal Technical Capability Program (FTCP).** The Board participated in FTCP meetings and activities during FY 2012 to ensure DOE maintained a competent and highly capable federal workforce at its defense nuclear facilities. The Board reviewed and commented on the FTCP's FY 2012 Operational Plan and provided input on potential enhancements to the Functional Area Qualification Standards, including expanding the depth and applicability of human factors competencies to a broader range of functional areas and reinforcing the need to focus on technical objectives, not administrative functions. The Board reviewed all newly issued and revised Functional Area Qualification Standards and provided extensive feedback to DOE on proposed improvements.

**Recommendation 2002-3, Requirements for the Design, Implementation, and Maintenance of Administrative Controls.** The Board followed DOE's efforts to verify the implementation of Recommendation 2002-3. During this fiscal year, the Board monitored onsite reviews at NNSA sites including LLNL, LANL, SNL, and Pantex. During the previous year, EM had completed a series of similar implementation reviews. DOE is in the process of integrating the results of these field reviews to determine whether sufficient justification exists to seek closure of the Board's recommendation.

**Recommendation 2004-2, Active Confinement Systems.** During FY 2012, Savannah River National Laboratory initiated several modifications to facility ventilation systems to address deficiencies identified as a result of the Board's Recommendation 2004-2. The Board also reviewed the laboratory's plans for addressing the highest priority

deficiencies.

**Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities.*** The Board continued to monitor DOE's efforts in implementing Recommendation 2009-1. The Board's recommendation identified the need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies for safety applications at DOE defense nuclear facilities. DOE has developed a draft Standard on the use of Probabilistic Risk Assessment in nuclear safety applications. The Board has been actively involved in encouraging DOE to seek opportunities for pilot application of the draft Standard. The Board will continue to work toward improving DOE's safety posture with respect to the use of risk assessment methodologies.

**Safety System Design, Functionality, and Maintenance.** During this fiscal year, the Board continued to conduct reviews of the design, functionality, and maintenance of safety systems at defense nuclear facilities and to follow up on previously identified issues. Examples of reviews conducted this year include detailed follow-up reviews related to safety system and control adequacy at LLNL and the Hanford Tank Farms. The Board's reviews have resulted in a number of hardware changes and significant commitments from DOE. The Board will continue to follow DOE's efforts to implement the changes associated with the Board's findings.

**Oversight of Safety Basis Requirements.** The Board engaged in significant efforts to improve DOE's system of safety basis requirements through the implementation of the Board's Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers.* The Board participated in several industry-wide workshops and evaluated DOE's efforts to revise DOE Standard 3009-94. The Board conducted extensive review and provided significant commentary to DOE in an effort to improve the standard. The Board is concerned that some of the proposed revisions to this vitally important guidance represent a relaxation or departure from longstanding safety principles. The Board will continue to closely monitor DOE's efforts to revise this standard and implement Recommendation 2010-1.

**Emergency Management.** The Board continued to pursue its review of emergency management programs at DOE sites with defense nuclear facilities. Key areas of concern included the ability of these programs to address severe events, multi-facility impacts, cascading or "connected" events, loss of utilities and supporting infrastructure, and the coordination of DOE and local response resources. Emergency preparedness, response, and recovery at LANL were key topics at the Board public meeting/hearing held in Santa Fe, NM, on November 17, 2011. The Board conducted reviews of emergency management programs and the incorporation of lessons learned from major accidents such as the tsunami impacts on Japan's Fukushima Daiichi nuclear power station into the programs at LANL, Hanford, and Y-12.

## Performance Goal 4

**Effective Nuclear Safety Programs and Analysis.** DOE regulations, requirements, and guidance are developed, implemented, and maintained; and safety programs at defense nuclear facilities are established and implemented as necessary to adequately protect the health and safety of the public, the workers, and the environment.

### FY 2011 Performance Accomplishments

**DOE Directives.** As part of its continuing review of new and revised DOE directives, the Board evaluated the DOE 2010 Safety and Security Reform Plan, which commenced on March 16, 2010. As a result of the 2010 Safety and Security Reform Plan, the Board evaluated more than 50 DOE directives including technical standards and NNSA supplemental directives. The Board provided constructive comments on directives being developed or revised, and evaluated the safety impact for directives that DOE proposed to cancel. Examples of reviews of DOE directives completed in FY 2011 include:

