FY 2014

BUDGET REQUEST

TO THE CONGRESS

Defense Nuclear Facilities Safety Board

April 10, 2013

GOVERNMENT PERFORMANCE & RESULTS ACT

GPRA Strategic Planning Reporting Requirements

The Government Performance and Results Act of 1993 (GPRA) requires each agency to prepare and submit a strategic plan establishing long-term programmatic, policy, and management goals. The Defense Nuclear Facilities Safety Board's Strategic Plan for FY 2011-2016 has been made available on the Internet at www.dnfsb.gov. In addition, agencies are also required to develop a performance budget with annual performance objectives that indicate the progress toward achievement of the strategic plan's goals and objectives. The Board's performance objectives for FY 2013 and FY 2014, as well as representative accomplishments for FY 2009 through FY 2012, 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 Reports to Congress, which may be reviewed at the Board's Web address (referenced above).

TABLE OF CONTENTS

Section		Page
1.	INTRODUCTION	iii
2.	BUDGET REQUEST SUMMARY	vii
3.	EXECUTIVE SUMMARY	1
4.	FY 2014 BUDGET REQUEST	4
	Exhibit A: Planned or Underway DOE Design/Construction Projects	13
	Exhibit B: The Board's Legislative Mandate	16
	Annual Performance Budgeting Objectives for Fiscal Year 2014	17
5.	PERFORMANCE GOAL 1: SAFE NUCLEAR WEAPONS OPERATIONS	20
	FY 2014 Objectives	22
	FY 2013 Objectives	23
	FY 2012 Accomplishments	24
	FY 2011-FY 2009 Accomplishments	27
6.	PERFORMANCE GOAL 2: SAFE PROCESSING AND STABILIZATION OF NUCLEAR MATERIAL	39
	FY 2014 Objectives	42
	FY 2013 Objectives	43
	FY 2012 Accomplishments	44
	FY 2011-FY 2009 Accomplishments	47
7.	PERFORMANCE GOAL 3: SAFETY IN NUCLEAR FACILITIES DESIGN AND INFRASTRUCTURE	53
	FY 2014 Objectives	58
	FY 2013 Objectives	59
	FY 2012 Accomplishments	60
	FY 2011-FY 2009 Accomplishments	63
8.	PERFORMANCE GOAL 4: EFFECTIVE NUCLEAR SAFETY PROGRAMS AND ANALYSIS	73
	FY 2014 Objectives	74
	FY 2013 Objectives	75
	FY 2012 Accomplishments	76
	FY 2011-FY 2009 Accomplishments	78
9.	PERFORMANCE GOAL 5: MANAGEMENT EXCELLENCE	88
	FY 2014 Target	89
	FY 2013 Target	89
	FY 2012 Accomplishments	92

TABLE OF CONTENTS

Section		Page
10.	FINANCIAL TABLES	95
	Object Class Summary	95
	Exhibit C: Obligations by Fiscal Year	100
	Advisory & Assistance Support Contracts Summary	101
	Technical Contracts Obligations by Fiscal Year	104

1. INTRODUCTION

Defense Nuclear Facilities Safety Board
FY 2014 Congressional Budget Request

APPROPRIATION & EXPENSE SUMMARY

(Tabular in thousands)

OPERATING EXPENSES

	ACTUAL FOR FY 2012	FINANCIAL PLAN FOR FY 2013	BUDGET REQUEST FOR FY 2014
New Budget Authority	29,130*	29,308**	29,915
Obligations	28,690	29,847	30,497
Outlays	26,519	29,250	29,887

* Energy and Water Development and Related Agencies Appropriations Act, 2012, Pub. L. No. 112-74

** Continuing Appropriations Act, 2013, Pub. L. No. 112-175 (annualized amount)

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 2014 Congressional Budget Request

PERSONNEL SUMMARY

	FY 2012 ACTUAL	FY 2013 FINANCIAL PLAN	FY 2014 BUDGET REQUEST
Statutory Personnel Ceiling: (FTEs) [1/]	150	150	150
FTE Usage [2/]	109	119	120
Board Members and Permanent Employees at End of Fiscal Year	116	120	120

1/ National Defense Authorization Act for FY 1992 and FY 1993, Pub. L. 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).

2/ 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 2014 Congressional Budget Request

PROPOSED APPROPRIATIONS LANGUAGE

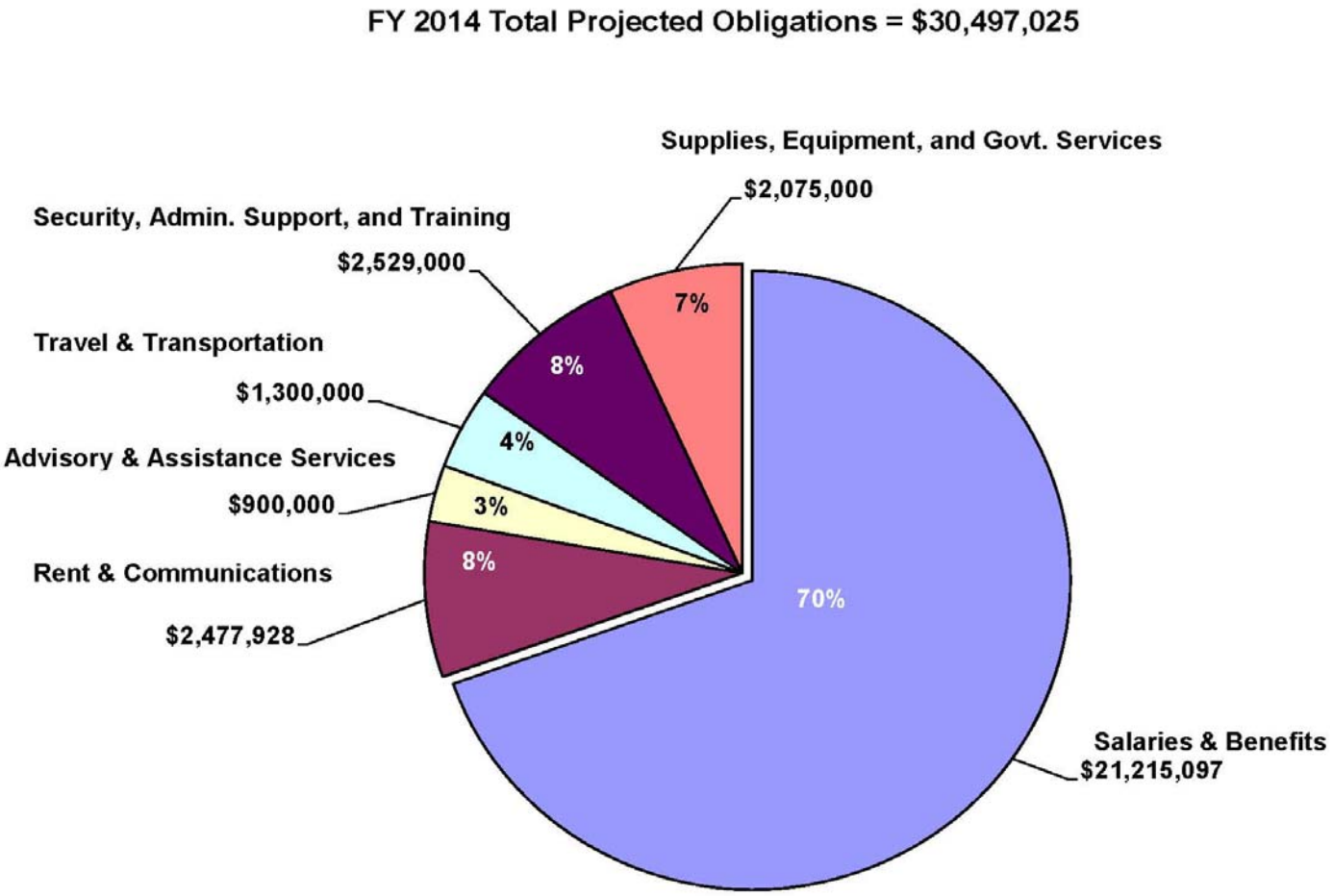
SALARIES AND EXPENSES

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 $29,915,000 to remain available until September 30, 2015.

Note – a full-year 2013 appropriation for this account was not enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 112-175). The amounts included for 2013 reflect the annualized level provided by the continuing resolution.

Defense Nuclear Facilities Safety Board
FY 2014 Congressional Budget Request

FY 2014 TOTAL PROJECTED OBLIGATIONS



2. BUDGET REQUEST SUMMARY

The Board's FY 2014 Budget Request for $29,915,000 and 120 FTEs includes funding for statutory increases in civilian salaries and associated employee benefits (e.g., employer contributions to employee health benefit and retirement accounts, matching Thrift Savings Plan contributions), and increases in Government Services costs offset by net reduction in other 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 2012 President's Budget/Enacted Appropriation	$29,130,000	120	
Funding for the proposed 1.0% civilian pay raise effective in January, 2014 and other salary adjustments. [Note: budget projection based on paying increased salaries and benefits for nine months in FY 2014 for a 1.0% federal pay raise and other salary adjustments.]	$200,000		11
Funding for increases in Government Services. [Note: funding necessary for increases in Department of Homeland Security building security costs and to fund inspector general services.]	$475,000		11
Net funding decreases. [Note: decreased funding necessary due to net cost reductions.]	($300,000)		11
Funding to address a decrease in unobligated balances from the previous year. [Note: additional new budget authority needed for FY 2014 budgeted obligations to make up for a decrease in unobligated balances available as a budgetary resource.]	$410,000		11
Total Additional Funding Requirements in FY 2014 Budget Request.	$785,000		
FY 2014 New Budget Authority	$29,915,000	120	

3. EXECUTIVE SUMMARY

Congress created the Defense Nuclear Facilities Safety Board (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[1] 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 continue 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 2014, the Board is requesting a total of $29,915,000 in new budget authority and 120 FTEs.

The Fukushima Daiichi nuclear disaster and the Deepwater Horizon accident serve as sobering examples of the risks and hazards of what can result from ineffective government oversight. The Government must accept and perform its inherently governmental function to protect the public and workers. 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 continues to require a staffing level of 120 FTEs due to a number of external factors:

1. The Board is performing safety oversight on about a 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 (see Exhibit A) and the Uranium Capabilities Replacement Project (formerly the Uranium Processing Facility) at the Y-12 National Security Complex. The design and construction reviews conducted by the Board on DOE facilities are resource-intensive and time consuming. DOE design and construction projects involve building unique, one-of-a-kind, highly complex facilities that often incorporate leading-edge technologies that require safety-related controls. However, completing these safety reviews beginning at the earliest stages of design is the key to preventing safety flaws in design and construction 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 is decades long. 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 carefully 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.

[1] 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."

3. A recent DOE/IG Audit Report (DOE-IG-0881, February 2013) entitled "National Nuclear Security Administration Contractor Governance," reviewed the effectiveness of a National Nuclear Security Administration (NNSA) 2007 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 years of effort, NNSA and its support offices and site contractors have not yet implemented fully functional and effective contractor assurance systems. One specifically troubling concern was the recognition that contractor self-assessments were not effective in identifying safety weaknesses subsequently identified by independent reviews and that the 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. NNSA has developed a plan for maintaining and evolving the nuclear weapons stockpile and infrastructure including a series of life extension activities that will enhance stockpile safety, security, and effectiveness without additional underground nuclear tests. This initiative requires a commensurate degree of safety oversight by the Board, especially in light of the production pressures associated with life extension programs.

6. In addition to the focus on specific DOE activities as noted above, the Board needs to continue its oversight of operations throughout the DOE defense nuclear complex to ensure continued safe operations. 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 activities to address the radioactive legacy of nearly 70 years of these operations. Continued effective oversight is the only way the Board can identify potential safety problems early and advise the Secretary of Energy in order to ensure adequate protection of public and worker safety at DOE's defense nuclear facilities.

7. The National Defense Authorization Act (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 mandates 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 requires 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 Inspector General (IG) in accordance with the Inspector General Act of 1978 by October 1, 2013. In addition to the increased new budget authority necessary to fund the IG services (see page 11), these changes will have a significant workload impact on the Board.

