



U.S. DEPARTMENT OF  
**ENERGY**

**Department of Energy  
Activities Relating to the  
Defense Nuclear  
Facilities Safety Board  
Fiscal Year 2013**

Report to Congress  
May 2014

United States Department of Energy  
Washington, DC 20585



## Message from the Secretary

Section 316(b) of the Atomic Energy Act of 1954, as amended, requires the Department of Energy to submit a written annual report to Congress addressing the Department's activities related to the Defense Nuclear Facilities Safety Board (Board). Enclosed is the report on the Department's activities for fiscal year 2013 (FY13).

The Board has a critical advisory role within the Department's safety framework for defense nuclear facilities. Its expertise in reviewing the content and implementation of standards and directives relating to the design, construction, operation, and decommissioning of the Department's defense nuclear facilities helps strengthen the safety protocols at the Department's facilities nationwide. We welcome the Board's advice and recommendations. Through healthy exchanges with the Board and its staff, we can together fulfill our shared goal of protecting workers and the public at the Department's defense nuclear facilities. We look forward to continuing to work closely with the Board in the coming year and welcome Congress's review of the attached FY13 Annual Report.

Highlights of the Department's accomplishments are included in the report's Executive Summary. Additional details, as well as the status of the Department's actions in response to Board recommendations and other Board input, are included in the body of the report.

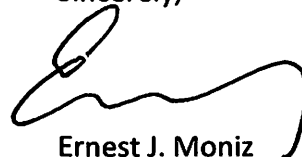
This report is being provided to the following members of Congress:

- **The Honorable Joseph R. Biden, Jr.**  
President of the Senate
- **The Honorable Mary L. Landrieu**  
Chair, Senate Committee on Energy and Natural Resources
- **The Honorable Lisa Murkowski**  
Ranking Member, Senate Committee on Energy and Natural Resources
- **The Honorable Barbara A. Mikulski**  
Chair, Senate Committee on Appropriations
- **The Honorable Richard C. Shelby**  
Ranking Member, Senate Committee on Appropriations
- **The Honorable Dianne Feinstein**  
Chair, Senate Subcommittee on Energy and Water Development
- **The Honorable Lamar Alexander**  
Ranking Member, Senate Subcommittee on Energy and Water Development
- **The Honorable Carl Levin**  
Chair, Senate Committee on Armed Services

- **The Honorable James M. Inhofe**  
Ranking Member, Senate Committee on Armed Services
- **The Honorable Mark Udall**  
Chair, Senate Subcommittee on Strategic Forces
- **The Honorable Jeff Sessions**  
Ranking Member, Senate Subcommittee on Strategic Forces
- **The Honorable John Boehner**  
Speaker of the House of Representatives
- **The Honorable Harold Rogers**  
Chair, House Committee on Appropriations
- **The Honorable Nita M. Lowey**  
Ranking Member, House Committee on Appropriations
- **The Honorable Mike Simpson**  
Chair, House Subcommittee on Energy and Water Development
- **The Honorable Marcy Kaptur**  
Ranking Member, House Subcommittee on Energy and Water Development
- **The Honorable Howard P. "Buck" McKeon**  
Chair, House Committee on Armed Services
- **The Honorable Adam Smith**  
Ranking Member, House Committee on Armed Services
- **The Honorable Mike Rogers**  
Chair, House Subcommittee on Strategic Forces
- **The Honorable Jim Cooper**  
Ranking Member, House Subcommittee on Strategic Forces
- **The Honorable Fred Upton**  
Chair, House Committee on Energy and Commerce
- **The Honorable Henry A. Waxman**  
Ranking Member, House Committee on Energy and Commerce

If you have any questions or need additional information, please contact me or Mr. Brad Crowell, Assistant Secretary for Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,



Ernest J. Moniz

## Executive Summary

The Department of Energy (DOE or the Department) welcomes the opportunity to provide this annual report to Congress in accordance with Section 316(b) of the Atomic Energy Act of 1954, as amended. This report describes the Department's activities during fiscal year 2013 (FY13) related to the Defense Nuclear Facilities Safety Board (DNFSB or the Board), including the Department's safety initiatives and activities, the status of Board recommendations, and interface activities between the Department and the Board. The Department has a unique role as owner, operator, and regulator of the nation's defense nuclear facilities, and the Board's expertise has enhanced the Department's nuclear safety posture at these facilities. The Department's nuclear safety assurance program includes continuously improved policies, procedures, activities, and initiatives, which collectively support safety implementation and a thorough response to emergent nuclear safety issues. As nuclear safety vulnerabilities are discovered, DOE determines their causes in order to address them both locally and across the complex if applicable.

The Department has undertaken safety initiatives and activities to reinforce and ensure nuclear safety performance. These initiatives respond to issues identified by the Board, as well as issues proactively identified by the Department through site, facility, and program office self-assessments; through the independent oversight activities of the DOE Office of Health, Safety and Security; and through other Departmental safety improvement initiatives and activities. This report describes the Department's FY13 initiatives and activities related to the Board.

### Progress on Initiatives and Activities

*Los Alamos National Laboratory Seismic Initiative at the Plutonium Facility.* DOE has undertaken physical upgrades to reduce seismic risk at the Los Alamos National Laboratory (LANL) Plutonium Facility (PF-4) concurrently with a new seismic risk analysis. FY13 improvements have included a new safety-class nuclear material storage system using fire-rated safes and containers, repairs to the facility's main fire wall, a strengthened roof, braced ventilation room columns and fan pads, and repairs above the facility floor.

*Los Alamos National Laboratory Criticality Safety Program.* In June 2013, the LANL director suspended programmatic activities in PF-4 because of criticality safety program non-compliance with DOE requirements, and to resolve a backlog of criticality safety issues. In light of Board observations and Federal and contractor assessments, the National Nuclear Security Administration (NNSA) has established a corrective action plan for a deliberate and formal resumption of operations, and the laboratory has implemented improvements to ensure that criticality safety procedures are in place and in use. The corrective action plan involves further program reviews to determine the root causes of the criticality safety program deficiencies.

*Aging Facilities.* Recognizing the challenges posed by aging but essential defense nuclear facilities and budget challenges, the Department is analyzing the most pressing age-related hazards confronting its older facilities and is implementing measures to eliminate or mitigate those hazards on a priority basis. During FY13, the Department continued with activities to address age-related issues at its higher risk

facilities. The report discusses three of many examples: the Aging Management Program at the Y-12 National Security Complex, upgrades to aging fire suppression systems at the Pantex Plant and the Savannah River Site, and improvements at the Waste Encapsulation and Storage Facility at the Hanford Site.

**Safety Culture.** Throughout FY13, safety culture assessments and improvements were a priority focus for DOE. In a memorandum to DOE managers on September 20, 2013, the Secretary and Deputy Secretary reiterated the critical importance of safety culture and a safety conscious work environment. The Secretary emphasized his expectations for a safety culture built on an environment of trust and mutual respect, worker engagement and open communication, an atmosphere that promotes a questioning attitude with effective resolution of reported problems, and continuous learning. As part of the Department's effort to improve safety culture, during FY13 a team of DOE, NNSA, national laboratory, and site contractor subject matter experts were assembled. In collaboration with the DOE National Training Center, this team designed, developed, and implemented a unique course, sponsored by the Secretary and Deputy Secretary, titled *SAF-200, Safety Conscious Work Environment*. Additionally, safety culture assessments were conducted at sites throughout the nuclear weapons complex, at both the Federal and contractor level, to support an understanding of safety culture health and identify areas to improve.

**Work Planning and Control.** During FY13, the Department made significant progress toward completing its work planning and control (WP&C) commitments to the Board. These commitments target two specific outcomes: enhancing complex-wide awareness and reinforcing the need for rigorous activity-level planning, and strengthening the guidance and formality associated with contractor implementation and Federal monitoring of these activities. Actions to create new directives are laying a firm foundation to ensure effective WP&C program implementation and oversight for the future.

