U.S. DEPARTMENT OF ENERGY

Department of Energy Activities Relating to the Defense Nuclear Facilities Safety Board

Fiscal Year 2015

Report to Congress

August, 2016

United States Department of Energy
Washington, DC 20585

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Message from the Secretary

The Department of Energy is required[1] to submit a written annual report to Congress addressing the Department's activities related to the Defense Nuclear Facilities Safety Board (DNFSB or Board). The Department welcomes the opportunity to provide this annual report to Congress describing the Department's activities in fiscal year (FY15) that relate to the DNFSB.

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 the public health and safety 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 FY15 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.

The following members of Congress are receiving this report:

- **The Honorable Lisa Murkowski**
  Chair, Senate Committee on Energy and Natural Resources

- **The Honorable Maria Cantwell**
  Ranking Member, Senate Committee on Energy and Natural Resources

- **The Honorable Thad Cochran**
  Chair, Senate Committee on Appropriations

- **The Honorable Barbara Mikulski**
  Ranking Member, Senate Committee on Appropriations

- **The Honorable Lamar Alexander**
  Chair, Senate Subcommittee on Energy and Water Development

- **The Honorable Dianne Feinstein**
  Ranking Member, Senate Subcommittee on Energy and Water Development

[1] Section 316(b) of the Atomic Energy Act of 1954, as amended, *codified at* 42 U.S.C. § 2286e(b).

- **The Honorable John McCain**
  Chair, Senate Committee on Armed Services

- **The Honorable Jack Reed**
  Ranking Member, Senate Committee on Armed Services

- **The Honorable Jefferson Sessions**
  Chair, Senate Subcommittee on Strategic Forces

- **The Honorable Joseph Donnelly**
  Ranking Member, Senate Subcommittee on Strategic Forces

- **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 Mac Thornberry**
  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 Frank Pallone, Jr.**
  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

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Executive Summary

The Department of Energy welcomes the opportunity to provide this annual report to Congress.[2] 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 approach is multilayered. It builds upon established nuclear safety legislation and regulatory governance. The Department has established specific nuclear safety requirements — within Departmental directives and technical standards — that include layers of safety oversight, first by the DOE contractors themselves, and then by DOE program and independent oversight offices. This system of control supports (1) safety implementation; and (2) a thorough response to emerging nuclear safety issues with the potential to effect DOE workers, the public, and the environment.

The Department has undertaken safety initiatives and activities to reinforce and ensure nuclear safety performance. These initiatives respond to issues identified by the Defense Nuclear Facilities Safety Board, as well as issues proactively identified by the Department through (1) site, facility, and program office self-assessments; (2) independent oversight activities; and (3) safety improvement initiatives and activities. This report describes the Department's key FY15 initiatives and activities related to the Board.

Progress on Initiatives and Activities

Los Alamos National Laboratory Plutonium Facility – The Department continues to make progress at the Los Alamos National Laboratory Plutonium Facility (PF-4) by enhancing the seismic structural capability. DOE completed structural modifications, removal of hazardous material, and extensive modeling and simulation. A new technical working group will make recommendations for further modifications and/or analysis to ensure facility seismic safety. In addition, operations are restarting at the facility after extensive improvements to the nuclear criticality safety program. Resumption of operations is a major effort and necessary to support the National Nuclear Security Administration's (NNSA) plutonium mission.

Waste Isolation Pilot Plant – The Waste Isolation Pilot Plant (WIPP) plays a critical role in the transuranic waste disposal strategy of the Department. Since the closure of this facility after two incidents in February 2014 – an underground fire, and a radioactive release – recovery actions have subsumed the main mission of the nuclear facility. The Department must restore many of the safety management programs as well as operations and maintenance efforts to fully functional status. Senior contractor and Federal leaders are focusing on efforts to sustain improvements in the conduct of

[2] In accordance with Section 316(b) of the Atomic Energy Act of 1954, as amended, *codified at* 42 U.S.C. § 2286e(b).

operations, the contractor assurance system, and organizational safety culture. The Department will restart operations with a revised safety basis and operational proficiency demonstrated by the contractor.

Nuclear Explosive Safety - NNSA has revised and updated many of the higher-level directives for the nuclear explosive safety program during FY15. The documents not only address process and organizational changes, but also changes in oversight. NNSA implemented these directives throughout the year.