The Board's FY 2014 Budget Request supports the successful effort that began with the FY 2009 Budget Request to increase the Board's staff to meet its scope of oversight responsibilities. This approach received support as evidenced by the President's budget submissions. The Board's on-board strength at the time of this submission is 117 personnel, with the remaining three positions expected to be filled in FY 2013. This FY 2014 Budget Request includes funding for 120 FTEs for FY 2014 (i.e., maintaining personnel strength at 120).

The cost of re-engineering and making 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, 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 while corrections are made. 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 2013 budget request included obligations of $5.5 billion and $7.6 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 to the Secretary, Recommendations, and periodic reports to Congress and the Department of Energy on the identification and status of significant unresolved issues between the Board and DOE.

In line with Congressional direction, the Board believes it is prudent to proactively address DOE safety issues. To do so, the Board needs the resources requested. The Board's requested FY 2014 budget of $29,915,000 in new budget authority and 120 FTEs is necessary to 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, and address Congressional concerns.

4. FY 2014 BUDGET REQUEST

FY 2014 Request Summary	*Permanent Positions*	*FTE*	*Amount ($000)*
FY 2012 Actual	116	109	$29,130
FY 2013 Budget Request	120	120	$29,415
FY 2014 Budget Request	120	120	$29,915
Total Change 2012-2014	0	0	$ 785

The DNFSB Mission

The mission of the Board 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 the 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 constitutes 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 the 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 at our 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 maintains Site Representatives at six of the sites and maintains a cadre of technical staff at its Headquarters that is organized to perform oversight roles as required. Over 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 necessary to feed high-level waste to the plan 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, while containing 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 in and after earthquakes, extreme winds, floods, lightning, wild land 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 errors, 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

The Board published an updated strategic plan for FY 2011 through FY 2016. Technical Nuclear 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 focuses its Technical Nuclear Safety Oversight through four interdependent strategic goals:

Strategic Goal # 1: Safe Nuclear Weapons Operations

Strategic Goal # 2: Safe Processing and Stabilization of Nuclear Material

Strategic Goal # 3: Safety in Nuclear Facilities Design and Infrastructure

Strategic Goal # 4: Effective Nuclear Safety Programs and Analysis

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

Strategic Goal # 5: Management Excellence

Human Capital - The Board's Greatest Asset

Seventy 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 23 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 total workforce, with the remainder comprised of administrative and legal staff. Between FY 2007 and FY 2012, the technical staff increased by 22 people. During this same period, the administrative support staff gained two employees and the legal staff 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).

Keeping 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; 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 16 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 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 a highly 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 3-year service commitment to the Board. The Board met its goal of recruiting two additional people into the program in FY 2012, and has a total of eight in the program at various stages of development.

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 2013 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 and legacy waste cleanup for applicability to the Board. A summary follows.

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.

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 2014, the Board will be required to expend considerable resources to review ongoing design efforts, as well as construction and startup activities.

Expedited DOE Safety and Security Reform Initiative

DOE Order 251.1C, *Departmental Directives Program*, was approved in January 2009. This directive codifies a set of principles for the DOE directives system intended to simplify and clarify requirements, reduce redundancy and unnecessary burden, and support improved management and mission accomplishment as outlined in a memorandum issued by the Secretary of Energy on September 10, 2007. Because DOE Order 251.1C establishes the framework for the entire directives system, it affects all DOE safety directives.

In 2010, the directives improvement effort was redirected by the Deputy Secretary of Energy's announcement of a *2010 Safety and Security Reform Plan* that would, among other things, eliminate half of the DOE's Office of Health, Safety and Security (HSS) directives in a six-month period. This led to an exchange of correspondence between the Board and DOE, and was discussed at public meetings held by the Board on May 12, 2010, and May 25, 2011. DOE has revised its reform plan and brought a parallel effort by the National Nuclear Security Administration into compliance with the reform plan, satisfactorily addressing the Board's concerns about the need for a rigorous and comprehensive approach for revising safety directives.

DOE's directives revision effort continues to occupy a significant portion of the Board's resources. As DOE reissues its directives to comply with the new program, the Board is reviewing all of them to ensure health and safety requirements are properly included. The Board has viewed this initiative as an opportunity to maintain and *strengthen* directives important to safety at DOE's defense nuclear facilities. DOE is also beginning to implement many of the directives at its field locations. The Board expects to continue expending considerable effort ensuring that implementation of the revised safety directives does not reduce the level of safety provided at DOE's defense nuclear facilities.

Additional Funding Needs

The Board's budget request includes funding to pay for a the proposed January 2014 Federal pay raise and funding necessary to pay for projected increases in Government Services costs not included in the President's FY 2013 Budget. An explanation of each requirement and associated funding impact and object class (OC) is discussed as follows:

- **Fully Fund the Salaries and Benefits Account for FY 2013 (OC 10)**

The Board's budget request includes an additional $200,000 to fund the proposed FY 2014 civilian pay raise of 1.0 percent and other projected salary adjustments.

- **Funding for Increased Government Services Costs (OC 25.3)**

The FY 2012 President's Budget included $370,000 for building security costs based on the estimate provided by the Department of Homeland Security (DHS). The Board's actual costs for FY 2012 were $422,013, and the FY 2013 estimate from DHS is $430,000. The Board is estimating $445,000 for FY 2014, a $75,000 increase from FY 2012.

The Energy and Water Development and Related Appropriations Act of 2012 (contained in the FY 2012 Consolidated Appropriations Act) mandated that the Board enter into an agreement to obtain inspector general services from the Nuclear Regulatory Commission (NRC) for fiscal years 2012 and 2013. The FY 2012 President's Budget did not include funding for these services. Despite its best efforts, the Board was unable to reach agreement with NRC to provide inspector general services in FY 2012. In the interim, the Board contracted for a risk assessment and draft FY 2013 audit plan from a firm composed of personnel with extensive federal inspector general experience. Based on the FY 2013 National Defense Authorization Act and Congressional FY 2013 appropriations committee language, the Board is expecting there to be a continued requirement in FY 2014 to obtain inspector general services from a federal agency. Based on its discussion with NRC and other agencies in FY 2012 on a reasonable scope of effort for such services, the Board estimates it will need a minimum of $400,000 to fund such services, for a total increase of $475,000 in Government Services costs in FY 2014.

The Board is able to defray $300,000 of these additional costs with reductions in other areas. However, with 70 percent of the Board's budget dedicated to paying for staff salaries and benefits, absorbing the balance would force the Board to reduce staffing levels.

- **Funding to Offset a Reduction in Carryover Available as a Budgetary Resource**

The Board's requested budgetary resources included in the President's FY 2012 Budget included $1.094M in unobligated balance from the previous fiscal year, i.e., $1.094M (in lieu of new budget authority) was to be used to fund budgeted obligations. The Board is currently projecting a carryover of unobligated balances of $611K from FY 2013 into FY 2014, a difference of $483K. Consequently, in order for the Board to have available budgetary resources match the same baseline level as FY 2012, before even considering additional costs such as higher personnel costs due to the proposed pay raise, it requires new budget authority of $483K simply to make up the difference. Of this amount, $73K can be offset by additional recoveries

of prior year obligations, leaving a balance of $410K. Without this additional new budget authority, the Board would have to reduce its obligations by the same amount which would equate to a reduction of approximately 2–3 FTEs.

Conclusion

The Defense Nuclear Facilities Safety 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 2014, the Board is requesting a total of $29,915,000 in new budget authority, and 120 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 $29.915 million in new budget authority and 120 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 Daiichi 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 dwarf even 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 Daiichi 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 2012		
			Critical Decision Approved	Design Completion[2]	Construction Completion[3]
Hanford Site	**Waste Treatment and Immobilization Plant**	12,263			**(*Operational 2019*)**
	a. Pretreatment Facility		CD-3	82% (Final Design)	42%
	b. High-Level Waste Facility		CD-3	89% (Final Design)	42%
	c. Low-Activity Waste Facility		CD-3	87% (Final Design)	72%
	d. Analytical Laboratory Facility		CD-3	85% (Final Design)	87%
	e. Balance of Facilities		CD-3	79% (Final Design)	65%
	K-Basin Closure Project Sludge Treatment	280	Phase 1: CD-1 Phase 2: CD-0	Phase 1: 85% (Final Design) Phase 2: 33% (Conceptual Design)	Phase 1: 10% ***(Operational 2015)*** Phase 2: ***(Operational to be determined)***
	Waste Feed Delivery System	660	Not formally implementing CD process.	Various degrees of completion.	Various degrees of completion and operations
	Tank Waste Supplemental Treatment Project	110-310	Not formally implementing CD process.	100% (Conceptual Design)	***Operational 2018*)**
	Interim Hanford High-Level Waste Storage Project	90-240	Not formally implementing CD process	80% (Conceptual Design)	***(Operational 2018-2019)***
Idaho National Laboratory	**Integrated Waste Treatment Unit Project (IWTU)**	570.9	CD-4	100% (Final Design)	100% ***(Operational 2013)***

[2] The statistics referenced on this table were provided by DOE and are reported in the Board's December 24, 2012 Periodic Report to Congress.
[3] Ibid.

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

SITE	FACILITY	TOTAL PROJECT COST ($M)	STATUS – December of 2012		
			Critical Decision Approved	Design Completion[2]	Construction Completion[3]
Idaho National Laboratory	**Calcine Disposition Project**	900-2,000	CD-0	< 30% (Conceptual Design)	Will utilize portions of IWTU ***(Operational 2022)***
Los Alamos National Laboratory	**Chemistry and Metallurgy Research Replacement Project - Nuclear Facility[4]**	3,710-5,860 (Undergoing DOE Review)	CD-1	70% (Final design)	Some ground work (***Operational to be determined***)
	Plutonium Facility (PF-4) Seismic Upgrades	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
	Upgrades to Pit Manufacturing Capability at the Plutonium Facility (Technical Area-55)	Annual funding	Not formally implementing critical decision process	Various degrees of completion	Work ongoing
	Radioactive Liquid Waste Treatment Facility Upgrade Project—Transuranic Waste Processing Facility	202-270	CD-1	0% (Preliminary design)	(***Operational 2020***)
	Transuranic Waste Facility Project	71-124	Phase A: CD-3 Phase B: CD-1	Phase A: 100% (Final Design) Phase B: 90% (Final Design)	Phase A: 85% Phase B: 0% (***Operational 2015 – 2018***

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

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

SITE	FACILITY	TOTAL PROJECT COST ($M)	STATUS – December of 2012		
			Critical Decision Approved	Design Completion[2]	Construction Completion[3]
Oak Ridge National Laboratory	**Transuranic Waste Processing Center Sludge Project**	50	CD-1	17% (Final Design)	***(Operational 2018)***
Savannah River Site	**Salt Waste Processing Facility**	1,340	CD-3	99% (Final Design)	65% **(*Operational 2015*)**
	Waste Solidification Building	345	CD-2/3	100% (Final Design)	84% ***(Operational 2013)***
Y-12 National Security Complex	**Uranium Capabilities Replacement Project**	4,200-6,500	CD-1	77% (Final Design)	***(Operational 2023)***

Exhibit B: The Board's Legislative Mandate

The Board's specific duties and responsibilities are delineated in its enabling statute, 42 U.S.C. § 2286, *et. seq.*, 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.

Annual Performance Budgeting Objectives for Fiscal Year 2014

The Defense Nuclear Facilities Safety Board (Board) is an independent, Executive Branch federal agency charged by statute with providing technical safety oversight of the Department of Energy's (DOE) defense nuclear facilities and activities in order to protect the health and safety of the public.

The Board's Strategic Plan presents the four Technical Nuclear Safety Oversight performance goals, summarized below, from which annual performance objectives are derived.

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.

2. **Safe Processing and Stabilization of Nuclear Material:** The processing, stabilization, 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.

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.

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.

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

5. **Management Excellence:** Management excellence in support of the Board's mission.

Each of these five performance goals is reviewed in the sections that follow.

To facilitate strategic management, the Board has organized its technical staff into four groups. The Group Lead of each group is assigned responsibility for one of the four technical performance goals in the strategic plan, and for executing the performance objectives associated with that goal. As required by Office of Management and Budget guidance governing compliance with the Government Performance and Results Act of 1993, the Board has produced measurable performance goals for FY 2013 and FY 2014 that, when executed, will demonstrate continued progress toward the Board's goals. These annual performance objectives and measures establish projected levels of performance and reflect the nature of the Board's independent oversight function.