**Lessons from Fukushima.** In April 2013, the Department issued an Operating Experience Level 1 Document (OE-1: 2013-01), *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*. This document requires all higher hazard DOE nuclear facilities to evaluate their vulnerability to severe accidents beyond the facility's design basis in order to identify opportunities for improving their capabilities to mitigate such events, and then provide a formal response to their respective under secretaries.

### **Progress on Board Recommendations**

This report documents the Board closure of three recommendations. The Board issued no new recommendations in FY13. Eleven recommendations remained open at the end of FY13. The number of open recommendations has remained fairly constant, ranging from 10 to 14 over the past decade, as new recommendations are issued and older ones closed.



## REPORT TO CONGRESS

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## I. Legislative Language

This report is provided in accordance with 42 U.S.C. § 2286e:

SEC. 316. REPORTS. [42 U.S.C. § 2286e]

(b) DOE REPORT. The Secretary of Energy shall submit to the Committees on Armed Services, Appropriations, and Energy and Commerce of the House of Representatives and the Committees on Armed Services, Appropriations, and Energy and Natural Resources of the Senate each year, at the same time that the President submits the budget to Congress pursuant to section 1105(a) of Title 31 [United States Code], a written report concerning the activities of the Department of Energy under this subchapter during the year preceding the year in which the report is submitted.

## II. Background and Organization

The Department of Energy (DOE or the Department) welcomes the opportunity to provide this annual report to Congress describing the Department's activities in fiscal year 2013 (FY13) that are related to the Defense Nuclear Facilities Safety Board (DNFSB or Board).

The Board is an independent executive branch agency established by Congress in 1988 to provide independent analysis, advice and recommendations to the Secretary of Energy regarding public health and safety issues at the Department's defense nuclear facilities. The Board reviews and evaluates the content and implementation of standards and directives relating to the design, construction, operation, and decommissioning of the Department's defense nuclear facilities. Figure 1 shows the locations of DOE's active defense nuclear facility sites.

The Board and the Department communicate and interact through a variety of mechanisms, including formal Board recommendations, formal reporting requirements, Board letters requesting information, letters providing suggestions, letters providing information (e.g., staff trip reports and reports on specific issues), Board-sponsored public meetings and hearings, Board briefings, discussions, and Board site visits. The remainder of this report is organized as follows:

- **Section III, Departmental Nuclear Safety Initiatives and Activities** describes broad-based Departmental activities affecting environment, safety, and health that are of interest to the Board.
- **Section IV, FY13 Progress on Board Recommendations**, describes Departmental activities completed or ongoing in FY13 to implement Board recommendations accepted by or under review by the Secretary of Energy.
- **Section V, Interface Activities**, describes Departmental activities to maintain communications and improve interaction between the Department and the Board.

- **Appendix A** contains tables summarizing the status of the 11 open Board recommendations, the 15 letter reports completed in FY13, and two Board public meetings/hearings held in FY13.
- **Appendix B** lists acronyms and abbreviations.

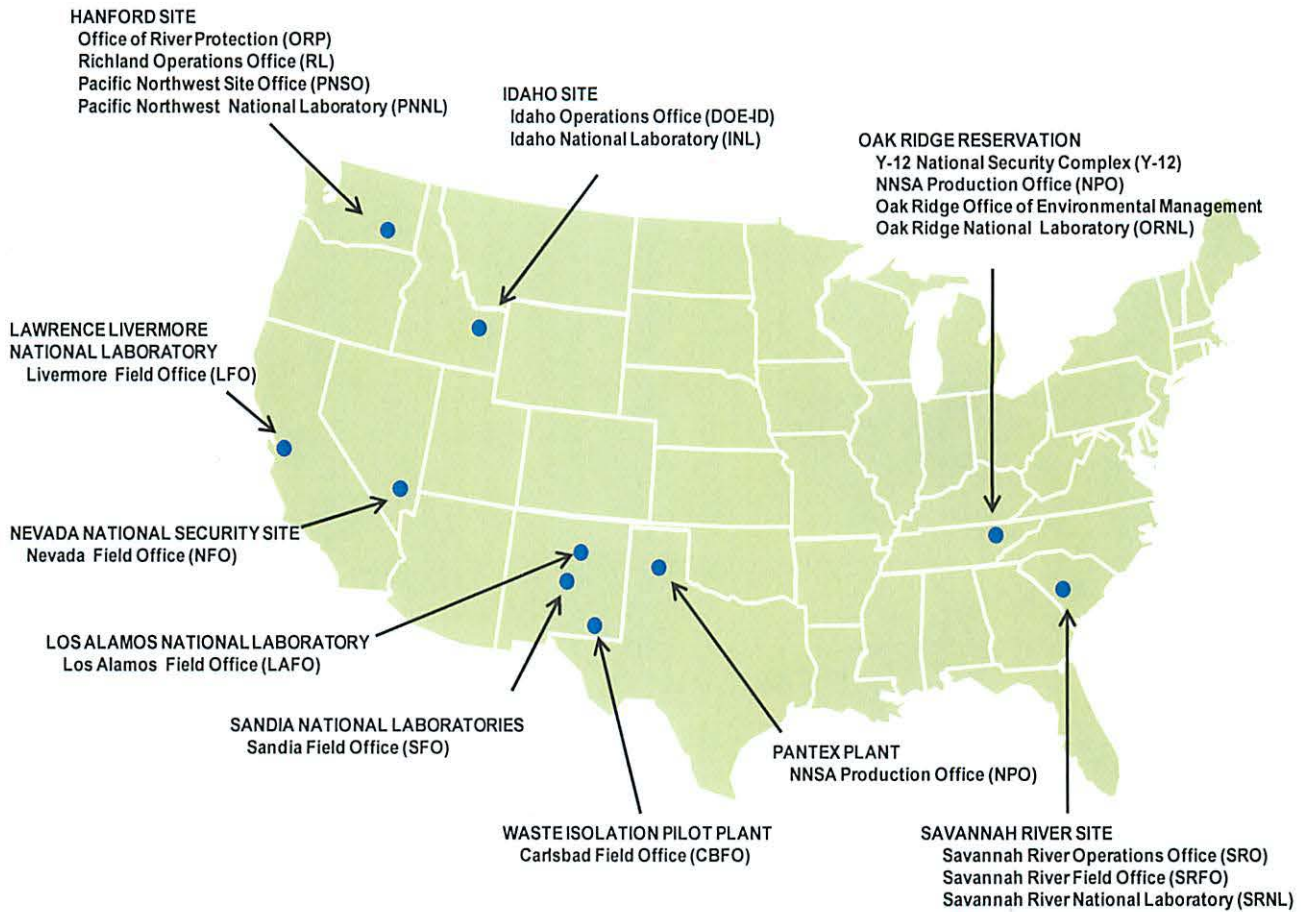


Figure 1. Department of Energy Active Defense Nuclear Facility Sites

### III. Departmental Nuclear Safety Initiatives and Activities

This section describes the major FY13 initiatives and activities the Department undertook to improve and ensure its nuclear safety performance. These initiatives respond both to issues identified by the Board and to issues proactively identified by the Department through site, facility, and program office self-assessments; through the independent oversight activities of the DOE Office of Health, Safety and Security (HSS); and through other Departmental safety improvement initiatives and activities. The Department ensures protection of its workers, the public, and the environment from nuclear hazards

through a rigorous, proactive nuclear safety program and a robust regulatory framework. DOE operates defense nuclear facilities under specific nuclear safety enabling legislation and well-established rules in the Code of Federal Regulations (CFR). DOE establishes and implements nuclear safety policies, requirements, and guidance within a system of directives and technical standards that are cited in contract terms and conditions. Several layers of oversight, as well as enforcement activities, are used to assure compliance with DOE's safety requirements. This report describes the Department's FY13 Board-related nuclear safety initiatives and activities, operating within this framework.