Nuclear Safety Issues at Other Facilities – Both Environmental Management (EM) and NNSA have spent a significant amount of effort evaluating their defense nuclear facilities and developing methods to assess, prioritize and perform corrective actions. NNSA is improving management capabilities with risk management tools, and EM is developing an implementation plan (IP) for the recommendations derived from their evaluations.

Integration of Nuclear Safety in the Design – Both the DNFSB and Department agree that it is time to examine interactions regarding nuclear safety design impacting the Department's major nuclear construction projects. A joint review of current processes and interactions to identify potential safety issues in the design and construction of defense nuclear facilities was initiated in FY15 and is planned to be completed in fiscal year 2016 (FY16). Primary objectives of the joint review include the identification of lessons learned and potential improvement opportunities to increase project effectiveness and efficiencies.

Progress on Board Recommendations

This report documents progress and status of the six open recommendations. Two of these open recommendations each have only one Implementation Plan (IP) action to complete.

Recommendation 2009-2, *Los Alamos National Laboratory (LANL) Plutonium Facility Seismic Safety* – All IP actions have been completed with the exception of providing an updated project execution plan for the seismic-related structural, system, and component upgrades.

Recommendation 2011-1, Safety Culture at the Waste Treatment and Immobilization Plant (WTP) – All IP actions have been completed with the exception of EM's review of the Bechtel Waste Immobilization and Treatment Plant contract, and implementing appropriate mechanisms to achieve balanced priorities and safety culture elements.

DEPARTMENT OF ENERGY ACTIVITIES RELATING TO THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD FISCAL YEAR 2015

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I. Legislative Language

This report is prepared and delivered to Congress in accordance with Section 316(b) of the Atomic Energy Act of 1954, as amended, *codified at* 42 United States Code (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 Board is an independent executive branch agency established by Congress in 1988 to provide independent technical analysis, advice, and recommendations to the Secretary of Energy regarding public health and safety issues at the Department's defense nuclear facilities (shown in Figure 1). 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;
- Performs analyses of design and operational data;
- Performs investigations of Departmental events and practices;
- Reviews the design of new defense nuclear facilities; and
- Makes recommendations to DOE relating to its defense nuclear facilities, including operations of such facilities, standards and research needs, for the purpose of ensuring adequate protection of public health and safety.

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.

Both the DNFSB and Department agree that it is time to examine their interactions regarding nuclear safety design affecting the Department's major nuclear construction projects. In FY15, DOE and the DNFSB initiated a joint review of current processes and interactions to identify potential safety issues in the design and construction of defense nuclear facilities. Primary objectives of the joint review include the identification of lessons learned and potential

improvement opportunities to increase project effectiveness and efficiencies. The review will be completed in FY16.

The report is organized as follows:

- ***Section III, Departmental Nuclear Safety Initiatives and Activities,*** describes broad-based Departmental activities affecting public safety and health that are of interest to the Board.
- ***Section IV, FY15 Progress on Board Recommendations*****,** describes Departmental activities completed or ongoing in FY15 to implement Board recommendations accepted by or under review by the Secretary.
- ***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 six open Board recommendations, 12 letter reports completed in FY15, and three Board public meetings/hearings held in FY15.
- ***Appendix B*** lists acronyms and abbreviations.