- DOE Policy 420.1, *Department of Energy Nuclear Safety Policy*
- DOE Policy 450.4A, *Integrated Safety Management Policy*
- DOE Order 450.2, *Integrated Safety Management*
- DOE Policy 226.1B, *Department of Energy Oversight Policy*
- DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*
- DOE Order 414.1D, *Quality Assurance*
- DOE Order 252.1, *Technical Standards Program*
- DOE Order 442.2, *Differing Professional Opinions for Technical Issues Involving Environment, Safety and Health*
- DOE Standard 1195-2011, *Design of Safety Significant Safety Instrumented Systems Used at DOE Non-Reactor Nuclear Facilities*

At year's end, the Board was in the process of resolving issues regarding revisions or drafts of 18 pending directives to improve the content, clarity, and consistency of safety requirements and guidance. These directives include draft DOE Order 420.1C, *Facility Safety*, draft DOE Guide 420.1-1A, *Nonreactor Nuclear Safety Design Criteria and Guide for use with DOE O 420.1, Facility Safety*, and draft DOE Guide 421.1-2, *Implementation Guide for Use in Developing Documented Safety Analyses to Meet Subpart B of 10 CFR 830*. As a result of DOE's proposed revisions to these directives, the Board expects that DOE technical standards will need to be revised to ensure consistency and clarity of requirements and guidance. Examples of these DOE technical standards include DOE Standard 1066-99, *Fire Protection Design Criteria*, and DOE Standard 1020-2002, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*.

**Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant.*** The Board issued this Recommendation 2011-1 on June 9, 2011, following an investigation that revealed a chilled atmosphere adverse to safety as well as suppression of technical dissent. On June 30, 2011, the Secretary of Energy responded by affirming the importance of a robust safety culture and identifying several near-term actions to improve the safety culture on the project and to evaluate safety culture at other sites and projects, but disagreed with some of the Board's findings. The Board provided additional detail to the Secretary of Energy in a letter on August 12, 2011, to assist DOE in developing a satisfactory response to the recommendation. On September 19, 2011, the Secretary of Energy provided clarification of his acceptance of the recommendation. The Implementation Plan for this recommendation is due to the Board in January 2012.

**Recommendation 2010-1, *Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers.*** The Board issued this recommendation on October 29, 2010. The Board intended for this recommendation to lead to clear identification of the requirements and criteria that contractors must meet in preparation of documented safety analyses and identification of safety-related controls for protection of the public and the workers, as well as the requirements that the DOE approval authorities must meet prior to giving their approval. DOE agreed that clearer requirements are needed and committed to revising two fundamental standards to provide better guidance. DOE partially rejected this recommendation on February 28, 2011, but committed to submit an Implementation Plan that would meet the intent of the recommendation. The Board received the DOE Implementation Plan on September 26, 2011, and is assessing whether it meets the intent of the Board's recommendation.

**Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities.*** The Board's recommendation identified the need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies for safety applications at DOE defense nuclear facilities. During this fiscal

year, the Board followed DOE's efforts to implement the recommendation. DOE issued a complex-wide Information Notice that discusses permitted uses of risk assessment under existing policy and guidance and the need for effective quality assurance. Further, DOE chartered a risk assessment working group and completed studies on the use of risk assessment in the DOE and other government agencies. DOE also issued a new Nuclear Safety Policy and developed a draft standard on the use of probabilistic risk assessment in nuclear safety applications.

**Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials.*** The Board continued to evaluate DOE's progress in implementing Recommendation 2007-1. Although responsibility for this recommendation was transferred from the DOE Office of Environmental Management to NNSA, milestones from the implementation plan continued to be met, including development of an action plan to address gaps in training and qualification, equipment capabilities, directives, research and development, quality assurance, and oversight.

**Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations.*** All commitments made in the DOE Implementation Plan responding to Recommendation 2004-1 were due to be accomplished by 2009. Although one commitment was closed this year, several commitments were late or had no discernible response from DOE. The Board was concerned that some previous improvements had degraded as result of changes in directives, management/oversight approach, and/or neglect. To address these concerns, the Board held a public hearing and meeting on the efficacy of DOE's safety oversight on May 25, 2011. This public meeting and hearing was the third in a series, and examined federal safety management and oversight policies being developed. Senior DOE and NNSA leadership confirmed their ongoing support for and commitment to integrated safety management and shared their vision for oversight across the DOE complex. The public meeting and hearing was effective in heightening the awareness of senior DOE and NNSA leadership to the need for maintaining effective safety management and oversight systems for defense nuclear facilities. The Board will continue to conduct reviews related to key aspects of this recommendation.