### **A. Nuclear Safety at the Los Alamos National Laboratory PF-4 Facility**

The Plutonium Facility (PF-4) at Los Alamos National Laboratory (LANL) is the nation's only fully operational, full capability plutonium science and manufacturing facility; its national security mission is unique. In 1996, DOE funded a seminal study by LANL scientists and contractors that concluded, in part, that "The ground shaking hazard at LANL is higher than might be indicated by the historical record and therefore higher than is commonly believed possible." Subsequent studies have confirmed and further illuminated PF-4's seismic vulnerabilities. PF-4 is 36 years old and has approximately 30 years of projected remaining service. However, having been designed and built in the 1970s, it lacks the structural ductility and redundancy required by today's building codes and standards, particularly in regard to seismic rigidity and post seismic event fire protection. Collectively, the unique mission, the material at risk, the known seismic hazard, the infrastructure age, and the potential for public and worker exposure following an earthquake and/or fire pose a unique combination of nuclear safety challenges.

*Seismic and Fire Safety Enhancements.* In late FY12, the DNFSB communicated to DOE its concerns about prior seismic analyses of the PF-4 facility and suggested a need to perform a more representative alternate analysis. In his response to the DNFSB, the Deputy Secretary committed the National Nuclear Security Administration (NNSA) to conduct a modal loading analysis of PF-4 to augment the previous analyses. The NNSA believes that this alternate analysis, which is currently under way, will further its understanding of PF-4's seismic integrity and will provide additional information for evaluating the facility's structural elements. NNSA has consulted with the DNFSB throughout this process to ensure that the assumptions and methodologies underpinning the modal loading analysis are appropriate and well documented. Concurrently with this analysis, DOE has undertaken physical upgrades to reduce seismic risk for PF-4. For example, during FY13, LANL: (1) installed a new safety-class nuclear material storage system using fire rated safes and containers; (2) assessed and repaired the facility's main fire wall; (3) strengthened the roof and braced the ventilation room columns and fan pads; and (4) repaired the mezzanines located above the laboratory floor. These upgrades were completed as required by Department standards, based on revised site-specific seismic hazards.

*Criticality Safety Measures.* The Board staff reviewed PF-4 operations in May 2013 and identified several issues relating to criticality safety, leading to the LANL director suspending fissionable material operations at PF-4. LANL then commissioned an external review team of subject matter experts from around the complex to provide criticality safety advice and recommendations. This team identified

longstanding weaknesses in the criticality safety program, and, in response, LANL developed both immediate corrective actions and longer-term improvements. Key improvements being made include ensuring rigorous compliance with all applicable criticality safety standards and conduct-of-operations requirements, ensuring that criticality safety documentation is both current and readily available to staff, and providing regular criticality safety refresher training to fissile material handlers.

During FY13, LANL received Federal concurrence for the criticality safety limits established for most fissile material operations on site. The exceptions involve solutions and high-fissile-mass operations, which will receive higher scrutiny as part of the resumption of PF-4 operations. During FY13, LANL also began a campaign to increase the number of qualified criticality safety staff members.

## **B. Nuclear Safety Oversight**

The Department has Congressionally mandated nuclear safety oversight responsibilities at DOE's defense nuclear facilities and the Board is responsible for advising and making recommendations to the Secretary of Energy on safety issues at DOE defense nuclear facilities. These two responsibilities are complementary, and the Board and the Department strive to ensure that the nation's defense nuclear facilities are designed, operated, and ultimately decommissioned in a safe manner.

Over the past three years, DOE's oversight approach shifted from large headquarters and independent oversight teams to a more reliance on DOE field and site office line management oversight. This shift has resulted in greater reliance on contractor assurance systems and line management assessment of these systems. Although there are benefits to increased use of contractor assurance systems, the ultimate ownership of, and responsibility for, nuclear safety oversight remains with the Department. Consequently, the Department has made considerable effort to assess and enhance its oversight model, and senior leadership has testified that DOE does not, and will not, have an "eyes on, hands off" approach to oversight of nuclear and high hazard operations. The Department is aware of the need to establish a clear understanding of the roles and responsibilities between Federal line management oversight and contractors executing their contractor assurance systems.

## **C. Nuclear Safety at Aging Facilities**

Many of the Department's defense nuclear facilities are rapidly approaching or have already exceeded their expected life spans, and some facilities do not meet modern safety standards. The DNFSB's Fourth Annual Report to Congress, *Summary of Significant Safety-Related Aging Infrastructure Issues at Operating Defense Nuclear Facilities*, issued in early FY14, noted that DOE made progress during FY13 in resolving issues at some of its aging facilities. One example is NNSA's completion of structural upgrades at PF-4. However, the report also identified the aging tanks at Hanford's Tank Farms and a degraded fire protection water supply system at the Savannah River Site (SRS) as emerging concerns. The Board cites LANL's Chemistry and Metallurgy Research facility, constructed in 1952, and the 9212 Complex at the Y-12 National Security Complex (Y-12), which began service in 1951, as facilities of particular concern from an age perspective.

Recognizing the challenges posed by aging but essential defense nuclear facilities and budget needs, the Department is analyzing the most pressing age-related hazards confronting its older facilities and

implementing measures to eliminate or mitigate those hazards on a risk priority basis. During FY13, the Department continued with activities specifically to address age-related issues at its higher risk facilities such as PF-4, discussed above. Examples of other activities that were initiated or continued in FY13 to address age-related concerns at unique or mission-critical facilities are described below.

*Y-12 Aging Management Program.* During FY13, the Y-12 production organization promulgated a Facilities and Infrastructure Aging Management Strategy and a Y-12 Aging Management Program (AMP) procedure. The AMP will be applied to production facilities and infrastructure in a graded approach for all Y-12 missions, with a focus on the enriched uranium (EU) nuclear facilities. The objectives of the AMP are to integrate the various aging management processes already under way, including the system health program, and to ensure that risks for continued safe operations are identified, gaps in gathering data to evaluate risk for continued safe operations are found, and management is informed when the risk for continued safe operations is not acceptable. During FY13 the site contractor, B&W Y-12, implemented a system health reporting program as an enhancement to existing Y-12 AMP management tools, which include the Continued Safe Operability Oversight Team and facility-specific operations plans. The purpose of the system health reporting program is to improve the information used to reflect the overall health of key production and safety-related systems by not only tracking system availability, but also defining a common set of metrics to better characterize system sustainability. To date, B&W Y-12 has developed system health reports for 22 systems.

*Aging Fire Suppression Systems.* Throughout FY13, the Department assessed vulnerabilities posed by aging fire suppression systems at several sites and implemented upgrades on a priority basis. In January 2013, HSS issued the results of an Independent Oversight review of SRS that included selected aspects of fire protection system design. Identified deficiencies at the SRS A Area have since been addressed through upgrades that allow the A Area water supply to provide adequate water flow and pressure to meet the safety significant fire suppression demands of the Savannah River National Laboratory. Although the B&W Pantex fire protection program for the Pantex Plant is excellent in many respects, recent HSS and Board reviews have documented some areas, often age-related, in need of upgrading. During FY13, B&W Pantex continued with a multi-year, prioritized program of upgrades that include replacement of the plant's high pressure fire loop, fire protection lead-ins, and most of the plant's fire penetration seals, as well as replacement or refurbishing of fire alarm panels. Collectively, these upgrades have significantly enhanced this critical safety system.

*Waste Encapsulation Storage Facility.* The integrity of the concrete walls at the aging Waste Encapsulation Storage Facility (WESF) at Hanford illustrates the Department's approach to analyzing and mitigating age-related hazards. A November 2012 safety evaluation report for the WESF concrete pool cells led to a determination that the pool cell concrete has sufficient strength to withstand a design basis earthquake. In addition, WESF completed the redistribution of the capsules in the pool in FY13, which placed higher-emitting capsules in positions farther from the pool cell walls. Thermal analysis showed that this configuration has mitigated the exposure of pool concrete to degrading gamma radiation.