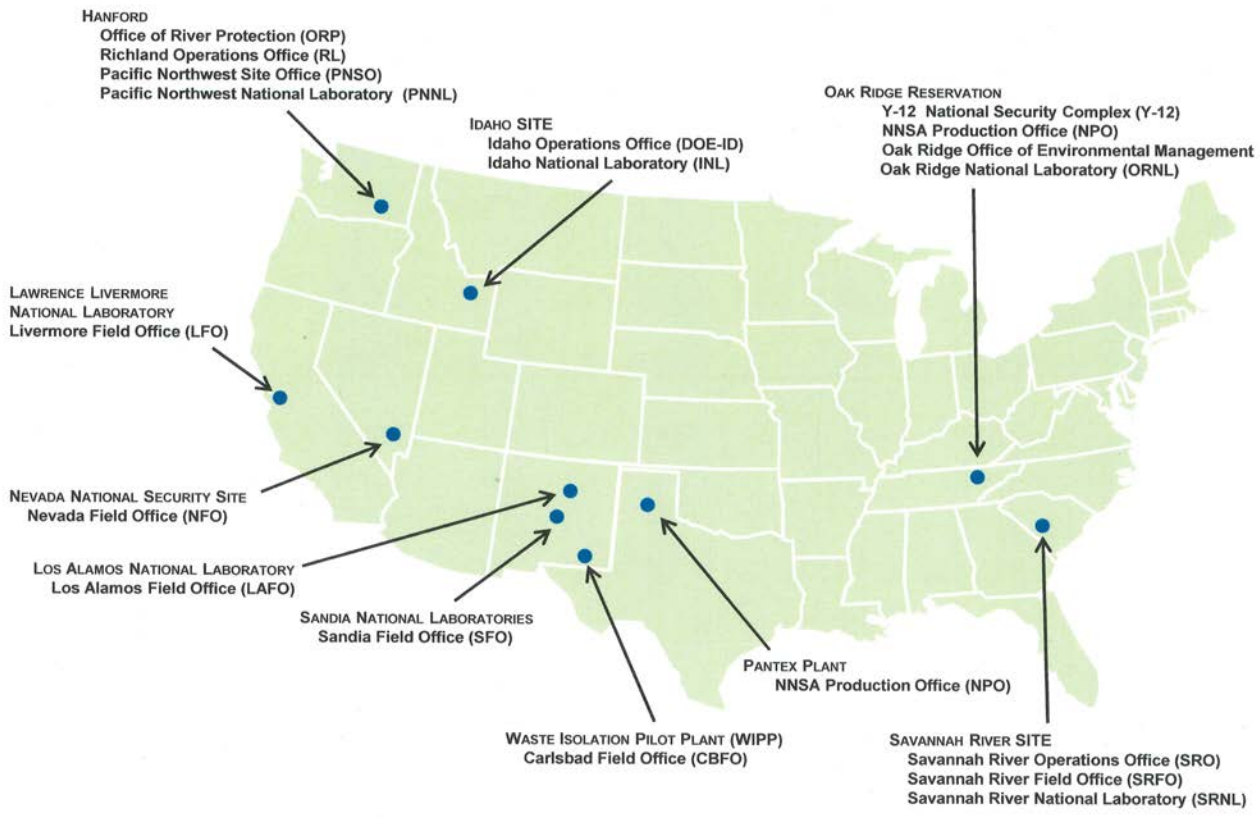

Figure 1. Locations of Department of Energy Defense Nuclear Facilities

III. Departmental Nuclear Safety Initiatives and Activities

This section describes the major FY15 initiatives and activities the Department undertook to improve and ensure nuclear safety. These initiatives respond to issues both identified by the Board and those proactively self-identified by the Department through site, facility, and program office self-assessments. Independent oversight activities by the Office of Enterprise Assessments (EA) and the Department's Central Technical Authorities help to identify nuclear safety issues for both Federal and contractor corrective actions. The Department protects its workers, the public, and the environment from nuclear hazards through a rigorous, proactive nuclear safety program and a robust nuclear safety regulatory framework. The Secretary has also placed a high-priority on improving project management across the Department.

A. Plutonium Facility Seismic Safety

The national security mission of PF-4 is unique. It is the Nation's only operational, full capability plutonium science and manufacturing facility. DOE and NNSA have increased the seismic margin of PF-4 through the execution of the IP for Recommendation 2009-2*, LANL Plutonium Facility Seismic Safety*. LANL annually updates its project execution strategy that tracks current and planned upgrades for improving PF-4 safety, including seismic safety.

NNSA and LANL completed four major seismic performance analyses for PF-4 within the last five years. In October 2014, NNSA reported the results of an alternate analysis suggested by the DNFSB. In FY15, NNSA and LANL engaged a seismic expert panel, including members of the National Academy of Engineering, to review the analyses and recommend a complete set of appropriate actions to ensure PF-4 seismic safety. In the spring of 2015, the panel issued its report and briefed NNSA management with recommendations, including upgrades currently underway, inspections, testing, operational controls, and limited additional analyses based on inspection results.

NNSA has made and will continue to make significant and substantial improvements to enhance the PF-4 capability to withstand a severe seismic event. There is an ongoing project to upgrade roof girders. NNSA established a working group conduct additional analysis and to make appropriate recommendations for additional actions or studies.