**Integrated Safety Management.** In addition to oversight activities related to Recommendation 2004-1, the Board continued its reviews of DOE's implementation of ISM and associated nuclear safety programs. The Board commented on revisions to the ISM Policy and Guide, and on the newly developed ISM Order. The Board observed that these revisions reduced the requirements and guidance developed during 15 years of implementing ISM systems. Continued DOE efforts are necessary to maintain ISM systems and ensure continuous improvement across the complex. The Board reviewed the effectiveness of the implementation of ISM in activity-level work planning processes at three sites. The reviews revealed shortcomings in the implementation of the ISM programs at Washington Closure Hanford, Nevada National Security Site, and Y-12 National Security Complex at the activity level. In all cases, weaknesses were identified in the processes used to analyze activity-level hazards and to provide adequate controls to ensure worker safety. In response to the Board's reviews, the DOE contractor URS Global Management and Operations Services developed a work planning standard that is now implemented at five DOE defense nuclear facilities. Additionally, the Energy Facility Contractors Group in concert with DOE and NNSA is tailoring the URS standard so that it can be used at all DOE sites operating defense nuclear facilities.

**Leading Indicators for Safety Performance.** During the last several years, DOE and its contractors have worked to develop and maintain performance-based contractor assurance systems. These systems are typically large databases of performance metrics selected to monitor contractor performance in satisfying DOE's contractual expectations. With the Board's encouragement, DOE and its contractors are beginning to consider whether data in those systems may provide leading indicators for facility safety programs. The Board has suggested a methodology for identifying and using leading indicators for facility safety programs and will continue to encourage DOE and its contractors in their efforts.

**Nuclear Criticality Safety.** The Board followed progress made by DOE contractors on nuclear criticality safety issues identified in previous years, specifically at the Y-12 National Security Complex and Los Alamos National Laboratory. The Board reviewed nuclear criticality safety evaluations from several sites, including the Nevada National Security Site, Los Alamos National Laboratory, Y-12, Savannah River Site, and Hanford. The Board also reviewed the technical basis for not requiring a criticality alarm system at Device Assembly Facility at the Nevada National Security Site. The Board continued to evaluate complex-wide activities as described in DOE's annual report on criticality safety. Each of these reviews confirmed that the various criticality safety programs and associated documentation were adequate, but the Board noted several opportunities for improvement and communicated them to DOE and its contractors.

**Readiness Reviews.** The Board evaluated Startup Notification Reports for defense nuclear facilities under its cognizance and reviewed startup and restart activities accordingly. Additionally, defense nuclear sites started implementing DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, which requires site offices and contractors to develop local implementation procedures for readiness reviews. The Board started reviewing local implementation procedures in FY 2011 and expects to continue reviewing the local procedures. The Board provided constructive critiques of the local implementation procedures in an attempt to ensure clarity and consistency with the requirements in DOE Order 425.1D and the guidance in DOE Standard 3006-2010, *Planning and Conducting Readiness Reviews*.

**Conduct of Operations.** The Board reviewed conduct of operations and maintenance at three Hanford facilities, the Idaho National Laboratory, and the Y-12 National Security Complex in FY 2011. The Board noted weaknesses in the quality and use of technical procedures, supervisory control of work activities, and execution of work. The Board formally communicated its concerns on Hanford and Y-12 and will continue to evaluate DOE's efforts to improve conduct of operations throughout the complex.

**Justifications for Continued Operations.** The Board continues to review DOE's processes and practices associated with the use of justifications for continued operations (JCOs) at defense nuclear facilities. Previously, the Board found a number of weaknesses in the JCO process and its implementation at defense nuclear facilities. In response to the Board's concerns, DOE developed and promulgated new and improved guidance in this important safety basis area. The Board continues to assess DOE's implementation of JCOs via the Unreviewed Safety Question (USQ) process. The most recent example involves the review of the JCO for structural vulnerabilities at LANL's Plutonium Facility. The Board will closely follow the implementation and effectiveness of the improved guidance.

**Safety System Design, Functionality, and Maintenance.** During this fiscal year, the Board continued to conduct reviews of safety system design, functionality, and maintenance at defense nuclear facilities and to follow up on previously identified issues. Examples of reviews conducted this year include safety system and control adequacy assessments of the Tritium Facility at Lawrence Livermore National Laboratory and the Hanford Tank Farms. A number of important safety issues were identified during these reviews and communicated to DOE for resolution. As a result of these interactions, several engineered systems were identified for upgrades to their safety classification.

**Federal Technical Capability Program (FTCP).** The Board participated in FTCP meetings and activities during FY 2011 to ensure DOE maintained a competent and highly capable federal workforce at its defense nuclear facilities. The Board reviewed the FTCP's FY 2011 Operational Plan and provided input on potential enhancements to the Functional Area Qualification Standards, including expanding the depth and applicability of human factors competencies to a broader range of functional areas. The Board also reviewed all newly issued and revised Functional Area Qualification Standards and provided feedback to DOE on ways to improve them.