The Board's objectives as outlined in its strategic plan address multi-year efforts and encompass a broad spectrum of technical areas relevant to the safety of DOE's defense nuclear mission. This submission includes the Board's *Annual Performance Plan for FY 2014*, which identifies annual performance objectives that consist of technical issues to be evaluated in support of the Board's strategic plan, the identification of specific candidate topics for these reviews and annual performance objectives and targets for the management excellence goal. An outcome measure for each objective is described as part of the discussion of each annual performance goal. Assessments of the outcome associated with each annual performance goal are provided in the Board's annual performance reports.

The Board measures progress toward achieving each annual technical performance goal in three stages by evaluating:

- DOE's acknowledgment that a safety enhancement is needed after the Board communicates the results of its technical reviews;

- DOE's subsequent development of appropriate corrective actions to resolve the Board-identified safety issue; and

- DOE's implementation of the necessary corrective actions, leading to the successful resolution of the safety issue and resulting in improved protection of the public, the workers, and the environment.

The basis of measurement for the qualitative assessment includes formal correspondence from DOE and its contractors, the Board's correspondence, reports from the Board's staff, public testimony by DOE and contractor personnel, and other sources. Past reporting (see the Board's Annual Reports to Congress) of Board-identified issues and associated DOE responses demonstrates that the Board has a sustained, clear, and substantial positive impact on the safety of DOE's defense nuclear activities.

Because of the variability of DOE's plans and schedules, some candidate areas identified in the Board's annual performance plan may not be addressed during a performance period. However, the Board's annual performance report will document that an equivalent level of effort was expended in support of the strategic objective, and describe the alternative area that was selected for review.

To facilitate an integrated review, the tables in the four technical performance goals that follow are formatted to show the flow-through from the general objective set forth in the Board's Strategic Plan to the specific Annual Performance Objectives for FY 2013 and FY 2014. To place this planning information in context, the performance goals are followed by examples of the Board's accomplishments during the years FY 2009 through FY 2012, as required by OMB's instructions on preparing and submitting a performance budget. (Note: the strategic plan slightly revised the titles and outcomes of the four technical program goals beginning in FY 2011; the former titles and outcomes are used for the FY 2009 and FY 2010 performance accomplishments. For example, Performance Goal 1 "Nuclear Weapon Operations" was changed to "Safe Nuclear Weapons Operations.")

A comprehensive assessment of progress during Calendar Year (CY) 2012 appears in the Board's *Twenty-Third Annual Report to Congress*. The Board's annual performance reports are available for review on the Internet at www.dnfsb.gov under the *Board Activities/Reports/Reports to Congress* headings.

5. 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.

SUMMARY:

Focused oversight of nuclear weapon activities at the Pantex Plant, in response to stockpile reduction initiatives, life extension programs, and stockpile surveillance requirements, will continue to be a major priority for the Board in FY 2014. DOE's effort to address the seismic vulnerability of the Los Alamos National Laboratory (LANL) Plutonium Facility will be one of the Board's highest priority activities in FY 2014. Ongoing operation of aged facilities at the Y-12 National Security Complex (Y-12), in parallel with the design, construction and transition into the modern Uranium Capabilities Replacement Project, will likewise need significant safety oversight activities by the Board. Other key areas of safety oversight for the Board in FY 2014 will include:

- *Nuclear Explosive Operations*—DOE's efforts to maintain an increased operational tempo at Pantex are expected to continue, due to life extension programs for aging weapon systems and dismantlement of weapons when they are retired as the nuclear weapons stockpile is reduced. DOE has begun to look at improving its tooling and nuclear explosive operating processes for all weapons in the enduring stockpile and dismantlement programs to incorporate the best "safety by design" technology.

- *Y-12 Modernization*—The Board will need to carefully evaluate the continued safety of operations at Y-12, particularly the need for system upgrades and improved maintenance practices to preserve safety in aging facilities that are overdue for replacement. Safety oversight is also needed for activities required to prepare to transition enriched uranium operations from existing facilities to the Uranium Capabilities Replacement Project.

- *Nevada National Security Site (NNSS) Nuclear Activities*—The Board will provide continued oversight of subcritical experiments expected to be conducted at NNSS in support of nuclear weapon programs. In addition, the Nation's single capability to perform nuclear criticality experiments has been moved from LANL to NNSS. The Board will be required to assess the safety of criticality operations and experiments at NNSS.

- *Safety Upgrades at the National Laboratories*— Recent reviews by the Board at LANL, Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories (SNL) found deficiencies in the authorization bases and safety programs at associated nuclear facilities. Progress is being made, but resolution of the underlying safety-related deficiencies still requires effort by DOE and the National Nuclear Security Administration (NNSA), and the safety of operations at the laboratories will require continued Board oversight. In particular, significant improvements in safety analysis and safety-related structures, systems, and components are needed at LANL to implement the Board's Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, and to address seismic vulnerabilities identified as a result of an updated probabilistic seismic hazard analysis completed for the site.

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 2014 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 CFR 830).
- Cross-cutting functional areas such as legacy material disposition, nuclear criticality safety, fire protection, emergency management, 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, B61, W78, 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).
- Modernization plans and infrastructure upgrades at Y-12 and LANL.
- 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).
- Risk mitigation activities for continued operations in aging facilities that are deferred from the scope of the Uranium Capabilities Replacement Project.
- Development and implementation of upgrades to address seismic vulnerabilities identified by the Seismic Analysis of Facilities and Evaluation of Risk (SAFER) analyses for the LANL Plutonium Facility, and implementation of Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*.
- Startup of additional transuranic waste disposition operations at LANL.
- Corrective actions to strengthen institutional safety programs and infrastructure at LANL, LLNL, and SNL including reviews of the fire protection, nuclear criticality safety and software quality assurance programs at LANL.
- Subcritical experiments at NNSS.
- Operation of the National Criticality Experiments Research Center at NNSS.
- Fire suppression system improvements at the Device Assembly Facility at NNSS.
- Potential nuclear explosive operations at the Device Assembly Facility at NNSS.
- Safety basis for the Annular Core Research Reactor at SNL.
- Post de-inventory safety posture at LLNL.

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 2014.

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 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 CFR 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 (SAFER) 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 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 wild-land 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 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 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 CFR 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 response 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 safety 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 NNSS.

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.

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 2009 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.

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 four Integrated Nuclear Planning workshops this fiscal year and believes the process is effective and continues to improve.

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. Postulated accident scenarios involving these drums predict high consequences to the public because of their radiological loading, the proximity of the storage area to the site boundary, and the lack of robust engineered controls. 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. Preparations are underway to vent the remaining drums to allow processing and disposal.

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. In response to the Board letter, NNSA committed to modifying procedures and retraining facility staff at LANL to ensure that MASS is not used to determine compliance with criticality safety limits. NNSA also stated that the Los Alamos Site Office (LASO) would review this issue during planned assessments. Overall, the actions that were taken by LANL 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 Plutonium Facility Confinement Ventilation. The decade-old safety basis for the Plutonium Facility credits 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*, an evaluation of the facility's confinement strategy was conducted along with a parallel effort to develop a new safety basis for the facility. The Board issued DOE a reporting requirement on January 13, 2009, to follow through on the DOE's commitment to deliver the Ventilation System Evaluation Report to the Board (originally due December 21, 2006) and provide Program Secretarial Office concurrence with and approval of the upgrades in coordination with the Central Technical Authority (originally due March 20, 2007). In its June 16, 2009, response, DOE asserted that some modifications identified as needed in the confinement ventilation evaluation may have subsequently been determined to be unnecessary to meet the overall safety strategy and goals under the final approved documented safety analysis. The DOE response contained inconsistencies regarding the course of action to address the scenario of a seismic event followed by a fire. The Board is continuing to engage DOE to ensure support for improvements to the safety posture of defense nuclear facilities is appropriate and timely.

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. In response, the laboratory developed a plan to repack or overpack all questionable containers into robust packaging by June 2010.

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, changes were made 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, with the result that LANL developed a detailed Plan of Action for a formal contractor Readiness Assessment that will also include significant Federal oversight.

Nuclear Explosive Safety. The Board evaluated 9 Nuclear Explosive Safety (NES) studies or change evaluations conducted at Pantex, including Master Studies of Pantex Special Purpose facilities and Support Activities. In a letter dated December 12, 2008, the Board identified shortcomings in the current NES process, including the designation of findings that must be addressed before or after nuclear operations are allowed to continue or start. In response, NNSA held a workshop to discuss these shortcomings and is pursuing actions to address the Board's concerns.

Revised Nuclear Explosive Safety Directives. In response to changes in operational and organizational realities and observations communicated by the Board, DOE completed the revision and implementation of key nuclear explosive safety directives, including DOE Order 452.1C, *Nuclear Explosive and Weapon Surety Program*; DOE Order 452.2C, *Safety of Nuclear Explosive Operations*; and DOE-STD-NA-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*.

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 2009, the Board reviewed the design laboratories' implementation of the standard and closed Recommendation 98-2 based on the finding that each laboratory had developed a process that would meet the standard.

Lightning and Electrostatic Discharge Protection at Pantex. The Board issued a letter on March 30, 2007, identifying that work remained to adequately address the hazards posed by the indirect effects of a lightning strike on Pantex facilities. DOE responded by forming the Nuclear Weapons Complex Electromagnetics Committee to analyze both lightning and electrostatic discharge (ESD) hazards. The Committee has begun to execute a plan to systematically address the Board's concerns and to improve the safety of operations at Pantex relative to lightning and ESD hazards. In FY 2009, the concern for concrete spalling was addressed, and testing for intrinsic bonding in nuclear explosive facilities was initiated. The Board has engaged experts in the field of lightning effects to verify DOE's analyses.

Pantex Procedures. In 2009, the Board completed a series of onsite reviews and provided immediate feedback to Pantex on areas where immediate improvements could be made in nuclear explosive operating procedures. Pantex took action to address the deficiencies identified during the reviews.

W76 Restart at Pantex. On August 8, 2008, the Board issued a letter detailing concerns with the process DOE used to authorize restarting W76 nuclear explosive operations following a safety-related work suspension. The Board reviewed the technical basis for the controls that were put in place to address the hazards that caused the work suspension and determined the controls were adequate to ensure public health and safety.

Pantex Safety Basis. In a letter dated July 30, 2007, the Board identified issues with the Pantex safety basis, including the treatment of beyond design basis accidents, the level of detail in some technical safety requirements, and a systematic lack of timeliness in declaring potential inadequacies in the safety basis. In December 2008, DOE began work to upgrade the safety basis at Pantex by reviewing all Technical Safety Requirements and recategorizing all Specific Administrative Controls to be consistent with DOE-STD-1186-2004, *Specific Administrative Controls*. The Board is reviewing the progress of this initiative and its impact on nuclear explosive operations.

Pantex Training and Qualification. The Board conducted a review of training and qualification procedures at Pantex. The Board issued a letter on July 8, 2008, noting concerns with the DOE program for providing weapons training units sufficient to conduct high fidelity training and with the lack of design agency training for Pantex employees on specific skills critical to nuclear explosive operations. DOE developed a program to periodically review the training needs of each weapon program and incorporate provision of high fidelity trainer units into the budget. In FY 2009, Pantex completed this review on several programs.

Pantex Tooling Review. In 2009, the Board completed a review of the Pantex tooling program and provided immediate feedback on the strengths and weaknesses of the administrative procedures that govern the tooling program.

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, some activities were placed on hold until work planning problems could be resolved and corrected.

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, evaluations were strengthened and weaknesses identified during an extent of conditions review were corrected.

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 2009 and found no issues that would impact the plan to begin operations in FY 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 began a campaign to review all procedures authorized for use during nuclear operations for potential improvements, including identifying the appropriate use category for each procedure.

Continued Operations of the Enriched Uranium Operations Building. Due to concerns over NNSA's ability to safety 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 two annual reports (in March 2008 and March 2009) that included specific actions NNSA has planned and taken to improve the safety posture of the Enriched Uranium Operations Building.

Work Planning and Control at LLNL. As part of the implementation plan for the Board's Recommendation 2004-1, *Oversight of Complex, High-Hazard Operations*, DOE promulgated a document in 2006 that provided the attributes and best practices of a successful work planning and control process. LLNL recently issued revised work planning processes for the laboratory as a whole and the Nuclear Materials Technology Program nuclear facilities. These processes were developed to meet the guidance document.