## D. Nuclear Safety in New Facility Design

*Hanford Site Waste Treatment and Immobilization Plant.* During FY13, significant work continued on resolving a range of technical issues that have stalled progress in designing both the High Level Waste Vitrification Facility and the Pretreatment Facility at the Waste Treatment and Immobilization Plant (WTP). Actions have also been taken to better integrate engineering, safety, and operations into the overall design process. The WTP Design Completion Team, chartered in October 2012, is now the focal point for addressing all design-related issues at WTP. The project's integrated project team, composed of DOE and contractor staff, is developing a safety design strategy (SDS) in accordance with DOE Standard 1189-2008, *Integration of Safety into the Design Process*, to incorporate safety requirements and considerations into the engineering design process. The SDS describes the major hazards anticipated at WTP and how those hazards will be comprehensively addressed using safety structures, systems, and components. The technical issues that have impeded completion of the final design have been organized into nine topical groups: (1) hydrogen gas release from vessel solids, (2) criticality in WTP vessels, (3) hydrogen in pipe and ancillary vessels, (4) pulse jet mixing (PJM) vessel performance, (5) erosion and localized corrosion, (6) design redundancy and in-service inspection, (7) black cell vessel structural integrity, (8) facility ventilation, and (9) waste preconditioning requirements. Dedicated technical issue resolution teams have been established to resolve each of these issues. Although resources are being applied to these areas, continued focus is needed.

*Y-12 National Security Complex Uranium Processing Facility.* The NNSA's strategy to meet the nation's EU processing requirements is to replace Y-12's aging EU processing facilities with a new Uranium Processing Facility (UPF). The UPF is in design and will undergo a phased construction and startup, with planned initial operations to support the 9212 Complex processes in the mid-2020s and full operations in the 2030s. Since 2010, the Board has raised a series of safety concerns regarding the design of the UPF. On October 25, 2013, the Government Accountability Office (GAO) released its second report on the UPF, *Information on Safety Concerns with the Uranium Processing Facility*, GAO-14-79R. The report is based on an extensive GAO audit conducted April-October 2013, which examined the Board's UPF concerns and NNSA's actions to address them. The report states that "As of June 2013, the Safety Board also identified 15 specific safety concerns with the UPF's design, and NNSA has taken actions—or has agreed to take actions—to address 14 of these concerns." The GAO report notes that Board staff and NNSA officials agreed that none of the 15 concerns should prevent the UPF from achieving approval of targets for the project's cost, schedule, and scope in 2015 as scheduled. The GAO audit report did not include any recommendations for congressional consideration or agency action.

## E. Nuclear Safety Policy

The Department protects its workers, the public, and the environment from nuclear hazards through a rigorous, proactive nuclear safety program and through equally rigorous responses to incidents or safety vulnerabilities identified through internal or external oversight. The Department's nuclear safety program includes continuously improved policies and procedures to support safety implementation and a thorough response to emergent nuclear safety issues within the complex. DOE's

nuclear safety policies, standards, and requirements comprise the foundation of its proactive nuclear safety assurance stance.

As further discussed in Section IV, revision of DOE Standard 3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, was actively pursued during FY13, including significant efforts to incorporate the perspectives of key stakeholders, such as site offices, contractors, and the DNFSB. Also, updates to DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*, and DOE Order 420.1C, *Facility Safety*, have been initiated.

## **F. Nuclear Explosives Safety**

In 2012, the DNFSB expressed concerns about a nuclear explosives safety (NES) issue at the Pantex Plant and about the independence and authority of the plant's NES organization. Organizational and operational corrective actions and improvements began immediately and continued into FY13. In April 2013, B&W Pantex completed a full causal factors analysis of the specific event that led to the initial DNFSB concerns and initiated a corrective action plan. The Board has considered some of NNSA's decisions about NES matters to be non-conservative, counter to promoting a healthy safety culture, and not fully transparent to the Board. Although discussions are ongoing, the technical issues have not yet been resolved. The NNSA Associate Administrator for Safety and Health, in his new NES oversight role, has taken the initiative to conduct a bottom-up review of NES directives and ensure clarity of requirements. In addition, NNSA has committed to reviewing the implementation of DOE Standard 3016, *Hazard Analysis Reports for Nuclear Explosive Operations* (a companion to 10 CFR 830, *Nuclear Safety Management*) to ensure that Federal expectations are met.

## **G. Nuclear Criticality Safety**

As discussed above in Section III.A, nuclear criticality safety (NCS) issues at the PF-4 facility resulted in the suspension of programmatic activities in June 2013. The corrective plan includes extensive procedure and documentation reviews, posting validation of criticality safety limits, proper labeling and handling of fissile materials, additional personnel training and certifications, and management engagement. At Y-12, a March 2013 review of the NCS program by B&W Y-12 indicated a need to enhance the program in the areas of criticality safety evaluation implementation procedures, the roles and responsibilities of the criticality safety officer and NCS engineers, and the scope and requirements of periodic reviews. In July 2013, in coordination with the DOE Criticality Safety Support Group and the NNSA Production Office, the NNSA Office of Infrastructure and Operations examined the Y-12 criticality safety operational review process, noting that senior Y-12 management had initiated and fully supported the NCS Implementation Review Plan and that significant progress had been made.

## **H. Nuclear Safety Culture**

*Secretarial Reiteration of Safety Culture Expectations.* Shortly after his confirmation, the Secretary traveled to Hanford to gain a firsthand understanding of the technical and safety culture issues at the WTP. In a memorandum to DOE managers on September 20, 2013, the Secretary and Deputy Secretary reiterated the critical importance of safety culture and a safety conscious work environment (SCWE).

The Secretary emphasized his expectations for a safety culture built on an environment of trust and mutual respect; worker engagement and open communication; and an atmosphere that promotes a questioning attitude, with effective resolution of reported problems and continuous learning. The memorandum also committed to fostering a SCWE across all Departmental operations and stated that DOE's ultimate safety objective is to have zero accidents, work-related injuries and illnesses, regulatory violations, and reportable environmental releases. Throughout FY13, safety culture assessments and improvements were a priority for DOE

*Safety Conscious Work Environment.* SCWE is an essential aspect of safety culture related to a work environment in which employees feel free to raise safety concerns to management or regulators without fear of retaliation. As part of the Department's effort to improve safety culture, during FY13 a team of DOE, NNSA, national laboratory, and site contractor subject matter experts assembled, in collaboration with the DOE National Training Center, to develop a senior leadership course, *SAF-200, Safety Conscious Work Environment*. The resulting course is based on best practices in the commercial nuclear industry, the oil and gas industry, and other high hazard industries; is aligned with the DOE integrated safety management system (ISMS); and focuses on the newly developed DOE ISMS guide. The course was delivered 70 times to approximately 1,700 DOE and contractor managers and leaders at both DOE Headquarters and sites across the DOE complex. In addition, DOE program and site offices and contractors conducted SCWE self-assessments using guidance provided by the Recommendation 2011-1 (*Safety Culture at the Waste Treatment and Immobilization Plant*) implementation team. An independent evaluation of line self-assessments of SCWE at sites across the DOE complex was initiated in May 2013 and will be completed in 2014.