**Quality Assurance.** The key quality assurance activity of the Board was reviewing DOE's revised directive on quality assurance. The revised order is stronger and clearer than the previous version. The Board continued to encourage and provide timely feedback to the efforts of DOE to improve awareness and performance in the areas of commercial grade dedication, suspect/counterfeit items, software quality assurance, and overarching quality assurance programs. The Board conducted five reviews in 2011 in multiple quality assurance areas. The Board issued a letter in April 2011 underscoring the software quality assurance issues with a soil-structure interaction model used to assess the seismic response of defense nuclear facilities.

**Safety Culture Improvement Project.** Since FY 2008, DOE and its contractors have worked to develop tools for assessing and improving the safety culture of the federal and contractor workforces. In FY 2009 and early FY 2010, the tools developed by the task team were piloted at several DOE sites, and lessons learned were incorporated into the tools. Two recurring observations from the pilot efforts were that safety culture improvement must be a long-term initiative, and that a cadre of personnel knowledgeable on safety culture should be available to advise and support the sites during their efforts. In FY 2011, the Board identified significant deficiencies in safety culture at the Waste Treatment and Immobilization Plant that resulted in issuance of Recommendation 2011-1, *Safety Culture at Waste Treatment and Immobilization Plant*, as noted above. Implementation of this recommendation is expected to assist DOE in identifying other facilities and activities needing improvements in safety culture.

## Performance Goal 4

**Nuclear Safety Programs and Analysis.** DOE regulations, requirements, and guidance are developed, implemented, and maintained; and safety programs at defense nuclear facilities are established and implemented; as necessary to protect adequately the health and safety the workers and the public.

### FY 2010 Performance Accomplishments

**DOE Directives.** As part of its continuing review of new and revised DOE directives, the Board and its staff evaluated and provided constructive critiques of over 35 directives associated with, but not limited to radiological protection, maintenance management, worker protection, and project management. At year's end, the staff was in the process of resolving issues regarding revisions or drafts of 12 pending directives to improve the content, clarity, and consistency of safety requirements and guidance. Examples of reviews completed in FY 2010 include:

- DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*
- DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*
- DOE Order 458.1, *Radiation Protection of the Public and the Environment*
- DOE Guide 423.1-1A, *Implementation Guide for Use in Developing Technical Safety Requirements*
- DOE Standard 1172-Year, *Safety Software Quality Assurance Functional Area Qualification Standard*
- DOE Standard 1158-2010, *Self-Assessment Standard for DOE Contractor Criticality Safety Programs*

In addition, the Board took actions in response to the *Department of Energy 2010 Safety and Security Reform Plan* issued by the Deputy Secretary of Energy on March 16, 2010, which called for "near term relief from specific low-value burdensome requirements as well as longer-term streamlining of requirements that will lead to measureable productivity improvements." The Deputy Secretary's plan called for a 50 percent reduction in the number of directives managed by DOE's Office of Health, Safety and Security. After reviewing the draft project management plan for this effort, the Board sent a letter to the Secretary of Energy on May 5, 2010, requesting a report and briefing to clarify the criteria DOE was using to analyze individual directives to determine cancelation and consolidation and the steps that DOE was taking to improve and strengthen directives. After the Board's May 12, 2010, public hearing and meeting on nuclear safety oversight, DOE revised its reform plan, satisfactorily addressing the Board's concerns about the need for a rigorous and comprehensive approach for revising safety directives.

**Recommendation 2009-1, Risk Assessment Methodologies at Defense Nuclear Facilities.** In 2009, as a result of several years of review of the use of quantitative risk assessment methodologies, the Board issued Recommendation 2009-1. The Board's recommendation identified the need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies for safety applications at DOE defense nuclear facilities. During 2010, the Board worked closely with DOE to develop an acceptable Implementation Plan, and a final plan was accepted in May 2010. The Board will evaluate DOE's implementation of the plan and continue to work toward improving DOE's safety posture with respect to the use of risk assessment methodologies.

**Recommendation 2007-1, Safety-Related In Situ Nondestructive Assay of Radioactive Materials.** The Board evaluated DOE's progress in implementing Recommendation 2007-1. DOE's Technical Support Group, defined in the recommendation's implementation plan and comprising senior DOE and contractor personnel with significant experience in nondestructive assay, continued to meet the plan's milestones and to provide the results of these efforts to the Board.