NNSS Device Assembly Facility (DAF) Fire Suppression System. In 2008, the Board determined that DAF had significant weaknesses in the fire suppression system, weaknesses that should be corrected before beginning more hazardous operations. In response, NNSA initiated an improvement project for the fire suppression system to assess the condition of the system, analyze and prioritize needed improvements, and plan to improve the system. In FY 2009, NNSA evaluated the results of the condition assessment, developed improvement options, presented a path forward, and began improvements to the system.

Readiness to Dispose of a Damaged Nuclear Weapon or Improvised Device at NNSS. NNSA is developing 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. The Board expects the new plan to be available in 2010. As a result of the Board's interactions and discussions in FY 2009, NNSA continued to complete some facility improvements and implement the results of the cost/risk benefit analysis of proposed controls and improvements. FY 2009 improvements have focused on significant occupational safety issues, e.g., tunnel ventilation.

Criticality Experiments in DAF. NNSA has been preparing for Criticality Experiment Facility 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. In FY 2009, the Board reviewed construction activities and the re-build and testing of the four machines. The Board will evaluate startup activities in 2010.

6. 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.

SUMMARY:

The Department of Energy continues significant stabilization and cleanup work at sites throughout the defense nuclear complex, in some cases in response to recommendations and other formal correspondence from the Board. The most significant activities are described below:

Integrity of High-Level Waste Tanks—DOE stores more than 50 million gallons of radioactive waste in high-level waste tanks at Hanford. Many of the old single-shell tanks have been known to leak. For this reason, liquids in those tanks had been mostly removed and transferred to newer double-shell tanks. These double-shell tanks were expected to remain sound until the wastes were eventually retrieved and immobilized for disposal. However, DOE identified a slow but continuing leak from the primary, or inner tank, of a double-shell tank, AY-102, in August 2012. The Board has been closely following DOE's plans for dealing with the leak and DOE's evaluations of other tanks containing similar waste, as well as the potential impact on the overall waste retrieval and treatment strategy.

Ventilation Systems for High-Level Waste Tanks—The Board issued Recommendation 2012-2, *Hanford Tank Farms Flammable Gas Safety Strategy*, to reduce the risk posed by flammable gas in the high-level waste tanks. The Secretary of Energy accepted this recommendation on January 7, 2013, and the Board is closely following DOE's progress in developing an implementation plan for this recommendation.

Nuclear Material Stabilization per Board Recommendation 2000-1—DOE has five commitments that remain open under the Implementation Plan for Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*. These commitments relate to the disposal of unsheltered containers at Los Alamos National Laboratory (LANL), other plutonium-bearing materials at LANL, and highly radioactive sludges at the K West Basin at the Hanford Site. DOE is working to complete and issue a coordinated plan that will address the five open commitments providing a path toward the closure of Recommendation 2000-1.

The K West Basin at the Hanford Site contains highly radioactive sludge that requires careful retrieval, stabilization, and disposal. DOE's most recent plans identify December 2015 as the new date for completing removal of the sludge from the K West Basin. DOE is nearing completion of the final design for removing the sludge from the basin and transporting it to Hanford's central plateau for interim storage. DOE has also examined options to stabilize and package the sludge once it is removed from the basin. The Board plans to follow the resolution of a number of issues it raised with the design for removing the sludge from the basin.

Spent Nuclear Fuel—DOE's decision to delay the processing of foreign and domestic research reactor spent nuclear fuel in H-Canyon at the Savannah River Site (SRS) may require the storage of these fuel assemblies for up to 50 years in L-Basin. In addition to research reactor spent nuclear fuel, L-Basin contains a wide variety of aluminum alloy and uranium oxide-based spent nuclear fuel, some of which has been cut or damaged during post-irradiation analyses. The inventory of damaged or degraded spent nuclear fuel currently stored in oversize isolation canisters in L-Basin poses a number of potential safety issues. The Board issued DNFSB/TECH-38, *Storage Conditions of Reactive Metal Fuel in L-Basin at the Savannah River Site*, that provides more detail on these potential issues.

Nuclear Material Packaging per Board Recommendation 2005-1—The Board issued Recommendation 2005-1, *Nuclear Material Packaging*, 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 robust 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 continues to work with DOE to ensure that procedures are established to certify these containers for storage of plutonium-based materials at DOE sites other than LANL.

Disposition of Surplus Nuclear Material—DOE made a decision in early 2011 to stop processing nuclear materials through H-Canyon and HB-Line. DOE later changed its plans and recommended that the H-Canyon/HB-Line be used to process non-pit plutonium for the Mixed-Oxide (MOX) Fuel Fabrication Facility under construction at SRS. Besides this plutonium mission, DOE has only authorized concurrent use for additional nuclear materials stabilization of a minor portion of the spent nuclear fuel at SRS, leaving the vast majority of this fuel and many other surplus nuclear materials with no established plan for disposition. DOE will be starting the plutonium mission in FY 2013. The Board is evaluating the safety of DOE's disposition pathways for nuclear materials as well as the long-term storage conditions of materials with no disposition paths.

High-Level Waste (HLW) Retrieval and Processing—DOE continues HLW retrieval and treatment activities, while facing the attendant hazards of extremely radioactive liquids, salts and sludges, old systems and equipment, and poorly characterized waste conditions. Workers at the Hanford Site, SRS, and the Idaho Cleanup Project continue decades-long projects to retrieve and treat wastes from tanks that date as far back as the World War II-era Manhattan Project. Large new facilities needed to treat and dispose of the wastes are in various states of design, construction, and commissioning—most notably the Waste Treatment and Immobilization Plant at the Hanford Site, the Integrated Waste Treatment Unit at the Idaho Cleanup Project, and the Salt Waste Processing Facility at SRS. The Board is performing close oversight of DOE's waste

retrieval operations, as well as DOE's implementation of programs, such as the waste transfer system integrity program at Hanford, to ensure the safety of existing operations. The Board also oversees the development, design, and construction of planned supplemental treatment facilities at Hanford. The Board continues to work closely with DOE's tank expert panels as they plan corrosion and structural testing to understand the factors affecting HLW tank integrity. These activities will require close oversight by the Board.

Transuranic (TRU) Waste Management—Several sites within the DOE defense nuclear complex store large quantities of contact-handled (lower activity) and remote-handled (higher activity) TRU wastes on concrete pads and in soil-covered trenches. DOE has been retrieving these wastes for shipment to the Waste Isolation Pilot Plant (WIPP) for disposal. DOE has completed shipping most of the lower activity TRU wastes from Oak Ridge National Laboratory (ORNL) and SRS to WIPP. What remains at these two sites are drums and boxes of waste containing items prohibited by the WIPP waste acceptance criteria and other hazardous materials that pose a greater risk to the workers and considerably slow the retrieval work. Current shipments to WIPP include TRU wastes from Idaho, LANL, and SRS. The Board will continue to provide oversight for these hazardous operations.

Deactivation and Decommissioning of Facilities—DOE's Office of Environmental Management continues to deactivate and decommission nuclear, radiological, and industrial facilities in the DOE complex. This work includes activities such as stabilizing materials, removing radiological, chemical, or hazardous materials, shutting down systems and equipment, and dismantling or demolishing equipment and structures to achieve final disposition end-states. Facilities where DOE expects to do deactivation and decommissioning work in FY 2013 and FY 2014 include the Plutonium Finishing Plant at Hanford and Building 235-F at SRS, per Board Recommendation 2012-1, *Savannah River Site Building 235-F Safety*. The Board intends to continue oversight of these and other high-hazard work activities.

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 2014 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, improved packaging, 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.
- 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:

- Plutonium oxide production at H-Canyon and HB-Line.
- H-Canyon and HB-Line life extension activities.
- Operation of plutonium blending and packaging systems at 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 startup preparations for the Salt Waste Processing Facility (SWPF).
- Operation of HLW facilities at SRS including Saltstone and the Defense Waste Processing Facility.
- Upgrades of SRS HLW facilities, including connections to SWPF.
- Bulk waste removal and cleaning of HLW tanks at Hanford and SRS.
- Leak monitoring of Hanford single-shell and double-shell tanks
- 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. (Recommendation 2012-2)
- Operations at the Integrated Waste Treatment Unit at INL.

Safe management of transuranic wastes:

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

Deactivation and decommissioning activities:

- Deactivation and decommissioning work at defense nuclear facilities.
- Reduction of material at risk and deactivation of Building 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 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 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 standdown 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 contactor 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.

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 2009 Performance Accomplishments

Electrical Systems at the Plutonium Finishing Plant (PFP). In late 2008, the Board reviewed the PFP life extension program for electrical systems and assessed the condition of select safety-related electrical equipment and cables. Several deficiencies were noted. The Board is continuing to evaluate DOE's work to resolve the issues.

Effectiveness of Corrective Actions at Hanford Tank Farms. Following the spill of radioactive waste at Hanford's Tank Farms in July 2007, DOE completed several investigations and issued corresponding corrective action plans. The Board continued its review of the effectiveness of the corrective actions for conduct of operations, emergency management, safety oversight, and equipment maintenance. The Board provided additional feedback to DOE. DOE is working to resolve the Board's issues.

HLW Tank Integrity at Hanford Tank Farms. The Board encouraged DOE to continue laboratory and in-situ testing of corrosion mechanisms related to the HLW tanks. This effort is expected to lead to assurance that DOE's tanks can continue to perform for an anticipated 30 or more years. The Board reviewed the integrity of the double-shell HLW tanks, and evaluated DOE's structural and leak assessment of the older single-shell HLW tanks.

Safety Standards at Hanford Tank Farms. The Board reviewed the standards invoked in DOE's proposed contract for the new tank farm contractor and noted that several important safety standards were missing. In response to Board inquiries, DOE added these standards to the contract.

Hanford Sludge Retrieval and Disposition Project. The Board observed the contractor's alternatives analysis and the subsequent DOE external technical review of the conceptual design for sludge retrieval. The Board closely followed this project to ensure that DOE followed proper project management processes for a high-hazard nuclear operation.

American Recovery and Reinvestment Act. The Board began reviewing the management and work scope of the DOE activities funded by the Recovery Act. In response to the Board's inquires, DOE improved its Recovery Act guidance regarding safety and project management requirements.

HLW Tank Integrity Program at SRS. The Board reviewed the HLW tank integrity program at SRS with a continued focus on ultrasonic testing. In response to a Board letter to DOE regarding tank integrity, DOE issued a revised HLW Tank Inspection Plan and completed a more thorough ultrasonic test inspection of HLW Tank 29. The inspection results showed no obvious active pitting, but revealed many small pits that had not been noted before. These data may prompt further inspections.

Tank 48 Treatment Process at SRS. The Board closely followed DOE's efforts to design a process for treating wastes containing organic materials in HLW Tank 48. In response to a Board letter to DOE noting several project weaknesses, DOE took action to ensure compliance with the DOE Order on project management, and to meet its commitments to perform an evaluation of the confinement ventilation system for the project. In June 2009, DOE confirmed the fluidized bed steam reforming process as the preferred treatment process for Tank 48.

HLW Maintenance Program at SRS. The Board found that the contractor's Maintenance Implementation Plan had not been reviewed by DOE since February 2000, which was contrary to the DOE Order requirement that DOE review and approve the contractor's plan every two years. In response, DOE reviewed and approved the current plan and performed a comparison of the DOE Maintenance Program Guide with site maintenance procedures and began implementing corrective actions.

Tank Closure at SRS. The Board's staff observed readiness reviews for mechanical waste removal in Tanks 18 and 19, as well as waste removal operations. The Board identified weaknesses in the performance of independent verifications, which were corrected.

H-Canyon Electrical Systems. The Board reviewed the safety of electrical systems within the H-Canyon and supporting facilities at SRS. The Board noted several deficiencies and highlighted these in a letter to DOE. DOE took action to immediately correct some of the weaknesses, and put in place plans to correct the remaining deficiencies.

H-Canyon Life Extension. A previous Board review of aging issues at H-Canyon highlighted the need to perform more inspections of aging equipment. The Board's review of the initial approach identified several flaws. The Board suggested a number of improvements to the system, and DOE took action to make improvements. The new Integrated Facility Aging Management Program produced the desired results, and DOE plans to expand the program to review safety systems across SRS.