B. Waste Isolation Pilot Plant Activities

WIPP is a cornerstone of DOE's cleanup effort as the Nation's repository for the disposal of transuranic (TRU) radioactive waste generated by atomic energy defense activities. Located in southeastern New Mexico, 26 miles east of Carlsbad, WIPP's facilities include disposal rooms excavated in an ancient, stable salt formation 2,150 feet underground. Waste disposal began at WIPP on March 26, 1999. DOE suspended operations at WIPP following two unrelated

incidents in February 2014 — an underground fire and a radioactive release. Resumption of WIPP operations are essential for the Department to meet state regulatory agreements.

The Accident Investigation Board (AIB)[3] issued its Phase II Report for the radiological release incident on April 16, 2015. The report identified the cause of the release as an exothermic reaction of incompatible materials that led to thermal runaway, which resulted in over-pressurization of the drum. This overpressure breached the drum integrity and released a portion of the drum's contents (combustible gases, waste, and wheat-based absorbent) into the WIPP underground mine and subsequently to the environment.

Improvements in the management of TRU waste programs within the Federal and contractor organizations are underway to prevent a reoccurrence of a radiological event at WIPP. The AIB reports identified a number of weaknesses in the safety basis and safety management programs at WIPP. The corrective actions documented in the corrective action plans will strengthen WIPP's nuclear safety, fire protection, emergency management, and radiological control and maintenance programs.

The Department is reestablishing the safety management programs and upgrading the documented safety analysis to comply with DOE Standard 3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis,* requirements. The Department will conduct comprehensive reviews of operational readiness when these programs, procedures, and safety basis are in place. These readiness reviews include contractor management self-assessments and formal operational readiness reviews, by both DOE and its contractor, ensuring the safe restart of radioactive handling operations.

The Department is making progress in increasing ventilation capacity to support underground operations. The Department completed the initial closure of the panels where the breeched drum and other similarly packed drums are located in the underground, as required by a New Mexico Environmental Department administrative compliance order. Actions are in place to immobilize the radioactive material that escaped from the breached drum to limit further contamination of the underground.

Department testimony to the Board at the WIPP public hearing on April 29, 2015, described the progress toward safely restarting waste emplacement activities at WIPP, including evaluations and investigations into both the fire and radiological release events. The Department defined and implemented corrective actions from the AIB Reports, and issued a high-level WIPP recovery plan.

DOE will resume disposal operations at WIPP when it is safe to do so. Safety first is the clear expectation behind every decision and activity undertaken in the WIPP recovery effort. DOE

[3] The Accident Investigation Board report for the underground fire (Phase I) was completed in FY14 and is not mentioned here.

will keep the community and a wide-range of stakeholders, including the Board, informed during the process.

C. Nuclear Criticality Safety

A collaborative effort between the Board staff and DOE staff agreed that each DOE Program Secretarial Office (PSO) would address six nuclear criticality safety topics in their annual report and briefing to the Board. These topics are comprised of the metrics relied upon in performing effective line management oversight of criticality safety operations and programs. Sites with fissile material nuclear operations use a variety of leading (providing insight to future results) or lagging (providing information on past activity) criticality safety-related metric indicators. Sites with higher risk operations tend to monitor more metrics. Metrics, combined with other tools such as performance awards and evaluations, trending analysis, communicating best practices, periodic reviews, etc., are elements indicative of a comprehensive line management oversight process.

Plutonium Processing Facility - Resumption of operations at the LANL PF-4 facility was a major effort throughout FY15. The Department continued to invest its subject matter expertise directly alongside LANL management to facilitate a safe, efficient restart. Criticality safety engineer staffing significantly improved throughout the year with more than twenty criticality safety engineers currently supporting LANL. Building upon this progress, hiring and training is underway to ensure the program is stable and is best in class. The Department completed three formal Readiness Assessments (RAs) resulting in the restart of machining operations and the isotope fuels impact tester. Contractor and Federal RAs continue to support the restart of additional operations in the PF-4 facility with the goal of restoring full operational capability by the end of FY16.