**Recommendation 2004-1, Oversight of Complex, High-Hazard Nuclear Operations.** All 22 commitments made in the DOE Implementation Plan responding to Recommendation 2004-1 were due to be complete by 2009. However, several commitments were late or had no discernible response from DOE, and the Board was concerned that some previous improvements had degraded as result of changes in management approach and/or neglect. The Board held two public meeting and hearings on the efficacy of DOE's safety oversight to address these concerns. The first public meeting and hearing held on November 12, 2009, examined DOE's commitment to integrated safety management as its core safety management system. Senior DOE and NNSA leadership confirmed their ongoing support for and commitment to integrated safety management. The second public hearing and meeting, held on May 12, 2010, focused on the efficacy of DOE and NNSA's safety oversight programs and the potential impact of significant changes to DOE's directives system envisioned under DOE's safety and security reform effort. The public meetings and hearings were effective in heightening the awareness of senior DOE and NNSA leadership to the need for maintaining effective safety management and oversight systems for defense nuclear facilities. The Board will continue to investigate all aspects of DOE's response to Recommendation 2004-1 in future public meetings and hearings and by



conducting reviews related to key aspects of this recommendation.

**Recommendation 2002-1, *Quality Assurance for Safety-Related Software.*** The Board closed Recommendation 2002-1 on April 14, 2010, based on DOE's progress in establishing the necessary processes for software quality assurance. The Board continued to evaluate the efficacy of quality assurance practices germane to safety-related software throughout the complex.

**Integrated Safety Management.** In addition to oversight activities related to Recommendation 2004-1, the Board continued its reviews of DOE's implementation of integrated safety management (ISM) and associated nuclear safety programs. While the Board noted considerable progress in the implementation of ISM, continued DOE efforts are necessary to maintain ISM systems and ensure continuous improvement across the complex. The Board reviewed the effectiveness of the implementation of ISM in activity-level work planning processes at five sites. The reviews revealed that the ISM programs at the Hanford Tank Farms, Lawrence Livermore National Laboratory, Pantex Plant, Hanford Plateau Remediation, Waste Isolation Pilot Plant, and Idaho National Laboratory have not been fully implemented at the activity level. In all cases, weaknesses were identified in the processes used to analyze activity-level hazards and to provide adequate controls to ensure worker safety. DOE has made efforts to address these weaknesses, but further improvement is needed.

**Leading Indicators for Safety Performance.** Over the last several years, DOE and its contractors have worked to develop and maintain performance-based contractor assurance systems. These systems are typically large databases of performance metrics selected to monitor contractor performance in satisfying DOE's contractual expectations. With the Board's encouragement, DOE and its contractors are beginning to consider whether data in those systems may provide leading indicators for facility safety programs. The Board has suggested a methodology for identifying and using leading indicators for facility safety programs and will continue to encourage DOE and its contractors in their efforts.

**Nuclear Criticality Safety.** The Board conducted nuclear criticality safety reviews in 2010 at the Salt Waste Processing Facility and H-Canyon at the Savannah River Site. The Board also followed progress made by DOE contractors on nuclear criticality safety issues identified in previous years, specifically at the Y-12 National Security Complex and Los Alamos National Laboratory. The Board reviewed nuclear criticality safety evaluations from several sites, including the Nevada National Security Site, Los Alamos National Laboratory, Y-12, Savannah River Site, and Hanford. The Board also reviewed the technical basis for the criticality alarm system at the Y-12 Highly Enriched Uranium Materials Facility. The Board continued to evaluate complex-wide activities as described in DOE's annual report on criticality safety. Each of these reviews confirmed that the various criticality safety programs and associated documentation were adequate, but the Board noted several opportunities for improvement and communicated them to DOE and its contractors.

**Readiness Reviews.** The Board evaluated Startup Notification Reports for defense nuclear facilities under its cognizance and reviewed startup and restart activities accordingly, including the following readiness reviews:

- Highly Enriched Uranium Materials Facility operational readiness review at Y-12.
- Weapons Engineering Tritium Facility operational readiness review at Los Alamos National Laboratory.
- Critical Experiments Facility operational readiness review at Nevada National Security Site.
- Transuranic Waste Processing Center Drum Venting operational readiness review at Y-12.
- Auxiliary Hot Cell Facility operational readiness review at Sandia National Laboratories.
- Barolo subcritical experiments operational readiness review at the Device Assembly Facility at Nevada National Security Site.
- Tritium Processing Station readiness assessment at Lawrence Livermore National Laboratory.

**Conduct of Operations.** The Board reviewed conduct of operations at Hanford in FY 2010. The Board noted weaknesses in work planning and control. The Board plans to follow DOE's efforts to improve work planning and control and conduct of operations at Hanford.