Fire Protection Systems at SRS. At SRS, the Board noted aging equipment in the site's fire protection program and questioned how the aging equipment was complying with National Fire Protection Association guidance. In response, DOE developed a replacement methodology for aging fire apparatus and submitted a baseline change proposal to purchase new ladder and pump trucks. When the Board questioned the efficacy of Mutual Aid Agreements with nearby fire departments, DOE developed new plans and procedures to reduce response times.

Radiation Protection Program at WIPP. The Board reviewed the radiation protection program and its implementation at WIPP. The Board identified that there was no formal process for performing the triennial audits required by federal regulations. DOE acknowledged and agreed to address the identified concerns.

TRU Waste Handling at WIPP. The Board continued oversight of the safety of TRU waste handling operations at WIPP. After a review of conduct of operations and overall safety culture, the Board communicated several deficiencies to DOE and its contractor. A full-time conduct of operations "champion" was hired and empowered to direct efforts towards correcting the identified deficiencies.

TRU Waste Operations at the Idaho Cleanup Project. The Board observed TRU waste retrieval and repackaging operations at the Idaho Cleanup Project and identified deficiencies in conduct of operations and operational safety. DOE responded by assigning a full time person to address needed improvements through an emphasis on work planning and control.

7. 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 health and safety 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.

SUMMARY:

DOE is undertaking significant development of new capability to process legacy special nuclear materials, and is replacing aging facilities needed to maintain the nuclear weapons complex. Several major projects are well underway across the DOE defense nuclear complex, with construction of the Waste Treatment and Immobilization Plant, the Salt Waste Processing Facility, the Waste Solidification Building, and the Integrated Waste Treatment Unit; and design of the Uranium Capabilities Replacement Project. DOE design and construction activity in FY 2014 will continue to require the Board to expend significant resources in exercising its oversight in this area to ensure that new facilities will be adequate to perform their intended functions safely. The key performance objectives for FY 2014 in this strategic area of concentration are:

- Ensure adequate design and construction of the Waste Treatment and Immobilization Plant at the Hanford Site.

- Ensure adequate design of the Hanford Tank Retrieval and Waste Feed Delivery System.

- Ensure adequate design of the Uranium Capabilities Replacement Project at the Y-12 National Security Complex.

- Ensure adequate construction, startup testing, and development of Technical Safety Requirements for the Salt Waste Processing Facility for treatment of high-level waste liquids and salts at the Savannah River Site.

- Ensure adequate redesign and redirection of the Pit Disassembly and Conversion (PDC) Project. The project is being redirected to look at the use of multiple existing facilities such as the K-Reactor at SRS, the Plutonium Facility at LANL, and other facilities at SRS.

- Ensure adequate construction and startup testing of the Waste Solidification Building at the Savannah River Site.

- Ensure adequate design of the Chemistry and Metallurgy Research Replacement Project at Los Alamos National Laboratory or potential alternatives.

Challenges for the Board's Safety Oversight:

Design and Construction of Nuclear Facilities. One of the Board's statutory responsibilities is the review of design and construction projects for DOE's defense nuclear facilities to ensure that adequate health and safety requirements are identified and implemented. These facilities must be designed and constructed in a way that will support safe and efficient operations for 20 to 50 years. This requires an exacting design process that will ensure appropriate safety controls are identified and properly implemented early in the process. Integrated Safety Management (ISM) provides the framework for this process. The Board's expectation is that hazards and their accompanying controls will be identified as early as practicable throughout the design and construction process in order to minimize potential impacts on project cost and schedule and to demonstrate clear and deliberate implementation of ISM principles and core functions.

The Board has become more proactive in identifying safety issues early in the design process to avoid significant cost and schedule impacts later in design and construction. The Board's involvement during the later detailed design stages has also increased as DOE has chosen to modify a project's design in response to cost and schedule pressure. The Board's involvement is needed to ensure that the safety aspects of the design are not compromised as a means of cost or schedule recovery. The Board expended considerable resources in evaluating proposed design changes to reduce the need for safety-related systems for the Waste Treatment and Immobilization Plant at Hanford. The Board intends to continue issuing a periodic report to Congress that identifies unresolved safety issues in DOE's nuclear facility design and construction projects. This report forms the basis to help ensure DOE senior managers, project personnel, and the Board share a common understanding of the Board's issues and actions needed to resolve the issues.

The Board has noted many problems occurring in the DOE complex with construction practices and procurement of safety equipment that has led the Board to become more involved early in construction, as well as in ensuring adequate quality assurance for procurement and installation of the materials and equipment used in facility construction. Additionally, as facilities near completion, the Board is reviewing the testing of safety systems and the development of Technical Safety Requirements as facilities transition to operation, thereby ensuring the proper operation of safety systems.

DOE has initiated the revision of several DOE directives and standards related to the design of safety-related structures, systems, and components. As a result, many DOE technical standards also need to be revised to correspond to the updated directives. In the Board's view, many of these changes could weaken the standards-based approach to nuclear design and construction adopted by DOE. Moreover, many of the technical issues the Board has raised on specific DOE and NNSA projects can be traced to inadequately defined DOE facility safety requirements. These technical issues could have been avoided if DOE's design requirements for defense nuclear facilities were properly linked to nuclear design codes and standards. While DOE has taken steps to improve the integration of safety into design, that progress can be undermined if the direct linkage between safety systems (functions and functional requirements) and nuclear design codes and standards becomes vague. The Board has identified a number of issues with the revised DOE directives and standards indicating that the required link to nuclear design codes and standards is becoming weak, almost optional. The Board has provided comments to DOE

addressing the improper linkage of nuclear design codes and standards during its reviews of proposed changes to draft DOE Order 420.1C, *Facility Safety*, draft DOE Standard 1020-YR, *Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities*, and draft DOE Standard 1066-YR, *Fire Protection*. One contributing factor is DOE's trend toward relying on design engineers in the field using implementation guides and the safety basis documents to determine needed requirements, rather than explicitly specifying the expected design requirements for its safety-related structures, systems, and components in orders or standards that are invoked through contracting mechanisms. This trend of blurring the requirements for design of defense nuclear facilities will result in the need to apply more Board resources to review projects to ensure that the technical basis behind detailed designs of safety systems is adequate and appropriately conservative. The Board is concerned that this approach will not result in timely identification and resolution of safety issues in design.

The Board's reviews of the design and construction of major facilities and projects are resource intensive and time consuming but result in significant safety improvements. The Board's early involvement in the design effort requires multiple reviews of safety systems to assess whether they meet design expectations. The Board has demonstrated the value of rigorous technical oversight to ensure that safety is addressed early in the design process. The Board's reviews of construction and functional testing of safety equipment as it is installed have helped ensure adequate quality and performance of required safety systems.

The following list provides a brief description of major DOE projects currently underway, or planned for the near future, that will require significant Board resources to review. It provides an informal rating of three characteristics: Significance (overall importance of the facility to the mission of the complex); Complexity (relative assessment of the difficulty in successfully implementing the design); and Risk (assessment of programmatic risk and safety risk for the facility):

- **Hanford Site (Office of River Protection)** - Waste Treatment and Immobilization Plant: a project consisting of four major nuclear facilities to pretreat and vitrify waste from the Hanford high-level waste tank farms. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Hanford Site (Office of River Protection)** - Tank Retrieval and Waste Feed Delivery System: long-term project to provide feed to the proposed Hanford Waste Treatment and Immobilization Plant. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, HIGH RISK.

- **Hanford Site (Office of River Protection)** - Tank Waste Supplemental Treatment Project: a project to pretreat some liquid waste from the Hanford Tank Farms to allow its immobilization as low-activity waste through early operation of the Waste Treatment and Immobilization Plant Low-Activity Waste Facility and/or the operation of supplemental immobilization facilities. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

- **Hanford Site (Office of River Protection)** – Interim Hanford High-Level Waste Storage Project: Project to provide the capability to receive and store 4,000 canisters of high-level waste produced by the Waste Treatment and Immobilization Plant, with the potential to add storage and shipping modules in follow-on projects. HIGH SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

- **Hanford Site (Richland Operations Office)** - Large Package and Remote Handled TRU and Mixed Waste Facility: a new facility or major facility modification to provide the capability to repackage transuranic, mixed transuranic, and low-level wastes for disposal. HIGH SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

- **Hanford Site (Richland Operations Office)** - K-Basin Closure Sludge Treatment Project: a new facility or major facility modification to provide the capability to retrieve, treat, and package spent fuel sludge for disposal. MODERATE SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

- **Idaho National Laboratory** - Integrated Waste Treatment Unit: a new facility constructed to treat about one million gallons of sodium-bearing wastes. MODERATE SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

- **Idaho National Laboratory** – Calcine Disposition Project: a new project that will use structural and process elements of the Integrated Waste Treatment Unit to convert 4400 cubic meters of calcined high-level waste into a form suitable for disposal. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, HIGH RISK.

- **Los Alamos National Laboratory** - Radioactive Liquid Waste Treatment Facility Upgrade Project: to replace the current aging and deteriorating facility with a modern facility. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

- **Los Alamos National Laboratory** - Transuranic Waste Facility: a new project that will provide storage, staging, and characterization for transuranic waste generated after 1999 by operations at Los Alamos National Laboratory. MODERATE SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

- **Savannah River Site** - Salt Waste Processing Facility: to be used to remove cesium, strontium, and actinides from high-level waste. The high-activity stream would go to the Defense Waste Processing Facility for vitrification in glass logs. The low-activity stream would go to the Saltstone Production Facility for disposal in grout. HIGH SIGNIFICANCE, HIGH COMPLEXITY, MODERATE RISK.

- **Savannah River Site** - Pit Disassembly and Conversion Project: to convert surplus weapons-grade plutonium metal into oxide for subsequent feed to the Mixed-Oxide (MOX) Fuel Fabrication Facility. This project represents a combination of the Pit Disassembly and Conversion Facility and the Plutonium Preparation Project as one project in the K-Area Complex. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Savannah River Site** - Waste Solidification Building: to process waste streams generated in the Pit Disassembly and Conversion Project and MOX Fuel Fabrication Facility. MODERATE SIGNIFICANCE, LOW COMPLEXITY, LOW RISK.

- **Y-12 National Security Complex** - Uranium Capabilities Replacement Project: a new facility to replace aging facilities and consolidate current capability to process uranium materials at the Y-12 Site. HIGH SIGNIFICANCE, HIGH COMPLEXITY, MODERATE RISK.

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 2014 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:

- Evaluate the execution of implementation plans to 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.
- Monitor construction activities and review preparations for testing, readiness evaluation, and activation of the Transuranic Waste Facility project at Los Alamos National Laboratory.
- Review the final design and preliminary documented safety analysis for the low level waste systems associated with the Radioactive Liquid Waste Treatment Facility Upgrade Project at Los Alamos National Laboratory. Also review the development of the preliminary design and safety basis for the project's transuranic waste systems.
- Review construction and development of the Technical Safety Requirements for the Salt Waste Processing Facility at the Savannah River Site.
- Review the Preliminary Documented Safety Analysis and final design for the building shell of the Uranium Capabilities Replacement Project at the Y-12 National Security Complex.
- 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 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 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 to 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 Los Alamos National Laboratory 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 Fiscal Year 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 Los Alamos National Laboratory. 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 Los Alamos National Laboratory. 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 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 through 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.

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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 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.

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 2009 Performance Accomplishments

Congressional Mandate: Chemistry and Metallurgy Research Replacement Facility at Los Alamos National Laboratory. Pursuant to the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, the Board has conducted extensive reviews of the preliminary design of the CMRR Nuclear Facility as part of certifying that design concerns reported by the Board have been resolved. During the past year considerable resources have been dedicated to the CMRR certification review. The Board identified seven topical areas for the certification review, which were the five open Board concerns identified in its quarterly reports to Congress plus two additional areas the Board considered important for the CMRR design process. The Board developed a systematic approach to completing the certification review, identifying concerns with NNSA's resolution of the topic area, and formally transmitting these concerns to NNSA for resolution. Based on NNSA responses and commitments each of these concerns were resolved. On September 4, 2009, the Board met the Congressional mandate by issuing *Chemistry and Metallurgy Research Replacement Facility Project, Los Alamos National Laboratory, Certification Review, Report to Congressional Defense Committees*. NNSA has committed to implement detailed designs consistent with specific design requirements to which NNSA had agreed as part of the certification process. The Board intends to review additional design material as it becomes available, and to review the final design and Documented Safety Analysis once the CMRR project is given approval to proceed to final design.