Uranium Processing Facility - The Department issued guidance on criticality safety considerations for the design of the new Uranium Processing Facility (UPF) at the Y-12 National Security Complex (Y-12). The guidance dealt primarily with how to analyze the criticality safety hazard caused by natural phenomena events (seismic, flooding, etc.). This guidance is consistent with the national criticality safety consensus standards contained in the American National Standards Institute/American Nuclear Society Standards. The UPF project efficiently and effectively incorporated these with other Departmental requirements related to natural phenomena hazards.

D. Nuclear Explosive Safety

The Department revised the DOE Order 452-series directives to clarify and add requirements to strengthen the Nuclear Explosive and Weapon Surety Program. These documents revised the Nuclear Explosive Safety (NES) standards and improved the NES evaluation report approval process. Specifically, DOE O 452.1E, *Nuclear Explosive and Weapon Surety Program*, updated

organizational offices and responsibilities, added nuclear enterprise assurance objectives, updated NES standards, and strengthened weapon design surety requirements.

DOE O 452.2E, *Nuclear Explosive Safety*, now incorporates the requirements of the NES manual. The Order re-sequenced and updated the one-point safety NES rules, the anomalous unit determination process, and the Nuclear Explosive-Like Assemblies (NELA) definition and standards. DOE cancelled the Nuclear Explosive Safety Evaluation Processes Manual DOE M 452.2-2 and replaced it with the NNSA Supplemental Directive 452.2, *Nuclear Explosive Safety Evaluation Processes*. This new safety directive contains the most significant changes made to the DOE O 452-series requirements.

Changes to the NES evaluation process included adding NNSA's Office of Safety (NA-51) involvement in selecting and certifying Senior Technical Advisors (STAs) and providing independent NES oversight. Changes based on operational experience emphasize the project team role to design nuclear explosive operations to meet NES Standards and other NES criteria. Other changes modified training and qualification requirements for contractor NES representatives, added an additional NELA question to the contractor NES change evaluation process, and refined and clarified the NES evaluation approval process. These changes strengthen the NES program.

The Supplemental Directive 452.2 also instituted several procedural change commitments made by the Deputy Administrator for Defense Programs to the Board. These changes clarified when to conduct NES evaluations, added an independent oversight role for STAs, consolidated like deficiencies between weapons systems, and required the tracking of findings and recommendations with resolutions provided back to the original source.

E. Nuclear Safety Issues at Other Facilities

NNSA enterprise contains many facilities and systems that are well beyond their respective design life. More than 50 percent of facilities by square footage are 40 years old, nearly 30 percent are Manhattan Project era, and 12 percent are excess to program needs. Failures resulting from these conditions are increasing in frequency and severity, for example:

- Multiple fire suppression leaks at the Pantex Plant bays/cells (June and August 2015);
- Multiple heating, ventilation and cooling failures at Lawrence Livermore National Lab Superblock resulted in program delays (May 2015);
- Vulnerabilities in excess contaminated buildings, e.g., Building 9204-4 at Y-12 had an electrical panel fire and major oil spill (March 2015) and 8-inch fire main break (August 2015), and Building 9201-5 (Alpha 5) at Y-12 had roof panel failures (July 2015); and
- Structural deficiencies in the Chemistry & Metallurgical Facility at LANL requiring operations to be transferred to the PF-4 and the Radiological Laboratory Utility Office Building by 2019.

Y-12 continued to implement nuclear safety management programs for enriched uranium processes, facilities, and related infrastructure. The Building 9212 nuclear facility risk reduction project completed early in 2015, accomplishing improvements to electrical, ventilation, process, utilities and support systems.

Because of scope changes to UPF in 2014, Building 9204-2E and the 9215 Complex will continue operation into the 2030s and beyond. Extended Life Programs (ELP) initiated for these two facilities will substitute for the ongoing Continued Safe Operating Oversight Team (CSOOT) approach that will continue for Building 9212. This year's CSOOT report identified no safety issue that would limit Building 9212 operations. Y-12 anticipates completion of an ELP report for Building 9204-2E and 9215 Complex in early 2016.

To address facility conditions, the NNSA Infrastructure and Safety program maintains, operates, and modernizes the NNSA infrastructure in a safe, secure, and cost-effective manner to enable results. Infrastructure and Safety efforts focus on general-purpose infrastructure and provide a comprehensive approach to arrest the declining state of infrastructure by implementing cutting-edge sustainable infrastructure management practices that manage risk, employ innovative solutions, and maximize return on investment.