**Justifications for Continued Operations.** The Board continued its review and oversight of DOE's processes and practices associated with the use of justifications for continued operations (JCOs) at defense nuclear facilities. Previously the Board found a number of weaknesses in the JCO process and its implementation at defense nuclear facilities. In response to the Board's concerns, DOE developed and promulgated new and improved guidance in this important safety basis area. The Board will closely follow the implementation and effectiveness of the improved



guidance.

**Safety System Design, Functionality, and Maintenance.** In 2009–2010 the Board continued to conduct reviews of safety system design, functionality, and maintenance at defense nuclear facilities and to follow up on previously identified issues. Throughout FY 2010 the Board interacted with DOE and NNSA to properly disposition the findings from these reviews. As a result of the Board’s involvement, all of the heat source plutonium in vulnerable packaging at Los Alamos National Laboratory has been repackaged into robust containers, and significant safety improvements have been implemented at the laboratory’s tritium facility. The Board conducted safety reviews of the Tritium Processing Station at Lawrence Livermore National Laboratory, the proposed Savannah River Site Enhanced Chemical Cleaning system, the Hanford Tank Farms, and the Barolo subcritical experiment activity at the Nevada National Security Site. A number of important safety issues were identified during these reviews and communicated to DOE for resolution.

**Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers.** Following issuance of Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, the Board inquired about the adequacy of the requirements and criteria in the DOE directives system pertaining to the problems that led to the issuance of the recommendation. The Board reviewed DOE’s responses to its inquiries and concluded that DOE’s requirements were not sufficiently systematic and comprehensive to ensure that (1) documented safety analyses for defense nuclear facilities are prepared such that they demonstrate adequate protection of the public and the workers, and (2) the DOE approval authority ensures the adequacy of the proposed controls for protection of the public and the workers.

**Federal Technical Capability Program (FTCP).** The Board participated in FTCP meetings and activities during FY 2010 to ensure DOE maintained a competent and highly capable workforce at its defense nuclear facilities. The Board reviewed the FTCP’s FY 2010 Operational Plan and provided input on the qualification of expert-level technical personnel. The Board also reviewed all newly issued or revised functional area qualification standards and provided comments to improve them. Through its staff’s interactions with the FTCP, the Board raised the need for DOE to resolve deficiencies in its human factors program and the necessity of alleviating the shortage of qualified individuals to address human factors issues.

**Quality Assurance Management.** In addition to the Board’s activities related to 2002-1, *Quality Assurance for Safety-Related Software*, the Board encouraged and provided feedback to the DOE efforts to improve Commercial Grade Dedication awareness and training within the department, and monitored the DOE Office of Environmental Management’s Corporate Board devoted to continuous improvement of quality assurance program implementation. The Board conducted seven reviews in 2010 involving quality assurance, software quality assurance, and commercial-grade dedication. The Board issued a letter in March 2010 underscoring the issues with the flow down of quality assurance requirements to subcontractors and vendors.

**Safety Culture Improvement Project.** In FY 2008, DOE and its contractors established a jointly sponsored task team to develop tools for assessing and improving the safety culture of the federal and contractor workforces. In FY 2009 and early FY 2010, the tools developed by the task team were piloted at several DOE sites, and lessons learned were incorporated into the tools. Two recurring observations from the pilot efforts were that safety culture improvement must be a long-term initiative, and that a cadre of personnel knowledgeable on safety culture should be available to advise and support the sites during their efforts. As a result, the safety culture task team has been re-chartered to serve in that capacity. Safety culture improvement activities are expected to begin or continue at several DOE sites over the next few years. The Board has been closely observing the team’s efforts and will continue to evaluate and encourage this effort as it continues to mature.

## **E. PERFORMANCE GOAL 5: MANAGEMENT EXCELLENCE**

The Board will strive for management excellence throughout its technical, legal, and administrative staffs.

**OUTCOME:** There will be public confidence that DOE defense nuclear facilities are being operated safely and that the Board's oversight is a positive influence on the safe execution of these activities.

### **FY 2013 Management Excellence Performance Accomplishments**

#### **Performance Goal 5.1: The Board will keep Congress informed on current health and safety issues at DOE defense nuclear facilities and the status of progress toward issue resolution.**

- The Board submitted to Congress its 23<sup>rd</sup> Annual Report for Calendar Year 2012 on February 28, 2013. As required by 42 U.S.C. § 2286e(a), this report describes the Board's current safety initiatives and assesses improvements in the safety of DOE defense nuclear facilities as well as safety problems yet to be resolved.
- On December 24, 2012, and July 15, 2013, the Board provided two periodic reports to Congress and DOE on the status of significant unresolved technical issues concerning the design and construction of DOE's defense nuclear facilities. These periodic reports built on earlier reports to summarize the status of issues previously raised and identified new issues associated with the relevant projects.
- As required by the NDAA for FY 2013, on February 14, 2013, the Board issued its Report to Congress on the Board interpretation of "Technical and Economic Feasibility."