Safety-in-Design: With significant Board involvement, DOE developed a change to DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets*, developed sixteen guidance documents to implement this order, and developed a proposed change to DOE Order 420.1B, *Facility Safety*, incorporating changes required to address safety-in-design issues. The Board reviewed and commented on these orders and guides.

Waste Treatment 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 Plant facilities. The Board's activities primarily consisted of evaluating the resolution of previously identified issues. Specifically:

- Following resolution of Board comments, the final summary structural reports for the Pretreatment and High Level Waste Facilities have been prepared. DOE is continuing to work on the final structural design for these facilities. The Board expects that DOE will satisfactorily complete the structural design for the Pretreatment and High Level Waste Facilities and submit final summary structural reports that fully demonstrate that the WTP facilities meet all structural design requirements.

- The Board resolved issues described in its letter dated June 24, 2008, regarding concerns with the contractor's proposed implementation of DOE Standard 1066, *Fire Protection Design Criteria*. The current WTP design for the confinement ventilation systems ensures they perform as expected and are adequately protected from the effects of a fire.

- In a letter dated January 9, 2009, the Board resolved a long-standing issue with fire protection coating of structural steel in WTP facilities. The Board evaluated the adequacy of fire protection coatings to protect facilities containing radiological and chemical hazards, and reviewed the chemical hazards in each of the WTP facilities. The Board's review revealed that the fire coatings applied in each facility are adequate to prevent structural collapse in a design-basis fire.

- The Board initiated review of proposed changes to the safety strategy in the Pretreatment Facility that would have reduced the safety classification of all the safety systems in the facility. The Board did not find the bases for the proposed changes to be technically defensible. DOE has revised its strategy and is maintaining some safety-class controls but has not yet provided an adequate justification for the entire safety strategy. The Board is continuing its evaluation.

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 evaluating the resolution of previously identified issues. In a safety-in-design project letter dated January 24, 2007, the Board had identified

several issues that required resolution during final design. Based upon the root-cause analysis of an over-temperature event in the pilot plant's charcoal bed, DOE modified the design to prevent and mitigate the event. Analysis of the waste characterization was completed which verified the control strategy was adequate for the worst-case inventory. The safety-related instrumentation and control system design was revised to separate its safety-related functions and power supply from the rest of the network, and an appropriate design standard was adopted to ensure its reliability. These actions resolved all outstanding Board issues with the project.

New Solid Transuranic Waste Facility Project at Los Alamos National Laboratory (LANL). Following the Board's review in November 2008, NNSA decided to place construction plans on hold pending completion of an engineering needs assessment. The Board's review identified problems with the facility safety strategy, e.g., the use of personal protective equipment in lieu of engineered safeguards to provide worker protection, and poor integration of safety into the design. This project remains on hold.

Radioactive Liquid Waste Treatment Facility Replacement Project at LANL. The Board had previously raised concerns with the preliminary design of the facility, and concluded there was weak integration of the safety and design processes and weak federal oversight. The Board continued to pursue the resolution of these concerns. NNSA has made some progress in addressing some of the concerns. For example:

- Federal oversight has been enhanced through the addition of more personnel dedicated to the project. It is premature to assess whether this action will be effective in improving federal oversight.

- The design was changed to require stainless steel process equipment in lieu of plastic processing equipment to provide confinement for the liquid radioactive waste.

Criticality Experiments Facility and Device Assembly Facility at the Nevada National Security Site. The criticality testing capability from TA-18 at LANL is being relocated to the Criticality Experiments Facility, which will be housed in the Device Assembly Facility at the Nevada National Security Site. In a letter dated January 18, 2008, the Board highlighted the lack of progress in addressing ongoing operational problems and design deficiencies in the water supply for the safety-related fire suppression systems. DOE subsequently conducted several studies culminating in long-term line item requests to replace the water tank and lead-in pipes. In the interim, short-term projects are being pursued to modify sprinkler systems to correct design deficiencies, replace strainers, refurbish the existing water tank, and investigate using standalone fire suppression systems to supplement the existing deficient fire sprinkler systems. A July 29, 2009, Board letter encouraged NNSA to complete the planned work and not allow administrative compensatory measures (e.g., posting a fire watch) to serve as a long-term substitute for reliable engineered safety systems.

Device Assembly Facility Structure. In a letter dated August 16, 2006, the Board noted concerns with extensive cracking and water leaks in the Device Assembly Facility. After further Board urging, DOE conducted concrete strength testing to determine whether the facility structure can function as designed. The Board reviewed the test results and concluded that the concrete meets strength requirements. This long-standing concern is now considered closed.

Flammable Gas Generation at the Savannah River Site (SRS) Salt Waste Processing Facility. The Board previously identified the need to evaluate the impact of thermolysis on the generation of flammable gases in the process vessels. The flammable gas generation rate assumed in the project analysis was not technically defensible. As a result of the Board's review, DOE initiated testing to validate the assumptions made in the safety basis regarding generation of flammable gases. The Board reviewed the test results and concluded that the flammable gas generation rate assumed in the design analysis adequately bounded the rate determined in the experimental testing. This concern is now considered closed.

Structural Design of the SRS Salt Waste Processing Facility. The Board previously pointed out deficiencies in the analysis of the facility's ability to resist natural phenomena hazards. The Board's review of the structural design focused on the resolution of these deficiencies. The Board completed its review of the finite element analysis, structural design, and summary structural report for the facility, and determined that all concerns were resolved.

Final Design Review of the SRS Salt Waste Processing Facility. The Board reviewed the final design of the Salt Waste Processing Facility. As a result of this review, the Board issued a safety-in-design project letter concurrent with Critical Decision (CD)-3 that stated the safety strategy was sound and identified no significant safety issues that would preclude the start of construction. The Board identified several new issues that require resolution as the design process continues: (1) the structural analysis of the ability of process piping to withstand potential explosions (deflagrations or detonations) did not include several considerations, (2) flammable gas generation rates assumed by the facility did not consider all potential sources of heat input into process vessels, (3) the design of the confinement ventilation system does not implement all features or demonstrate the equivalency of the design to those features specified in Section 14 of DOE Standard 1066, *Fire Protection Design Criteria*, for the protection of the final stage of high-efficiency particulate air filters, (4) the design of the facility does not ensure that all operator actions deemed necessary in the Preliminary Documented Safety Analysis following a seismic event can be readily accomplished, and (5) additional actions beyond those identified in the Preliminary Documented Safety Analysis may be required. The project is in the process of revising its design and performing additional analyses to address these concerns.

Instrumentation and Control System for the SRS Salt Waste Processing Facility. The Board reviewed the design of the safety-related portion of the instrumentation and control system for the Salt Waste Processing Facility. This review identified that (1) the isolation of the safety-related portion of the distributed control system from other portions of the system requires better description and understanding by the project to ensure this functional requirement is met, (2) the safety integrity level specified in the Preliminary Documented Safety Analysis may not be achievable, and (3) the project lacked a clear plan to ensure adequate quality of the software to be used in the system. The project is taking action to address the concerns raised during this review.

Quality Assurance for SRS Salt Waste Processing Facility. The Board initiated reviews of the construction practices being utilized for the placement of concrete for the facility. The Board identified numerous quality problems with the control of the materials used to form the concrete that could have affected the as-placed concrete strength. The project took actions to correct the problems identified. The Board also initiated review of the procurement of safety-related equipment. The project is using a commercial grade dedication process for most procurements. The Board's review concluded that the methodology would not ensure the requisite quality of the safety-related components. The Board reviewed configuration management procedures for the project, and found weaknesses that resulted in discrepancies in design and procurement documentation. The project is in the process of rewriting procedures to correct its configuration management and procurement practices. The Board will continue to review this area.

Waste Solidification Building at SRS. The Board completed a final design review for the Waste Solidification Building, as documented in a letter dated January 12, 2009. The Board closed all final design issues related to structural design, red oil, and hydrogen deflagration/detonation prior to the project receiving CD 2/3 on December 10, 2008. The issues related to red oil and hydrogen deflagration/detonation will continue to be followed by the Board as safety controls are being finalized and implemented.

Uranium-233 Downblending at Oak Ridge National Laboratory. In a September 14, 2007, safety-in-design project letter, the Board identified safety-related concerns with the Uranium-233 Downblending and Disposition Project. The Board and DOE reached agreement on the path forward to address these issues. The Board initiated review of the Preliminary Documented Safety Analysis.

Startup Testing for the Highly Enriched Uranium Materials Facility at the Y-12 National Security Complex. The Board reviewed the startup testing of safety-related systems at the Highly Enriched Uranium Materials Facility. The Board concluded that the testing generally ensured that the safety-related systems would meet their functional requirements, although two gaps were noted. The Board also noted problems with the configuration management of the software used for the safety-related confinement ventilation system. The project is taking action to address the Board's concerns.

Quality Assurance for the Y-12 Highly Enriched Uranium Materials Facility. As the Highly Enriched Uranium Materials Facility was being constructed, the project identified quality assurance concerns with thousands of fasteners used in safety-class storage racks. The Board ensured that corrective actions that included sample testing of fasteners would provide a technically defensible rationale for acceptance of the fasteners. The project's initial plans were inadequate; additional actions identified by the Board were subsequently incorporated into the corrective action plan. The Board reviewed the testing results and concluded that the fasteners could be reasonably accepted as-is. This

concern is considered closed. The Board is now encouraging DOE to provide detailed lessons learned to help preclude recurrence of this and other quality problems experienced by the project.

Uranium Processing Facility at the Y-12 National Security Complex. The Uranium Processing Facility project continued with its preliminary design phase in FY 2009. The Board has continued to conduct reviews of the project management, DOE oversight, geotechnical and structural design, development of safety systems design, design criteria development, and technology development. These reviews have served to resolve open items from the Board's August 9, 2007, safety-in-design project letter, have provided timely input to improve the project design inputs, and kept the Board up-to-date on revision to design strategies to prevent new issues from developing and support future reviews at the completion of preliminary design.

Filter Test Facility. Nuclear-grade high-efficiency particulate air (HEPA) filters used in essentially all new nuclear facilities 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. In the past year, DOE has improved the acquisition and transmittal of data from testing to responsible procurement personnel, allowing formal corrective action processes to be initiated for testing failures. DOE is continuing to work with the contractors to address quality improvement and verification testing for HEPA filters purchased by DOE.

8. 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.

SUMMARY:

For FY 2014, the key performance goals and initiatives of the Board in this area are intended to continue to address problems and ensure safety is improved at the level of the workers. If addressing nuclear safety hazards at the worker-level at DOE defense nuclear facilities can be improved, then the safety of the public more distant from the hazards will be substantially improved. Major efforts to achieve this goal in FY 2014 include:

- Ensure that DOE directives that impact safety at defense nuclear facilities are evaluated and strengthened, including the development of new safety directives to provide guidance in areas for which none is currently available.

- Ensure that DOE programs related to activity-level work planning and controls, conduct of operations, and conduct of maintenance are being managed and implemented effectively and safely throughout the complex.

- Ensure that DOE and its contractors apply the principles of integrated safety management at the activity level, i.e., that work scope is properly identified, that workers know the hazards and controls for their work, that work is performed in accordance with the controls, and that feedback and improvement are used to reduce further the risks of future work.

- Ensure safety programs are appropriately implemented by technically qualified personnel and oversight of these programs is conducted by technically competent federal personnel.

- Strengthen the application of quality assurance principles at defense nuclear facilities to improve the reliability and effectiveness of controls used to prevent or mitigate potential accidents.

- Ensure DOE sites are prepared to respond to beyond design basis and severe events through appropriate emergency preparedness, response, and recovery activities.

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 2014 Performance Objectives

DOE Directives. The Board will continue to assess the adequacy of proposed changes 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 directives reviews completed by the Board will be provided to DOE for action. The Board anticipates that approximately 35 DOE and NNSA directives that may impact public and worker health and safety will require review, of which five to ten are likely to require significant Board and staff interaction to ensure satisfactory resolution of potential 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.

Integrated Safety Management. The Board will continue its reviews of DOE's implementation of integrated safety management (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. Safety management programs are designed to ensure defense nuclear facilities are operated in a manner that adequately protects workers, the public, and the environment. At least five reviews will be completed in areas such as training and qualification, quality assurance, nuclear criticality safety, software quality assurance, conduct of operations, configuration management, maintenance management, and readiness preparations and verifications. As a result of these reviews, it is anticipated that DOE will provide an acceptable approach and schedule for resolution of any identified issues to support the safe operation of defense nuclear facilities.