NNSA is improving infrastructure program management capabilities with improved management tools (e.g., G2 program management system, Enterprise Risk Management, Mission Dependency Index, and BUILDER) to capture and analyze key data in a holistic manner and facilitate data-driven, risk-informed infrastructure investment decisions. The June 2015 Report to Congress, *NNSA 10-Year Strategic Plan to Reduce Deferred Maintenance and Dispose of Unneeded Facilities* provides further detail on the tools employed.

Office of Environmental Management Actions – In response to the WIPP fire and radiological release events, EM directed its sites to perform extent-of-condition reviews of deferred maintenance. These included, evaluating performance against 30 "mandatory factors," reporting on the adequacy of system and equipment maintenance, maintaining configuration control, and upgrading support systems infrastructure.

EM established a Headquarters team led by the Office of Safety, Security and Quality Programs, to review the EM site responses and to produce a summary report. Overall, the team found that EM sites conducted maintenance activities to ensure the operability of safety class/safety significant systems and equipment. Several sites indicated, however, that although current facility conditions were adequate, continuing declines in facility physical conditions present challenges that could result in the future curtailment of operations.

The review also identified several common issues at more than one site, such as, long-standing fire protection impairments, a high number of facility nuisance alarms, and increasing backlogs in corrective maintenance. The team report issued in November 2014 and approved by the Assistant Secretary for Environmental Management, included nine recommendations to

address these issues. In June 2015, the EM Office of Safety, Security and Quality Programs, issued a corrective plan for the report finding, identifying specific actions, responsibilities, and milestone dates for each.

F. Integration of Nuclear Safety into Design

In December 2014, the Secretary specified actions to strengthen project management across the complex. He clarified principles and policies to institutionalize requirements into existing Departmental directives in June 2015. This clarification included requirements for the design management of Hazard Category 1, 2 and 3 nuclear facilities.

In addition, the Department initiated a revision to DOE-STD-1189-2008, *Integration of Safety into the Design Process*, to reflect changes in the project management requirements and capture lessons learned since its development. Further, the Board proposed a joint effort to review the processes by which the Board and Department interact to identify potential safety issues in the design and construction of nuclear facilities and lessons learned and potential improvement opportunities. The Secretary agreed that lessons learned could benefit the Department's safety review process and may serve to improve project performance. This effort should be completed in FY16.

Transuranic Waste Facility at Los Alamos National Laboratory – The Transuranic Waste Facility (TWF) supports the closure of Material Disposal Area G in Technical Area-54, consistent with a 2005 Consent Order signed with the State of New Mexico. This project supports the safe storage, handling, and shipping of transuranic waste. LANL designed the TWF project in compliance with DOE Standard 1189, *Integration of Safety into the Design Process,* and the project is currently under construction and scheduled for completion in 2017. Although LANL resolved several Board-related issues that could affect the design and functional classification of safety-related controls, some remain open. Previously identified issues focus on analysis of radiological consequences to workers and the public, as well as strategies for ensuring operability of the fire protection system during cold weather. Newly identified issues include inadequate analyses of potentially high consequence accidents affecting facility workers and safety controls to address a postulated wild land fire.

Uranium Processing Facility at Y-12 National Security Complex – NNSA is pursuing a new strategy for modernizing uranium operations at Y-12. This strategy will significantly change the originally conceived design of the UPF. The NNSA Production Office approved the UPF Conceptual Safety Design Report (CSDR) for the new design in May 2015. The DNFSB staff reviewed the CSDR and met with the UPF project team in July 2015 to discuss their comments and concerns. A June 25, 2015, Board letter established a 90-day reporting requirement for NNSA to submit a report on the design methodology and technical basis associated with the design of the UPF confinement ventilation system in a post-seismic condition. NNSA briefed the DNFSB in August 2015 on the status of the UPF Project and the Department provided a

formal response to the Board letter September 11. As the UPF alternative design matures, both NNSA and the Board will continue to monitor the safety design strategies and progress.

Waste Treatment and Immobilization Plant - The Department is working to construct and operate the treatment facilities and infrastructure to safely immobilize and dispose of Hanford Site's (Hanford) tank waste. The WTP at Hanford will include five facilities: (1) Analytical Laboratory, (2) Balance of Facilities[4], (3) Low-Activity Waste Facility, (4) High-Level Waste Facility, and (5) Pretreatment Facility. The Department also plans the construction of additional facilities to support the operation of these five facilities.