#### **Performance Goal 5.2: The Board will inform the public of issues related to health and safety at defense nuclear facilities.**

- During FY 2013, the Board posted numerous documents to the public website to include the Board's Annual Report, Periodic Reports, weekly Site Representative Reports, letters to DOE regarding safety issues, Board recommendations, Federal Register notices, and notices of Board hearings. The standard was met for posting documents to the public website within 2 working days of the publication date.
- On October 2, 2012, the Board held a public hearing in Knoxville, Tennessee, on factors that could affect the timely execution and safety of the UPF Project. The hearing was made publicly available via a live video stream on the Board's website.
- On March 14, 2013, the Board held a public hearing in Amarillo, Texas, on safety culture and the status of emergency preparedness at the Pantex Plant. The hearing was made publicly available via a live video stream on the Board's website.

**Performance Goal 5.3: The Board will adopt and execute processes and procedures with DOE that are compatible with the Board’s enabling legislation and further the Board’s mission.**

- The Board received briefings on issues by senior DOE officials from the Office of Environmental Management and NNSA in order to continue the dialogue on public health and safety at DOE defense nuclear facilities.
- On August 15, 2013, the Board issued Policy Statement 5, *Policy Statement on Assessing Risk*, which establishes the approach the Board will take to assess risk when making recommendations to the Secretary of Energy.

**Performance Goal 5.4: The Board will implement internal processes and procedures that effectively support the Board’s oversight operations and responsibilities as a Federal agency using OMB and OPM management guidance applicable to small agencies to gauge performance.**

- The Board planned, organized, and held training for Board executives on the new Senior Executive Service (SES) performance system, with an emphasis on how to develop performance plans (including performance standards) that meet OPM requirements for system certification.

**Performance Goal 5.5: Appropriate technical and professional expertise will be recruited and/or trained by the Board to accomplish the mission.**

- The Board continued its recruitment of highly-qualified technical personnel and was able to achieve its goal of utilizing at least 95% of its budgeted FTEs, despite absorbing an 8% reduction to its enacted appropriation as a result of sequestration.

**Performance Goal 5.6: The Board will effectively manage the appropriated financial resources, and exercise responsible stewardship over its resources to meet its needs and accomplish the mission.**

- The Board achieved its seventh consecutive unqualified audit opinion on its FY 2012 financial statements from an independent auditor, as required by the Accountability of Tax Dollars Act of 2002. The auditor found that the Board complied with all applicable federal laws and regulations and had no material weaknesses in its internal controls.

**Performance Goal 5.7: The Board will assign staff to be in residence at selected sites.**

- The Board enhances its on-site safety oversight of DOE defense nuclear facilities by assigning experienced technical staff members to full-time duty at priority DOE sites. Ten full-time site representatives are stationed at five DOE sites: (1) Pantex Plant to oversee nuclear weapons activities, including the weapons stockpile stewardship and weapons disassembly programs; (2) Hanford Site to monitor waste characterization and stabilization and facility deactivation; (3) Savannah River Site to monitor DOE’s efforts to deactivate facilities, stabilize waste materials, and store and process tritium; (4) Oak Ridge’s Y-12 National Security Complex to monitor safety and health conditions at Y-12 and other defense nuclear facilities in the area; and (5) LANL to advise the Board on overall safety

and health conditions at LANL, and to participate in Board reviews and evaluations related to the design, construction, operation, and decommissioning of LANL defense nuclear facilities.

### **FY 2012 Management Excellence Performance Accomplishments**

#### **Performance Goal 5.1: The Board will keep Congress informed on current health and safety issues at DOE nuclear facilities and the status of progress toward issue resolution.**

- The Board submitted to Congress its 22<sup>nd</sup> Annual Report for Calendar Year 2011 on February 17, 2012. As required by 42 U.S.C. § 2286e(a), this report describes the Board's current safety initiatives and assesses improvements in the safety of defense nuclear facilities as well as safety problems yet to be resolved.
- On March 7, 2012, and June 25, 2012, the DNFSB provided two quarterly reports to Congress and DOE on the status of significant unresolved technical issues concerning the design and construction of DOE's defense nuclear facilities. These quarterly reports built on earlier reports to summarize the status of issues previously raised and identified new issues associated with the relevant projects.
- On April 17, 2012, the Chairman testified before the House Armed Services Committee, Subcommittee on Strategic Forces regarding "Safety Oversight of Department of Energy Defense Nuclear Facilities."