## **I. Nuclear Safety at the Work Planning and Control Level**

On August 28, 2012, the Board issued a letter to DOE expressing concerns associated with deficiencies and weaknesses in the implementation of work planning and control (WP&C) at the activity level. The Board asked to be apprised of DOE's actions, both taken and planned, to address WP&C deficiencies and weaknesses, and to be informed of DOE's assessment of the effectiveness of these actions. During FY13, working across DOE program and staff offices, the Department has made significant progress toward completing each of the WP&C commitments stated to the Board. These commitments target two specific outcomes: (1) enhance complex-wide awareness and reinforce the need for rigorous activity-level planning, and (2) strengthen the guidance and formality associated with contractor implementation and Federal monitoring of these activities. The effort has enhanced complex-wide awareness through an integrated safety management (ISM) workshop and through analysis of WP&C weaknesses in HSS safety databases. Steps have been taken to develop a process handbook and guidance for Federal oversight in order to institutionalize guidance and oversight. This documentation will be promulgated within the DOE directives system. In addition, individual sites and program offices have undertaken an extensive list of specific activities. Sustained Federal and contractor oversight of the effectiveness of activity level WP&C is supported by the array of Departmental actions and strong Secretary and Deputy Secretary leadership and support.



## **J. Nuclear Safety Emergency Preparedness: Lessons from Fukushima**

After the March 2011 Fukushima Daiichi nuclear plant accident in Japan, DOE embarked on several initiatives to investigate the safety posture of its nuclear facilities relative to beyond design basis events (BDBEs). These initiatives have included issuing Safety Bulletin 2011-01, *Events Beyond Design Safety Basis Analysis*; conducting pilots to refine possible process improvements; and conducting three nuclear safety workshops. DOE has issued two reports documenting the results of these initiatives: *Review of Requirements and Capabilities for Analyzing and Responding to Beyond Design Basis Events*, August 2011; and *Beyond Design Basis Event Pilot Evaluations: Results and Recommendations for Improvements to Enhance Nuclear Safety at DOE Nuclear Facilities*, January 2013.

In April 2013, the Department issued an Operating Experience Level 1 Document (OE-1: 2013-01), *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*. This document requires all higher hazard DOE nuclear facilities to evaluate their vulnerability to severe accidents beyond the facility's design basis and to identify opportunities for improving their capabilities to mitigate such events. In addition, the Department's Independent Oversight organization issued an April 2013 lessons-learned report on emergency management reviews conducted in 2011 and 2012 regarding preparedness for severe natural phenomenon events at sites with hazard category 1 and 2 nuclear facilities, some of which also have significant quantities of hazardous chemicals. Several additional Independent Oversight reviews of preparedness for severe natural phenomenon events were conducted at other sites. Early results show that many site plans do not fully consider the ramifications of severe natural phenomenon event consequences by considering hazardous material (HAZMAT) releases from multiple facilities, the degradation of command centers and employee shelters, the proximity of command centers to HAZMAT, and complications in acquiring offsite assets. Also, Independent Oversight identified practices at some sites that were not consistent with DOE policy.

## **K. Other Office of Environmental Management Nuclear Safety Activities**

In FY13, the DOE Office of Environmental Management (EM) continued program-wide changes and initiatives intended to improve safety culture across the DOE complex. These changes were related to execution of the implementation plan (IP) for DNFSB Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant*. However, these efforts extended well beyond the WTP. EM identified emerging safety issues through ongoing awareness and analysis of operational experience and efforts to improve the quality assurance (QA) program across EM sites. Examples of EM efforts supporting operational experience improvements include:

- Implementation of the revised Corporate Quality Assurance Plan document including status/verification reviews by EM Headquarters;
- Assessments of WP&C and conduct of operations at multiple sites;
- Participation in the DOE Nuclear Criticality Safety Support Group;
- Support of the DOE differing professional opinion process; and
- Support and review of EM sites' annual ISMS and QA report declarations.

EM continues to work with sites to promote the widespread use of performance indicators targeted at identifying trends, positive and negative, so that action can be taken before an event occurs. EM also instituted the Integrated Site Team (IST) matrix concept. The responsibilities of the IST span the functional areas of safety, project management, program planning, and budget execution.

#### **L. Other National Nuclear Security Administration Nuclear Safety Activities**

The Chief of Defense Nuclear Safety's biennial reviews of NNSA offices with nuclear safety responsibilities, initiated in 2005, continued in FY13. The fourth round of reviews commenced in FY13 with reviews at the Nevada Field Office and at the Savannah River Field Office, the latter including a review of the Federal oversight of the Mixed Oxides (MOX) project under the Office of Defense Nuclear Nonproliferation. These reviews noted continuing steady improvement in field office performance.

## **IV. FY13 Progress on Board Recommendations**

### **A. Overview**

The Board issues recommendations to the Secretary for specific measures that should be adopted to ensure adequate protection of public health and safety. The Secretary is required to respond to each Board recommendation within 45 days after its publication in the *Federal Register* (or longer, if granted additional time). In addition, the Secretary must provide an IP to the Board within 90 days after publication in the *Federal Register* of the Secretary's acceptance of all or part of a recommendation (or longer, upon appropriate notice). The Department's policy is to begin IP development in parallel with the development of the Department's response, if it is expected that the Secretary will accept the recommendation in whole or in part. The Department strives to satisfy all IP actions within one year of issuance. However, most IP schedules extend beyond one year due to the scope and technical complexity of the safety issues being addressed, the lengthy processes for revising DOE directives, and the challenges inherent in implementing and verifying complex-wide changes.

Appendix A, Table A.1, *Open Board Recommendations*, lists the 11 recommendations that remained open at the end of FY13, the date they were issued, and the timeframe that DOE currently projects for completing the associated IP actions. The number of open recommendations has remained fairly constant (between 10 and 14) over the past decade as new recommendations were issued and older ones closed. All recommendations (both open and closed), the associated IPs, and a chronological record of related correspondence between DOE and the Board can be accessed on the websites of the DOE Office of the Departmental Representative to the DNFSB (DR) (<https://hsspublic.energy.gov/deprep/>) or the Board (<http://www.dnfsb.gov/>).

This report documents the closure of three recommendations which include: Recommendation 2008-1: *Safety Classification of Fire Protection Systems*, Recommendation 2007-1: *Safety-Related In Situ Nondestructive Assay of Radioactive Materials* and Recommendation 2002-3: *Requirements for the*

*Design, Implementation, and Maintenance of Administrative Controls.* The Board issued no new recommendations in FY13.

## **B. Recommendations Closed in FY13**

### ***2008-1: Safety Classification of Fire Protection Systems***

Recommendation 2008-1 was opened in January 2008. It identified the need for standards applicable to the design and operation of fire protection systems that are relied on as a primary means of protecting the public and workers from radiological hazards at DOE defense nuclear facilities.

In a letter dated March 21, 2013, DOE advised the Board that the Department had developed these standards; included them in DOE Standard 1066-2012, *Fire Protection*; and incorporated appropriate changes into DOE Order 420.1C, *Facility Safety*. Both the standard and the order were issued in December 2012. By letter dated April 22, 2013, the Board agreed that DOE's actions were sufficient to close this recommendation.

### ***2007-1: Safety-Related In Situ Nondestructive Assay of Radioactive Materials***

Recommendation 2007-1 was opened in April 2007. It identified the need for improved assay programs for radioactive material holdup at DOE defense nuclear facilities. By letter dated October 22, 2012, DOE advised the Board that it had completed all actions necessary to satisfy the IP. By letter dated March 19, 2013, the Board agreed that DOE's actions were sufficient to close this recommendation.

### ***2002-3: Requirements for the Design, Implementation, and Maintenance of Administrative Controls***

The Board issued Recommendation 2002-3 on December 11, 2002. The recommendation cited technical inadequacies in a number of safety-related administrative controls (now called specific administrative controls) proposed for, or in use at, various defense nuclear facilities. The Secretary accepted the recommendation on January 31, 2003.

In 2007, the Department completed the actions to establish specific administrative control guidance and proposed closing this recommendation. The Board countered by citing a need for additional actions to ensure appropriate implementation of specific administrative controls in the field. In response, the Department performed a series of line management and independent oversight reviews to verify that specific administrative controls had been implemented properly. These reviews confirmed that specific administrative controls were appropriately implemented in the field and that processes are in place to continue oversight of their proper implementation.