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 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 5 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 integrated safety management (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 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 FY10 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.

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 2009 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 40 directives associated with, but not limited to nuclear design criteria, 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 10 pending directives to improve the content, clarity, and consistency of safety requirements and guidance. Examples of DOE directive reviews completed in 2009 include:

- DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*
- DOE Order 426.X, *Federal Technical Capability*
- DOE Order 410.2, *Management of Nuclear Materials*
- DOE Order 452.2D, *Nuclear Explosive Safety*
- DOE Order 452.1D, *Nuclear Explosive and Weapon Surety Program*
- Title 10, Code of Federal Regulations Part 712, *Human Reliability Program*
- DOE Guide 413.3-4, *U.S. Department of Energy Technology Readiness Assessment Guide*
- DOE Order 414.4.IX, *Quality Assurance*
- DOE Standard 1172, *Safety Software Quality Assurance Functional Area Qualification Standard*
- DOE Standard XXXX, *Application of Safety Instrumented Systems used in Non-Reactor Nuclear Facilities*
- DOE Standard 1173-2009, *Criticality Safety Functional Area Qualification Standard*
- DOE Standard 1083-2009, *Processing Exemptions to Nuclear Safety Rules and Approval of Alternative Methods for Documented Safety Analyses*
- DOE Handbook 1028-2009, *Human Performance Improvement Handbook*, Volume 1: *Concepts and Principles*, and Volume 2: *Human Performance Tools for Individuals, Work Teams, and Management*

Use of Quantitative Risk Assessment Methodologies. The Board identified the timely need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies at DOE defense nuclear facilities and issued Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities*. The Board recommended that DOE:

1. Establish a policy on the use of quantitative risk assessment for nuclear safety applications.
2. Consistent with this policy, establish requirements and guidance in a DOE directive or directives that prescribe controls over the quality, use, implementation, and applicability of quantitative risk assessment in the design and operation of defense nuclear facilities.
3. Evaluate current ongoing uses of quantitative risk assessment methodologies at defense nuclear facilities to determine if interim guidance or special oversight is warranted pending the development of formal policy and guidance.
4. Establish a requirement to identify deficiencies and gaps in ongoing applications of quantitative risk assessment along with the additional research necessary to fill those gaps in support of the development and implementation of the final policy and guidance.

DOE's Implementation Plan for this Recommendation 2009-1 is expected in late calendar year 2009.

Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*. The Board evaluated DOE's progress in implementing the recommendation issued in October 2007. The Technical Support Group, defined in the Implementation Plan and comprised of senior DOE and contractor personnel with significant experience in nondestructive assay, developed lines of inquiry to be used during site reviews starting in calendar year 2009. Lines of inquiry included criteria for reviews of training and qualification, design requirements for new facilities and equipment, standards for conducting holdup measurements, implementation of standards, research and development, quality assurance, and oversight. The Board's staff observed the Technical Support Group's benchmarking efforts at key defense nuclear facilities.

Nuclear Criticality Safety. The Board conducted reviews in 2009 related to nuclear criticality safety issues highlighted in Board correspondence with DOE in January 2008 that expressed concerns that DOE reviews of criticality safety may not be of sufficient depth to accurately assess the health of nuclear criticality safety programs at defense nuclear facilities. The Board issued a letter in January 2009 underscoring issues with Nuclear Criticality Safety Evaluations conducted by Y-12. In addition, the Board's staff conducted a review of nuclear criticality safety at Los Alamos National Laboratory to assess progress in resolving previously identified issues. The Board continued to evaluate complex-wide activities as described in DOE's annual report on criticality safety.

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 (JCO) 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 is making progress in developing revised guidance for use in the field in the development and implementation of JCOs. Formal review of this guidance is expected to be completed by late calendar year 2009.

Safety System Design, Functionality, and Maintenance Reviews. In 2008 the Board conducted reviews of safety system design, functionality, and maintenance at a number of defense nuclear facilities. These reviews identified a number of deficiencies and weaknesses related to ensuring that credited safety systems can adequately perform their required functions in all operating regimes. Throughout FY 2009 the Board interacted with DOE and NNSA to properly disposition these findings. In particular, the Board has taken definitive action to fully characterize and drive the corrective actions for significant safety issues at Los Alamos National Laboratory at both the plutonium and tritium facilities.

A previous Board review of aging issues at H-Canyon highlighted the need to perform more inspections of aging equipment. The Board's review of the initial proposed approach identified many major flaws, and the Board strongly encouraged DOE to pursue a different approach. The new Integrated Facility Aging Management Program is producing the desired results in a timely manner and is now being expanded to review safety systems across SRS.

Readiness Reviews. The Board reviewed updates to directives related to startup and restart of nuclear facilities, as well as their implementation at defense nuclear facilities. Revisions to these directives are expected to provide much needed clarity. The Board actively monitors Startup Notification Reports for defense nuclear facilities under its cognizance and reviews startup and restart activities accordingly.

Conduct of Operations. The Board conducted conduct of operations reviews at Y-12 and Hanford in 2009. These reviews assessed the adequacy of DOE directives and standards implementation in the flow down to site-specific policies, procedures and instructions. Although the Board noted areas where opportunities for improvement in conduct of operations existed, overall these two sites had properly implemented conduct of operations programs.

Recommendation 2002-1, *Quality Assurance for Safety Related Software*. On December 22, 2008, the DOE Chief Health, Safety and Security Officer proposed an approach for managing the safety software central registry, a task of the remaining commitment of DOE's Implementation Plan for Recommendation 2002-1. Based on progress throughout this fiscal year, the Board expects DOE to formally request closure of this recommendation late this calendar year, 2009. The Board continues to evaluate quality assurance practices for safety-related software throughout the complex.

DOE Technical Capability. The Board continues to follow the state of technical competency throughout the DOE defense nuclear complex. The Board's staff observed the activities of DOE's Federal Technical Capabilities Panel (FTCP) throughout the fiscal year and reviewed directives governing the FTCP as well as technical qualification standards for several areas of technical specialization.

After the Board identified several deficiencies with qualification cards for Facility Representatives, DOE conducted an assessment, revised the qualification cards and standards, and disqualified a Facility Representative who had been improperly granted interim qualifications. After the Board identified the lack of training opportunities for Facility Representative candidates, DOE set up a two-week course for Facility Representative candidates and Safety System Oversight candidates.

Activity-Level Work Planning. During 2009, the Board reviewed work planning processes at three sites. The reviews of work planning and control processes at Idaho National Laboratory, Y-12, and Los Alamos National Laboratory indicate that their programs have not been fully implemented and weaknesses still remain. DOE has made efforts to address these weaknesses, but to date these efforts have been inadequate.

Implementation of Safety Basis Controls. Independent validation of implementation of safety basis controls is important to nuclear safety, as discussed in a Board letter to DOE in 2008. Some DOE sites have protocols for performing such validations, but DOE continues to lack complex-wide requirements and guidance for independent reviews of the implementation of nuclear safety basis controls. In a brief to the Board on March 26, 2009, DOE provided the Board with information on a new Guide that has been drafted, *Guide for Performance of Independent Verification Reviews (IVRs) of Safety Basis Controls.* This draft Guide was issued to the field on March 19, 2009, in a 6 month pilot effort. The memo states that, "It is expected that each site will compare the practices outlined in this guide to your current site processes and adjust them, if appropriate." This direction is a positive step in compelling independent verification reviews at defense nuclear facilities.

Safety Culture Improvement Project. Starting in FY 2008 with DOE and its contractors establishing a jointly sponsored task team to develop tools for assessing and improving the safety culture of the federal and contractor workforces, progress continues to be made in refining these tools. As evidenced by the Deputy Secretary of Energy's memorandum dated January 16, 2009, support for strengthening safety culture now has strong leadership support. The Board has been closely observing the team's efforts and will continue to evaluate and encourage this effort as it continues to mature.

Recommendation 2004-1, Oversight of Complex, Hazardous Nuclear Operations. All 22 commitments made in the DOE Implementation Plan responding to Recommendation 2004-1 were due to be complete by 2009. Concerns remain with several commitments that are late or have no discernible response from the DOE. The Board issued a letter to the Secretary of Energy on March 23, 2009, highlighting particular commitments needing attention from senior management and organizational support to meet the intent of the recommendation. The specific troubled commitments highlighted to the Secretary of Energy are:

- Commitment 7, develop process to identify research and development needs across DOE/NNSA and identify the extent that these needs are being met by existing programs; and Commitment 8, develop method to ensure nuclear safety research. These commitments are more than two years late. Efforts made by the office of primary responsibility have fragmented and fall far short of a complex-wide assessment.

- Commitment 2, provide adequate technical support for the Central Technical Authorities (CTAs); and Commitment 3, fully implement the CTA function. The DOE CTA function supporting the Under Secretary of Energy underwent turmoil during the transition of Presidential administrations, and the technical support of the NNSA CTA has been degraded as result of staff reorganization at NNSA. It appears that the DOE CTA issue was resolved following the confirmation of the Under Secretary of Energy.

The Board also remains engaged in two other areas that have been problematic:

- Commitment 5, issue DOE Safety Oversight Guide. This is intended to be a key document to improve the consistency and completeness of implementation of Integrated Safety Management.

- Commitment 10, Deliverable A, develop and implement Quality Assurance Plans required by DOE Order 414.1C, *Quality Assurance.* NNSA's inadequate performance in this area indicates that implementation has not been effective.

9. 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 the defense nuclear facilities are being operated safely and that the Board's oversight is a positive influence on the safe execution of these activities.

SUMMARY:

The Board executes its oversight responsibilities using a matrix form of organization for its technical staff that is based on the four previous goals. This organizational structure allows the formation of technical teams composed of personnel from each group to share information and address cross-cutting issues more easily and efficiently. Management techniques that keep the support staff small, while maximizing its technical staff, will be continued. The Board relies on management guidance from the Office of Management and Budget (OMB), Office of Personnel Management (OPM), and other Executive Branch agencies, especially guidance that applies to small agencies, in developing and assessing its internal policies and procedures. The Board uses cost-effective external service providers rather than maintaining a large government or on-site contractor staff. A small government staff, augmented by contractors, performs the functions of human resources management, financial management, acquisition management, information technology management, logistics management, security management, travel management, and other administrative matters. A separate General Counsel office provides legal advice to the Board. The Board utilizes organizations such as the Small Agency Council as forums to address common management issues and seek best business practices from other small agencies.

The Board works directly with DOE management at all levels, both at DOE headquarters and in the field, as necessary to accomplish its safety oversight mission. The Board keeps the DOE Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board informed of its activities and coordinates activities between the two agencies with that office when appropriate. The Board uses its legal authorities to establish policies, processes, and procedures for working with DOE.

The Board utilizes the annual Congressional appropriations and authorization process to acquire the resources necessary for the Board's safety oversight activities.

The Board manages three personnel systems: Excepted Service (for the technical staff), Competitive Service, and Senior Executive Service to support its human capital program. The Board's Professional Development Program provides a source for entry-level technical staff. The human resources (HR) staff provides staffing, recruiting, benefits, policy management, and serves as an interface between the HR service provider and the Board's employees. The Board uses a robust training program to maintain and improve the competencies of the staff. The Board

adheres to merit and equal employment opportunity principles. The Board maximizes use of incentives and benefits to attract and retain a quality workforce.

The Board uses its legislative authorities to stay attuned to the planning and execution of DOE's defense nuclear programs by gathering information from a broad range of sources. Once a safety concern is communicated to DOE, the Board uses the same information sources and techniques to ensure that appropriate and feasible (both technical and economic) corrective actions are developed by DOE and its contractors, commitments are made to implement these corrective actions in a timely manner, and the commitments are met. Based on an analysis of available information, the Board chooses from a broad spectrum of action-forcing mechanisms granted by law to communicate identified health and safety concerns and promote appropriate DOE corrective actions. By posting its oversight interactions with DOE and its contractors in the public domain using the Board's public website, the Board seeks to foster the transfer of lessons learned throughout the DOE's defense nuclear complex.