The plant design will process tank farm waste over roughly a 40-year period. The original plan required waste to be processed through the Pretreatment Facility, separating it into a low-activity waste stream to be vitrified in the Low-Activity Waste Facility and a high-level waste stream to be vitrified in the High-Level Waste Facility. The Analytical Laboratory and Balance of Facilities support these verification activities.

Construction of the Low-Activity Waste Facility, Balance of Facilities, and Analytical Laboratory, along with the work necessary to address feeding low-activity waste directly to the Low-Activity Waste Facility, is ongoing while efforts continue to resolve the technical issues associated with the Pretreatment and to a lesser degree the High-Level Waste Facilities. The Department is focusing on the start-up and operation of the Low-Activity Waste Facility, Balance of Facilities, and Analytical Laboratory as they are nearest to completion, to begin immobilization of waste as soon as practicable. The Department plans to support the analysis and design of a new Low-Activity Waste Pretreatment System Facility for this initiative. DOE's focus allows it to address, in the near-term, the most mobile tank waste — the supernate — while working in parallel to resolve the technical and design issues associated with the High-Level Waste and Pretreatment Facilities.

DOE and the DNFSB are engaged to resolve the following project issues:

- Potential criticality in process vessels;
- Potential generation and accumulation of hydrogen in process vessels;
- Pulse jet mixer control;
- Ability to obtain representative samples;
- Hydrogen gas controls: hydrogen in pipes and ancillary equipment;
- Inadequacies in spray leak methodology;
- Heat transfer analyses for process vessels;
- Safety controls for ammonia hazards;
- Erosion and corrosion of piping, vessels and pulse jet mixer nozzles;
- Design and construction of the electrical distribution system;
- Formation of sliding beds in process piping;

[4] This includes multiple facilities that provide support to the processing buildings to include, water, compressed air, emergency power, utilities, steam plant, storage and others.

- Volcanic ash fall hazard; and
- Unanalyzed melter accidents.

DOE recognizes that WTP's mission presents ongoing technical challenges and remains committed to safely completing the project.

G. Nuclear Safety Culture

The Integrated Safety Management System has been the cornerstone of DOE's strategy for safety mission accomplishment and continuous improvement. Attention to safety culture[5] within Integrated Safety Management is part of a natural evolution of taking its implementation to the next level – a standard of excellence.

During FY15, the Department made progress in improving safety culture across the complex by developing and conducting training to teach safety culture concepts and execution to both senior leadership and first line managers, implementing safety culture sustainment plans developed earlier in the year, and forming a Safety Culture Improvement Panel. The Deputy Secretary signed the panel's charter in May 2015, and the Panel continues to sustain and strengthen the Department's best practices and monitor safety culture in the Department. This creates a strong safety conscious work environment (SCWE). Departmental leaders support the Secretary's endorsement of a positive safety culture and SCWE across the DOE complex.

In April 2015, EM issued the Safety Culture Sustainment Plan Review Report, which captured an evaluation of all the 11 Federal and 21 contractor Plans received. The report discussed overall conclusions and recommendations for safety culture sustainability across the EM complex, discussed areas for improvement and lessons learned, and identified 66 best practices across the EM Complex. This effort contributes to establishing a consistent approach to implement a positive safety culture and SCWE throughout EM, and providing a mechanism for EM to identify areas of improvement and promote sharing of best practices.

In June 2015, consistent with the recommendations of the EM Safety Culture Sustainment Plan Review Report, EM Headquarters and Field Office Managers met to discuss lessons learned from the Waste Isolation Pilot Project AIB Reports. Specific focus and dedicated attention provided an application of the lessons learned to each site and identified potential preliminary precursors, or indicators, for weaknesses in safety culture. In this meeting, EM Leadership committed to hold a workshop to discuss oversight, as well as safety culture practices in FY16.

NNSA provided the Board a memorandum approving the site performance culture sustainment plans in accordance with the Implementation Plan for Recommendation 2011-1, *Safety Culture at the Waste Treatment and Immobilization Plant,* in December 2014.

[5] DOE's definition of safety culture is "An organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect the workers, the public, and the environment."