In a letter dated August 21, 2013, the Secretary notified the Board that all actions contained in the IP for Recommendation 2002-3 had been completed. In early FY14, the Board agreed and confirmed closure of this recommendation.

## C. Open Recommendations

### ***2012-2: Hanford Tank Farms Flammable Gas Safety Strategy***

The Board issued Recommendation 2012-2 on September 28, 2012. It reflected the Board's belief that current operations at the Hanford Tank Farms require safety-significant active ventilation of double-shell tanks to ensure the removal of flammable gas from the tanks' headspace. A significant flammable gas accident would have considerable radiological consequences, endanger personnel, contaminate portions of the Tank Farms, and seriously disrupt the Hanford waste cleanup mission. The Board also recommended that DOE install real-time monitoring to measure tank ventilation flow rates and perform other upgrades on indication systems used to perform safety-related functions. DOE delivered the IP for this recommendation to the Board on June 6, 2013.

Two IP actions were completed during FY13; 11 remain open. During FY13, the DOE Tank Farm operations contractor completed implementation of a revision to the Tank Farms documented safety analysis (DSA), which added a new control that measures ventilation flow through each tank on a periodic basis, supplementing the existing flammable gas monitoring control. This revision also placed requirements on operability of the in-service and standby primary ventilation trains.

### ***2012-1: Savannah River Site Building 235-F Safety***

The Board issued Recommendation 2012-1 on May 9, 2012. The recommendation reflected the Board's stance that the Department should take action to remove and/or immobilize the residual contamination within Building 235-F because of the potential dose consequences associated with a radiological release to collocated workers and the public. The Board also believed that DOE must take more effective near-term actions to prevent a major fire in Building 235-F. The Secretary accepted the recommendation, agreeing with the need to take action to reduce the hazards associated with the material at risk that remains as residual contamination within Building 235-F. The Secretary's acceptance letter noted DOE's actions to remove special nuclear material from Building 235-F, remove transient combustible material, and limit access to the building. The IP for Recommendation 2012-1 was issued on December 5, 2012.

Ten IP actions were completed in FY13, all on schedule. Nineteen IP actions remain open; completion of all IP actions is currently scheduled for 2018. DOE Savannah River made a strong start on the 235-F risk reduction project, including the development of a Deactivation Project Plan. A core project management team with experience in deactivation and decommissioning projects was assembled. Other accomplishments include the fabrication and installation of a plutonium fuel form cell mockup facility for procedure development, training, operator qualification, and work planning. A transient combustible control program was implemented, and a plan for fixed combustible removal, encapsulation, or isolation was developed. A key requirement of the IP is the execution of at least one formally-assessed drill each year based on a postulated radiological release from Building 235-F. Three such drills were conducted in FY13. The overall performance of the facility's emergency response organization, as demonstrated in these drills, indicates that the facility is capable of responding effectively to a radiological release from 235-F and implementing protective actions to protect personnel in facilities and construction sites surrounding 235-F.

**2011-1: Safety Culture at the Waste Treatment and Immobilization Plant**

The Board issued Recommendation 2011-1 on June 9, 2011. The recommendation reflected the Board's belief that, taken as a whole, the Board's investigative record indicates that the safety culture at WTP was in need of prompt, major improvement and that corrective actions would be successful and enduring only if championed by the Secretary of Energy. The Secretary accepted the recommendation, and the IP was delivered to the Board on December 27, 2011. On September 14, 2012, an IP addendum was delivered to supplement the original IP, based on information and experience accumulated to date during execution of the IP. A revised schedule for completing some IP milestones related to complex-wide actions was sent to the Board on September 27, 2013.

During FY13, the Department completed three non-recurring<sup>1</sup> IP activities, and 10 activities remain open. The activities completed in FY 13 represent substantial progress toward completing the IP. One part of this recommendation was that DOE should conduct extent-of-condition reviews to determine the state of safety culture at sites/facilities other than the WTP. By letter dated February 11, 2013, DOE transmitted the final safety culture assessment report to the Board, marking the completion of the independent reviews of selected major DOE projects called for in the recommendation.

In a letter dated April 30, 2013, the EM informed the Board that the Office of River Protection (ORP) had completed its Safety Culture Improvement Plan addressing ORP actions for safety culture improvements, including responses to HSS's recommendations for ORP and changes to management and employee performance plans that include specific measures for meeting safety culture expectations. ORP has now completed the nine near-term actions described in this plan. By letter dated May 30, 2013, DOE transmitted to the Board a report on the validation and effectiveness reviews of ORP contractor safety culture improvement actions. The report concluded that ORP has made a substantial start toward improving its safety culture, while acknowledging that much remains to be done to demonstrate effective change.

As outlined in Section III.H of this report, other 2011-1 Recommendation activities supporting the overall enhancement of an effective safety culture throughout the DOE complex included training for supervisors and the conduct of safety culture self-assessments at all sites by Federal and contractor organizations.

**2010-2: Pulse Jet Mixing at the Waste Treatment and Immobilization Plant**

The Board issued Recommendation 2010-2 on December 17, 2010. The recommendation addressed the Board's concern that equipment testing and analysis at the WTP should be enhanced to establish

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<sup>1</sup> Recurring IP commitments include regularly or periodically scheduled reports, briefings, or updates that DOE provides the Board.

with confidence that the PJM and waste transfer systems will perform adequately at full scale. The Secretary accepted the recommendation and committed to more testing to provide additional confidence that PJM and waste transfer systems for the WTP will achieve their design and operating requirements. The IP was delivered to the Board on November 10, 2011.

During late FY12 and FY13, DOE identified and confirmed the need to revise the original IP based on a different technical approach to resolving the Board's concerns about inadequate mixing, which could lead to a criticality event, flammable gas releases, or an inability to fully control PJM vessels. The revised approach addresses concerns associated with the potential accumulation of solids due to inadequate mixing. On January 28, 2014, the Board closed Recommendation 2010-2.

***2010-1: Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers***

The Board issued Recommendation 2010-1 on October 29, 2010. The recommendation advised DOE to amend 10 CFR Part 830, *Nuclear Safety Management*, by incorporating a revised DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, into the text as a requirement. The recommendation also requested that the revisions to DOE Standard 3009-94 reflect the Board's desire to see clearly delineated criteria for methodologies, accident scenarios, and mitigation options, as well as a clearly defined approval authority for safety analyses at defense nuclear facilities. The Secretary partially accepted the recommendation, and DOE transmitted the IP to the Board on September 26, 2011. A revised IP schedule was transmitted to the Board on September 20, 2013.

The IP provides an approach for updating the Department's DSA standards and requirements to improve the performance of hazard and accident analysis and the identification of safety controls. The actions taken pursuant to the IP also reinforce and expand on the improvements made during DOE's recently completed directives reform initiative. As part of the Department's IP efforts, the revision of DOE Standard 3009, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, was actively pursued during FY13, including significant efforts to incorporate the perspectives of key stakeholders, such as site offices, contractors, and the DNFSB. The guide is scheduled to be issued in FY14. Also, updates to DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*, and DOE Order 420.1C, *Facility Safety*, have been initiated to incorporate commitments from the IP into the DSA approval process.

***2009-2: Los Alamos National Laboratory Plutonium Facility Seismic Safety***

The Board issued Recommendation 2009-2 on October 26, 2009. The recommendation advised the Department to implement near-term actions and compensatory measures to reduce the consequences of potential seismic events at PF-4 and to develop and implement a longer-term strategy to reduce consequences from seismic events. The Secretary accepted the recommendation on February 2, 2010, and transmitted the IP to the Board on July 13, 2010.

All non-recurring IP actions for this recommendation have been completed. The recommendation remains open pending completion of the installation of certain active confinement ventilation

elements, the completion of further structural analysis, and, if necessary and appropriate, the development of modifications.