#### **Performance Goal 5.2: The Board will inform the public of issues related to health and safety at defense nuclear facilities.**

- During FY 2012, the Board posted numerous documents to the public website to include the Board's Annual Report, Periodic Reports, weekly Site Representative Reports, letters to DOE regarding safety issues, Board recommendations, Federal Register notices, and notices of Board hearings. The standard was met for posting documents to the public website within 2 working days of the publication date.
- On November 17, 2011, the Board held a public hearing in Santa Fe, New Mexico, on Seismic Safety of the Plutonium Facility, Los Alamos National Laboratory. The hearing was made publicly available via a live video stream on the Board's website.
- On March 22, 2012, in Session I, Parts 1 and 2, in Kennewick, Washington, the Board held a public hearing and received testimony from DOE and its contractors concerning the status of actions related to unresolved technical safety issues in the design of the Waste Treatment and Immobilization Plant. The hearing was made publicly available via a live video stream on the Board's website.
- On May 22, 2012, in Session II, the Board received testimony regarding the status of actions related to DOE's implementation plan for the Board's Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant* at the Board's Headquarters in Washington, DC. The hearing was made publicly available via a live video stream on the Board's website.

**Performance Goal 5.3: The Board will adopt and execute processes and procedures with DOE that are compatible with the Board’s enabling legislation and further the Board’s mission.**

- The Board received briefings on issues by senior DOE officials from the Office of Environmental Management and NNSA in order to continue the dialogue on public health and safety at DOE defense nuclear facilities.

**Performance Goal 5.4: The Board will implement internal processes and procedures that effectively support the Board’s oversight operations and responsibilities as a Federal agency using OMB and OPM management guidance applicable to small agencies to gauge performance.**

- The Board implemented its new DN (Technical) Performance Management system during FY 2012 and began revising its SES Performance Management System during FY 2012 with the goal of achieving full OPM certification during FY 2013.
- The Board developed and posted its Operating Practices and Procedures on the Board’s public webpage and intranet.
- The Board occupied second place among 35 small agencies in “The Best Places to Work in the Federal Government 2011” list published by the Partnership for Public Service. This ranking is based on data drawn from the Federal Employee Viewpoint Survey, conducted annually by OPM.

**Performance Goal 5.5: Appropriate technical and professional expertise will be recruited and/or trained by the Board to accomplish the mission.**

- The Board continued its recruitment of highly-qualified technical personnel to reach an on-board strength of 116 personnel, with the remaining four vacancies expected to be filled in early FY 2013.

**Performance Goal 5.6: The Board will effectively manage the appropriated financial resources, and exercise responsible stewardship over its resources to meet its needs and accomplish the mission.**

- The Consolidated Appropriations Act of 2012 provided the Board \$29.130 million in new budget authority. The Board effectively managed its appropriated financial resources and received monthly briefings from senior Board staff on the use of these resources.
- The Board achieved its sixth consecutive unqualified audit opinion on its FY 2011 financial statements from an independent auditor, as required by the Accountability of Tax Dollars Act of 2002. The auditor found that the Board complied with all applicable federal laws and regulations and had no material weaknesses in its internal controls.
- The Board hired an advisory and assistance contractor to perform a risk assessment of Board administrative and program activities and develop a draft FY 2013 audit plan.

**Performance Goal 5.7: The Board will assign staff to be in residence at selected sites.**

- The Board enhances its on-site safety oversight of DOE defense nuclear facilities by assigning experienced technical staff members to full-time duty at priority DOE sites. Ten full-time site representatives are stationed at six DOE sites: (1) Pantex Plant to oversee nuclear weapons activities, including the weapons stockpile stewardship and weapons disassembly programs; (2) Hanford Site to monitor waste characterization and stabilization and facility deactivation; (3) Savannah River Site to monitor DOE's efforts to deactivate facilities, stabilize waste materials, and store and process tritium; (4) Oak Ridge's Y-12 National Security Complex to monitor safety and health conditions at Y-12 and other defense nuclear facilities in the area; (5) LANL to advise the Board on overall safety and health conditions at LANL, and to participate in Board reviews and evaluations related to the design, construction, operation, and decommissioning of LANL defense nuclear facilities; and (6) Lawrence Livermore National Laboratory to perform similar advisory and review efforts.
- The Site Representatives Program provides a cost-effective means for the Board to closely monitor DOE activities, and to identify health and safety concerns promptly by having on-site staff conducting first-hand assessments of nuclear safety management at the priority sites to which they have been assigned. Site representatives regularly interact with the public, union members, congressional staff members, and public officials from federal, state, and local agencies.