The public has access to the Board's work to the maximum extent possible. This provides visibility into DOE activities to help maintain and restore, as needed, public confidence that the defense nuclear facilities are being operated safely and that the Board's oversight is a positive influence on the safe execution of these activities. The Board documents its activities and makes correspondence available to the Congress and the public in order to ensure there is no ambiguity concerning the Board's position on a particular matter. The Board maintains a public website and conducts public hearings, as appropriate. Reports to Congress include annual reports detailing new health and safety issues. The Board provides informal briefings to Congressional committees and testifies before Congress, as required. The Board and DOE provide joint reports on appropriate topics. The Board's official reports are posted on its public website at www.dnfsb.gov.

	FY 2013 Target	FY 2014 Target
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 will publish its annual report to Congress by March 1. This report is to include all recommendations made by the Board during the preceding year, and an assessment of: (1) the improvements in the safety of DOE's defense nuclear facilities during the period covered by the report, (2) the improvements in the safety of DOE's defense nuclear facilities resulting from actions taken by the Board or taken on the basis of the activities of the Board, and (3) the outstanding safety problems, if any, of DOE's defense nuclear facilities. The Board will publish Periodic Reports on the *Status Of Significant Unresolved Issues with the Department of Energy's*	

<table>
<tr><td></td><td colspan="2">Design and Construction Projects and the Summary of Significant Safety-Related Infrastructure Issues at Operating Defense Nuclear Facilities. These reports will serve to provide Congress and the public timely information on significant issues prior to publication of the Board's Annual Report.</td></tr>
<tr><td rowspan="2">Performance Goal 5.2: The Board will inform the public of issues related to health and safety at defense nuclear facilities.</td><td colspan="2">The Board will post public documents, including all recommendations, the Board's Annual Report, Periodic Reports, and other correspondence with DOE on its public website within 2 work days of publication date.</td></tr>
<tr><td>The Board will plan a Public Meeting and Hearing at Oak Ridge National Laboratory/Y-12 National Security Complex in the first quarter in order to review public health and safety at the site, provide transparency into DOE activities, and allow interested persons or groups to present comments, technical information, or data to the Board on the announced topics.</td><td>The Board will plan at least one Public Meeting and Hearing in order to provide transparency into DOE activities, and allow interested persons or groups to present comments, technical information, or data to the Board on the announced topics.</td></tr>
<tr><td>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.</td><td colspan="2">The Board will be briefed on issues by senior DOE officials from EM and NNSA on a periodic basis in order continue a dialogue to further public health and safety at DOE defense nuclear facilities.

The Chairman will consult with the DOE Secretary and Deputy Secretary on matters of interest and will meet with the DOE Deputy Secretary periodically in</td></tr>
</table>

	order to ensure there are no misunderstandings concerning the Board's recommendations and other concerns at defense nuclear facilities to review documents for classified and security related sensitive information.
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 will improve employee performance by developing a revised GS performance management system to make it more performance oriented in accordance with OPM guidance. The Board will strive toward full certification of its SES performance management system.
Performance Goal 5.5: Appropriate technical and professional expertise will be recruited and/or trained by the Board to accomplish the mission.	The Board will continue to hire technically competent engineers and scientists who can support the Board's nuclear safety oversight mission. The Board will emphasize improving the diversity of its technical staff workforce. The Board will utilize at least 95% of its authorized FTEs.
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 independent auditor's Report on Internal Control & Compliance with Laws and Regulations does not identify any material weaknesses or non-compliance with laws or regulations. This is to demonstrate the Board is properly managing its resources.
Performance Goal 5.7: The Board will assign staff to be in residence at selected sites.	The Board will assign site representatives at appropriate defense nuclear facilities based on changes in DOE priorities and activities. The Board will review the assignment of site representatives semi-annually in order to ensure each manned site has at least one staff member assigned and assess the need for additional site representatives to meet operational needs.

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 22nd 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 the Department of Energy (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 Department of Energy from the Chairman regarding a multitude of 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 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 the 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 numerous briefings on issues by senior Department of Energy officials from the Office of Environmental Management and National Nuclear Security Administration 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 the Office of Personnel Management.

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 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 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 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) Los Alamos National Laboratory (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 (LLNL) 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.

10. FINANCIAL TABLES

OBJECT CLASS SUMMARY

Actual obligations for FY 2012, projected obligations for FY 2013 and the Board's Budget Request for FY 2014 are presented by object class accounts in Exhibit C. The Board proposes to utilize the budget resources requested in the following manner:

Salaries and Benefits (Object Class 10)

The FY 2014 request includes funding of $21,215,097 to support the projected salary and benefit costs for 120 FTEs. The funding for salaries and benefits represents 70 percent of the Board's FY 2014 estimated obligations. In calculating the projected salary and benefits needs of the Board, the following federal pay and benefits assumptions for Executive Branch employees are used:

- Pay increase of 1.0 percent beginning in January 2014.
- Employee benefits of 27.1 percent of salaries, or $35,292 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 23 percent hold doctoral degrees. Almost all 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 sufficient 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 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) Los Alamos National Laboratory (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 (LLNL) 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.

Travel (Object Class 21)

The Board requests $1,150,000 to support the official travel of Board Members and staff, $100,000 less than the amount requested in FY 2012 President's Budget. 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 the DOE defense nuclear facilities that may affect public health and safety, requiring unplanned travel expenditures to support its work at these sites. During FY 2012, Board Members, technical staff, and the Board's outside technical experts made 132 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 fiscal years, the Board anticipates a continued need for technical staff teams to monitor construction and startup of new DOE defense nuclear facilities, such as the Waste Treatment and Immobilization Plant in Richland, Washington, and the Uranium Capabilities Replacement Project 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 2014 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.

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 7.3 percent of the Board's FY 2014 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. 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 conflict of interest.

A list of major technical support contracts with a brief description of each contractor's area of expertise, and a chart that reflects funding levels for this support are included on pages 101 through 104. The FY 2014 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.

Other Services (Object Class 25.2)

The budget request includes $2,350,000 to fund a wide range of recurring administrative support needs of the Board in FY 2014 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 2012 Budget adjusted for projected escalation under the Board's main support contract, and $75,000 for Certification and Accreditation of the Board's IT systems.

Government Services (Object Class 25.3)

The Board's budget request includes $1,275,000 for reimbursable support agreements with other federal agencies, including $400,000 for inspector general services, $475,000 more than the amount included in the President's FY 2012 Budget. The additional $475,000 is for increases in building security and inspector general services as explained on page 11. 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 $30,500 for maintaining Board facilities (e.g., HVAC maintenance, building alterations and plumbing repairs outside the scope of the building lease).

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.

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.

Acquisition of Assets (Object Class 31)

The Board requests $500,000 acquisition of assets, the same amount included in the President's FY 2012 Budget. This includes $400,000 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 $100,000 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 a small amount (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).

EXHIBIT C: FY 2014 CONGRESSIONAL BUDGET REQUEST

BUDGET ACCOUNT -- (OC)	FY 2012 OBLIGATIONS (Actual)	FY 2013 ANNUALIZED CR	FY 2014 BUDGET REQUEST
PERSONNEL SALARIES -- (11)	$14,504,340	$16,043,041	$16,345,010
PERSONNEL BENEFITS -- (12)	$ 4,702,219	$ 4,836,023	$ 4,870,087
TRAVEL -- (21)	$ 988,088	$ 1,100,000	$ 1,150,000
TRANSPORTATION OF THINGS -- (22)	$ 143,375	$ 130,000	$ 150,000
RENTAL PAYMENTS TO GSA -- (23.1)	$ 2,211,869	$ 2,206,524	$ 2,217,928
COMMUNICATIONS & UTILITIES (23.3)	$ 293,739	$ 260,000	$ 260,000
PRINTING & REPRODUCTION -- (24)	$ 30,838	$ 48,500	$ 48,500
ADVISORY & ASSISTANCE SERVICES -- (25.1)	$ 1,173,013	$ 900,000	$ 900,000
OTHER SERVICES -- (25.2)	$ 2,336,853	$ 2,350,000	$ 2,350,000
GOVERNMENT SERVICES -- (25.3)	$ 979,473	$ 842,500	$ 875,000
GOVERNMENT IG SERVICES – (25.3)	$ 0	$ 200,000	$ 400,000
OPERATION & MAINT. OF FACILITIES -- (25.4)	$ 31,890	$ 30,000	$ 30,500
OPERATION & MAINT. OF EQUIPMENT -- (25.7)	$ 99,264	$ 100,000	$ 100,000
SUPPLIES & MATERIALS -- (26)	$ 275,035	$ 300,000	$ 300,000
ACQUISITION OF ASSETS -- (31)	$ 920,484	$ 500,000	$ 500,000
*** TOTAL OBLIGATIONS ***	$28,690,479	$29,846,588	$30,497,025
NEW BUDGET AUTHORITY	$29,130,000	$29,308,376	$29,915,000
UNOBLIGATED BALANCE - PREV. FY	$ 366,386	$ 924,672	$ 611,360
RECOVERY OF PRIOR YR OBLIGATIONS	$ 118,765	$ 225,000	$ 225,000
TOTAL BUDGETARY RESOURCES	$29,615,151	$30,457,948	$30,751,360
EST. UNOBLIGATED BAL. - CUR. FY	$ 924,672	$ 611,360	$ 254,335
OUTLAYS	$26,519,468	$29,249,656	$29,887,085

ADVISORY & ASSISTANCE CONTRACTS SUMMARY

A list of major (> $25,000 in estimated annual expenditures) advisory and assistance support contracts, with a brief description of each contractor's areas of expertise, follows. The FY 2014 Budget Request includes $750,000 in this account for such contracts to assist the Board in the support of its mission.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

ADVISORY & ASSISTANCE SUPPORT CONTRACTS

(Status as of March 15, 2013)

Contractor	Contract Expiration Date	Description of Work
Ashford & Associates	5/31/13	Provide technical support to the Board involving the review of a Board developed Special Accident Study
David S. Boyd, Inc.	9/30/13	Provide technical support to the Board, specifically involving the evaluation of directives and procedures governing operation and maintenance of defense nuclear facilities. In addition, provides technical support evaluating the implementation of Integrated Safety Management (ISM) for ongoing operations and maintenance, and also preparations for startup or restart of defense nuclear facilities. Example of work includes supporting review of readiness preparations for restart of at the Pantex Plant.
Buttonwood Consulting	5/31/13	Provide technical support to the Board involving the review of a Board developed Special Accident Study
Dr. Najmedin Meshkati	5/31/13	Provide technical support to the Board involving the review of a Board developed Special Accident Study
Mr. Lew Miller	9/30/13	Provide technical support to the Board in the general subject area of defense nuclear facility design, including design basis accident analysis, safety system classification, application of national consensus codes and standards, application of DOE directives, and the review of technical documents supporting the DOE Critical Decision Process.
Mr. Kenneth Pusateri	10/31/13	Support the review, evaluation, and analysis of various internal processes and control activities used by the Office of the Technical Director and prepare draft directives, procedures, and/or policies relating these processes.

Contractor	Contract Expiration Date	Description of Work
Paul C. Rizzo & Assoc., Inc.	3/31/13	Provide technical support to the Board, specifically in the review and evaluation of systems and seismic engineering of structures, systems and components with particular emphasis on geotechnical investigation and soil mechanics, systems engineering, adequacy of analyses performed by DOE contractors, seismological hazards, safety analysis, hydrology, and environmental related issues.
Dr. William Shields	6/30/13	Provide support in such areas as legal and policy matters, fire protection, oversight of DOE directives, interpretation of DOE rules and standards, and safety/accident analyses.
J.D. Stevenson Consulting	3/31/13	Provide technical support to the Board, specifically in the review and evaluation of systems and seismic engineering of structures, systems and components with particular emphasis on applicability and content of orders and standards developed by DOE and its contractors as well as existing codes and standards used at DOE utilities, applicability of commercial nuclear industry standards as they apply to DOE facilities, quality assurance related matters, adequacy of various types of analysis performed by DOE contractors, and hazard and systems classification.
D. Volgenau Associates, Inc.	3/31/13	Provide technical support to the Board, specifically involving the evaluation of directives and procedures governing operation and maintenance of defense nuclear facilities. In addition, provides technical support evaluating ongoing operations and maintenance and for preparations for startup or restart of defense nuclear facilities. Examples of work include supporting the review of programs and activities at Los Alamos National Laboratory and supporting design review at the Savannah River Site.

Defense Nuclear Facilities Safety Board Technical Contracts
Obligations By Fiscal Year