In a letter dated March 27, 2013, Secretary Chu advised the Board that since PF-4 can provide its confinement safety function based on DOE's current seismic analysis and the identified near-term risk reduction measures, he had concluded that PF-4 can continue to operate safely while longer-term structural modifications are completed. However, Secretary Chu also noted that an evaluation of DOE safety analyses indicated that although Departmental analytical methods were appropriate for determining safety control classification within DOE's safety basis construct, the Department might benefit from the nuclear industry's best practices in risk assessment. To this end, he directed HSS to investigate national and international standards, and best regulatory practices, to determine how the Department might take advantage of them to improve safety.

NNSA continues to update its project execution plan for upgrading safety significant components to mitigate consequences from seismic activity. By letter dated September 3, 2013, NNSA advised the Board that two major analysis efforts, a dynamic linear analysis and a static non-linear analysis, had been completed and that a third alternative analysis, modal loading, was completed in December 2013. Modal loading analysis provides better understanding of the seismic integrity of the PF-4 facility and enhanced confidence that all structural elements requiring reinforcement have been identified.

#### ***2009-1: Risk Assessment Methodologies at Defense Nuclear Facilities***

The Board issued Recommendation 2009-1 on July 30, 2009. The recommendation advised DOE to establish policies and associated standards and guidance on the use of quantitative risk assessment methodologies (referred to as probabilistic risk assessment) at its defense nuclear facilities. The Secretary accepted the recommendation and transmitted the IP to the Board on November 3, 2009; and, on April 27, 2010, transmitted Revision 1 of the IP to the Board.

Two IP actions remained open at the end of FY 2013. They are related to Department-specific guidance, standards, and policy expectations that are necessary to ensure the appropriate and consistent use of probabilistic risk assessment (PRA) in nuclear safety analysis and to the related decision making processes supported by PRA in the design and operation of defense nuclear facilities. In early FY14, DOE communicated to the Board that all remaining IP actions for this recommendation had been completed. The Board closed this recommendation on January 28, 2014.

#### ***2005-1: Nuclear Material Packaging***

The Board issued Recommendation 2005-1 on March 10, 2005. The recommendation acknowledged DOE's progress in the stabilization and storage of its excess nuclear materials, but called for further enhancement of nuclear safety by developing technically justified criteria for nuclear material packaging systems on a DOE-wide level. The Secretary accepted the recommendation on May 6, 2005, and transmitted the IP to the Board on August 17, 2005.

The Department completed the final non-recurring IP action in FY11. Onsite repackaging activities will continue on a priority basis until all material is properly packaged. Significant progress has been made

in ensuring worker safety during the packaging of nuclear material. The Department approached this issue with worker risk in mind. Repackaging or disposal of the highest risk material as soon as practicable is, and will remain, the first priority. An orderly, risk-driven schedule will be followed in repackaging lower risk material. This repackaging strategy reduces risks to worker safety from the storage of nuclear material in older, less robust, containers while minimizing the radiation exposure and cost associated with the repackaging effort. NNSA has led the way with LANL to develop material containers and a process for certifying these containers at individual sites. This action will benefit the entire complex and is an ongoing effort to fully implement DOE Manual 441.1-1, *Nuclear Material Packaging Manual*. The Department is evaluating the completed IP commitments and ongoing actions.

#### ***2004-2: Active Confinement Systems***

The Board issued Recommendation 2004-2 on December 7, 2004. The recommendation cited the Board's belief that benefits that would accrue if the Department changed its safety policy to require active confinement ventilation systems for all new and existing hazard category 2 and 3 defense nuclear facilities that present the potential for a radiological release. The Board also recommended that the Department evaluate all new and existing defense nuclear facilities and enhance and update the associated DOE directives and standards.

The Secretary accepted the recommendation on March 18, 2005, and transmitted Revision 1 of the IP to the Board on July 12, 2006. The revised IP commits to a review of all hazard category 2 and 3 defense nuclear facilities to ensure that the selected confinement strategy is properly justified and documented. In accordance with the IP, priority was given to design and construction projects, including ongoing major modifications to existing facilities.

In a letter dated November 30, 2012, DOE advised the Board that a review had been performed to evaluate the recommended modifications for EM facilities, and also to provide DOE decision makers a way to focus on and prioritize the modifications of active confinement ventilation systems that are most likely to significantly improve safety performance across the relevant EM facilities. In December 2012, DOE satisfied the last non-recurring action in the IP for this recommendation: revisions to DOE Order 420.1C, *Facility Safety*, and DOE Guide 420.1-1A, *Nonreactor Nuclear Safety Design Guide for Use with DOE O 420.1C, Facility Safety*. DOE Order 420.1C establishes facility and programmatic safety requirements for DOE and NNSA for nuclear safety design criteria, fire protection, criticality safety, natural phenomena hazards mitigation, and the system engineer program. DOE Guide 420.1-1A provides an acceptable approach for safety design of DOE hazard category 1, 2, and 3 nuclear facilities to satisfy the requirements of DOE Order 420.1C.

#### ***2004-1: Oversight of Complex, High-Hazard Nuclear Operations***

The Board issued Recommendation 2004-1 on May 21, 2004. The recommendation cited Board concerns regarding a number of safety issues related to the central technical authority, delegations of safety responsibilities, technical capability, nuclear safety research and development (NSR&D), lessons learned from significant external events, and ISM. On August 30, 2011, DOE transmitted to the Board an updated IP that identified three broad areas for improvement: strengthening Federal safety



assurance, learning from internal and external operating experience, and revitalizing ISM implementation.

Five non-recurring IP actions remain open, addressing three general topics: issuing a DOE Safety Oversight Guide, implementing an NSR&D function, and establishing and verifying a robust Federal safety assurance capability.

*Safety Oversight Guide.* DOE issued Guide 226.1-2, *Federal Line Management Oversight of DOE Nuclear Facilities*, in FY12. However, the Board expressed concerns about DOE's expectations for the criteria, review and approach documents cited in Appendix C of the Guide and requested more information on DOE's implementation of its independent oversight function. Discussions with the Board are ongoing to better understand and complete this commitment.

*Nuclear Safety Research and Development.* The NSR&D program DOE established in response to this recommendation now provides a corporate-wide structure and process to improve coordination, integration, and support of the Department's research, analysis, and testing of nuclear safety technologies, consistent with its *Implementation Plan to Improve Oversight of Nuclear Operations*. Significant progress has been made on the NSR&D commitments. The NSR&D Committee is now in full operation, and an NSR&D Program Manager has been brought on board. The corporate NSR&D program funded its first three projects during FY13 and will solicit proposals for additional projects in FY14. Funding for NSR&D has been adequate to appropriately address current NSR&D needs.

*Federal Safety Assurance Capability.* This is a multi-faceted and overarching "desired end state" requirement that includes instituting central technical authorities; providing effective Federal oversight; instituting a nuclear safety research program; establishing clear roles, responsibilities, and authorities; and ensuring technical capability and capacity to fulfill safety responsibilities for proper oversight and execution of complex, high-hazard nuclear operations. Because some Departmental organizations and operations have changed since this IP was developed, the method for verifying compliance with the specific details of the commitment for effective Federal oversight may differ from what is specified in the plan. The Department is working with the Board to develop a satisfactory method to ensure that validation actions reflect current expectations.

#### ***2000-1: Prioritization for Stabilizing Nuclear Materials***

The Board issued Recommendation 2000-1 on January 14, 2000. The recommendation encouraged DOE to accelerate the schedule for stabilizing and repackaging high-risk, unstable special nuclear materials, spent fuel, unstable solid plutonium residues, and highly radioactive liquids that pose potential safety concerns for the public, workers, and the environment. The Secretary accepted most of the recommendation on March 13, 2000, and Revision 2 of the IP was transmitted to the Board on July 22, 2002. All NNSA IP actions are complete, except for various material stabilization activities at LANL. All EM IP actions are complete, except for the stabilization of Hanford K-Basin sludge.

In a letter dated April 11, 2013, NNSA updated the Board on progress toward stabilizing the remaining materials at LANL. Approximately 20 kilograms of depleted uranium and 5 kilograms of actinides other

than plutonium that do not require immediate stabilization are now included in a larger, accelerated NNSA effort to disposition all excess materials held at LANL. Under this effort, these items will be prioritized by risk and dispositioned over the next five years. The confinement vessel disposition project is now managing the stabilization of full vessels and disposition of materials. The Board closed this recommendation December 19, 2013.

## V. Interface Activities

In addition to formal recommendations, the Board and its staff regularly communicate with DOE by letter, visit the Department's defense nuclear facilities to review the implementation of safety initiatives, examine defense nuclear facilities and operations, and attend briefings. Information about DNFSB interactions with DOE, including all correspondence, is available by site and by fiscal year on the DR website at <https://hsspublic.energy.gov/deprep/>.

In addition to meeting IP commitments, DOE responds to commitments requested by the Board through the issuance of formal letters establishing reporting requirements pursuant to 42 U.S.C. Section 2286b(d). During FY13, DOE completed 15 actions related to such reporting requirements. These are shown in Appendix A, Table A.2. One public hearing was held during FY13. It is summarized in Appendix A, Table A.3.

## Appendix A. FY13 Summary: Open Recommendations; Statutory Letter Reports; and Public Meetings/Hearings

Table A.1 Open Recommendations

Rec #	Title	Date Opened	Projected Timeframe for Completing Implementation Plan Actions
2012-2	Hanford Tank Farms Flammable Gas Safety Strategy	09/28/2012	2015 (Before vitrification operations begin at WTP)
2012-1	Savannah River Site Building 235-F Safety	05/09/2012	2018
2011-1	Safety Culture at the Waste Treatment and Immobilization Plant	06/09/2011	2014
2010-2	Pulse Jet Mixing at the Waste Treatment and Immobilization Plant	12/17/2010	Closed by Board letter of January 28, 2014
2010-1	Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers	10/29/2010	2016 (Assuming issuance of Standard 3009 in March 2014)
2009-2	Los Alamos National Laboratory Plutonium Facility Seismic Safety	10/26/2009	2014
2009-1	Risk Assessment Methodologies at Defense Nuclear Facilities	07/30/2009	Closed by Board letter of January 28, 2014
2005-1	Nuclear Material Packaging	03/10/2005	2014
2004-2	Active Confinement Systems	12/07/2004	2014
2004-1	Oversight of Complex, High-Hazard Nuclear Operations	05/21/2004	2014
2000-1	Prioritization for Stabilizing Nuclear Materials	01/14/2000	Closed by Board letter of December 19, 2013

**Table A.2 DOE Reports Requested by DNFSB Letters Completed In FY13**

Statutory Letter #	Commitment Title	Date Completed
SL12-014	A report identifying actions taken or planned by the National Nuclear Security Administration to resolve safety issues relating to the Transuranic Waste Facility project at Los Alamos National Laboratory	10/09/2012
SL12-015	A report and briefing regarding the approved safety basis for the Plutonium Facility at Los Alamos National Laboratory	11/05/2012
SL12-021	A report on NNSA's approach to validate the modeling assumptions in the analysis and design of the Uranium Processing Facility main building at Y-12	11/05/2012
SL12-019	A report and briefing on the actions taken and planned by DOE to address the lack of comprehensive requirements and guidance for Integrated Safety Management at the activity level: work planning and control	11/30/2012
SL12-023	A report on DOE's plans to address issues regarding approved safety basis for Area G at Los Alamos National Laboratory	01/16/2013
SL12-020	A report and briefing regarding the adequacy of the development, review, and approval of safety control strategies for nuclear operations at Lawrence Livermore National Laboratory	01/31/2013
SL11-026	A report and briefing on actions the NNSA has taken or plans to take to ensure the Lawrence Livermore National Laboratory Plutonium Facility's glovebox system and Fire Detection and Alarm System can perform their safety functions	02/20/2013
SL03-031	Annual report on the Department's Nuclear Criticality Safety Program	03/25/2013
SL11-025	A report and briefing regarding plans to address the issues/weaknesses in the tracking and closure process for Nuclear Explosive Safety findings at the Pantex Plant	03/25/2013
SL12-006	A report on the NNSA's actions to address the issues on the effectiveness of the nuclear explosive safety program at the Pantex Plant	03/30/2013
SL13-001	A report and briefing on DOE senior leadership's assessment of the current state of public and worker protection for seismic accident scenarios, and the risk reduction measures to be applied to mitigate near term seismic risks of the Plutonium Facility at Los Alamos National Laboratory	03/27/2013
SL13-002	A report and briefing regarding plans and schedules for actions to ensure the proper operability and reliability of fire protection systems at the Pantex Plant	05/30/2013
SL13-003	A schedule outlining the path to complete the alternate analysis for a seismic collapse scenario at the Los Alamos National Laboratory Plutonium Facility	09/03/2013

SL13-005	A report providing the schedule for completing a revised implementation plan for Recommendation 2010-2, <i>Pulse Jet Mixing at the Waste Treatment and Immobilization Plant</i>	09/11/2013
SL13-006	A report and briefing on the actions DOE is taking to meet the commitments of its Implementation Plan for Recommendation 2010-1, <i>Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers</i> , with an updated Implementation Plan schedule	09/20/2013

**Table A.3 DNFSB Public Meetings/Hearings Conducted in FY13**

Date	Topic	Location	Discussion Areas
03/14/2013	Safety Culture, Emergency Preparedness, and Nuclear Explosive Operations at Pantex	Amarillo Civic Center Amarillo, Texas	<ul style="list-style-type: none"> <li>• Identification of shortfalls in the Pantex safety culture</li> <li>• Potential impacts that a flawed safety culture may have on nuclear explosives operations</li> <li>• Management approaches to improving safety culture</li> <li>• Status of emergency preparedness at the Pantex Plant.</li> </ul>
10/02/2012	Factors That Could Affect the Timely Execution and Safety of the Uranium Processing Facility (UPF) Project	Knoxville Convention Center, Knoxville, Tennessee	<ul style="list-style-type: none"> <li>• Actions taken to address issues with the conduct of operations, maintenance and work planning at Y-12 National Security Complex</li> <li>• The contractor's process for identifying and resolving safety issues</li> <li>• Effectiveness of NNSA oversight of nuclear operations</li> <li>• Status of emergency preparedness and contractor's method to ensure effective response to severe site emergencies.</li> </ul>

## Appendix B. Acronyms and Abbreviations

AMP	Y-12 Aging Management Program
BDBE	Beyond Design Basis Event
Board	Defense Nuclear Facilities Safety Board
CFR	Code of Federal Regulations
Department	Department of Energy
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DR	Office of the Departmental Representative to the DNFSB
DSA	Documented Safety Analysis
EM	Office of Environmental Management
EU	Enriched Uranium
FY	Fiscal Year
GAO	Government Accountability Office
Hanford	Hanford Site
HAZMAT	Hazardous Material
HSS	Office of Health, Safety and Security
IP	Implementation Plan
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
IST	EM Integrated Site Team
LANL	Los Alamos National Laboratory
NCS	Nuclear Criticality Safety
NES	Nuclear Explosives Safety
NNSA	National Nuclear Security Administration
NSR&D	Nuclear Safety Research and Development
ORP	Office of River Protection
Pantex	Pantex Plant
PF-4	LANL Plutonium Facility
PJM	Pulse Jet Mixing
PRA	Probabilistic Risk Assessment
QA	Quality Assurance
SCWE	Safety Conscious Work Environment
SDS	WTP Safety Design Strategy
SRS	Savannah River Site
UPF	Y-12 Uranium Processing Facility
U.S.C.	United States Code
WESF	Hanford Waste Encapsulation Storage Facility
WP&C	Work Planning and Control
WTP	Hanford Waste Treatment and Immobilization Plant
Y-12	Y-12 National Security Complex