H. Environmental Management Nuclear Safety Initiatives

In FY15, the EM Chief of Nuclear Safety (CNS) continued initiatives to promote technical responsibility and nuclear safety at EM facilities. The CNS performs oversight, provides technical support, and executes technical activities as appropriate to support nuclear operations. For example, in FY15, CNS:

- Hosted a Natural Phenomena Hazards (NPH) meeting to improve performance in NPH analysis and design;
- Led and provided technical expert reviewers for the Construction Project Review at the Savannah River Site (SRS) Salt Waste Processing Facility;
- Conducted over 30 field operational awareness visits and assessments guided by the CNS Nuclear Facility Risk Ranking;
- Sponsored the DOE EM/Office of Nuclear Energy/Office of Science Software Quality Assurance Support Group to maintain Federal competency and promote consistent implementation of nuclear safety software quality requirements;
- Provided nuclear quality assurance training to executives and staff in DOE's new Office of Project Management Oversight and Assessments;
- Convened a meeting of the CNS Seismic Lessons-Learned Panel to focus on the Idaho site seismic hazard analysis and other critical seismic hazard issues across the DOE complex;
- Contributed to multiple technical meetings and documents sponsored by the International Atomic Energy Agency, International Standards organization, and International Association for Structural Mechanics in Reactor Technology that benefit nuclear safety and quality;
- Represented DOE on the American Society of Mechanical Engineers/American Nuclear Society Joint Committee for Nuclear Risk Management;
- Issued the EM Startup and Commissioning Lessons Learned report and developing a draft technical standard on performance base methods for conduction Operational Readiness Reviews;
- Managed EM's Differing Professional Opinion Process and worked with sites to ensure the site programs are developed; and
- Developed a new Standard Review Plan for conducting 30-60-90% Design Reviews for Major Nuclear Construction Projects.

The Office of the CNS, in cooperation with NNSA, completed a project to verify and validate (V&V) the System for Analysis of Soil-Structure Interaction (SASSI) software. DOE and the nuclear industry use this software extensively to perform soil-structure interaction analyses of facilities during seismic events. The V&V effort began after DOE contractors noted irregularities in certain SASSI results and after a letter issued by the DNFSB in April 2011, expressed concerns with the V&V of SASSI. The project developed a suite of test problems to demonstrate that SASSI simulations are sufficiently accurate over a range of parameters for sites and structures typical of nuclear facilities. The V&V activities included 12 tasks and over 1,000 engineering test problems.

In July 2015, CNS briefed the DNFSB on the project results. In August 2015, CNS issued a guidance memorandum to EM site offices on the use of SASSI.

I. NNSA Nuclear Safety Initiatives

In FY15, the NNSA Office of Safety, Infrastructure and Operations (NA-50) undertook initiatives to promote technical expertise, qualification, responsibility, and nuclear safety at NNSA facilities. NA-50 performs oversight, provides technical support, and executes technical activities as appropriate to support nuclear operations at NNSA facilities. For example, in FY15, NA-50:

- Created the Office of Safety, Infrastructure, and Operations (NA-50), aligning the operational nuclear safety functions with nuclear infrastructure management responsibilities to reduce duplication of oversight and increase opportunities for synergy between safety and infrastructure initiatives.
- Resumed its Biennial Review program, conducting a Biennial Nuclear Safety Program review at the Savannah River Field Office to ensure the effective implementation of nuclear safety requirements and delegated safety authorities.
- Laid groundwork for accreditation (achieved in 1Q FY16) of the program we use to develop and maintain qualification of personnel responsible for the safety of our nuclear facilities. This was the first accreditation of a DOE Headquarters Organization.
- Finalized a review by a panel of Seismic experts regarding work done to improve the seismic resilience of the Los Alamos plutonium facility (PF-4).
- Resolved a Differing Professional Opinion submitted by a Management and Operating contract employee, helping ensure that all voices are heard when opinions differ regarding nuclear safety.
- Supported Field Offices by conducting or participating in over 37 technical reviews of nuclear safety programs and activities to ensure safe operations of NNSA nuclear facilities.
- Assisted Los Alamos in an overhaul of their readiness preparation capabilities – resulting in remarkable improvement in the safe startup of not just the plutonium facility, but Los Alamos facilities in general. Demonstrated effectiveness during the restart of three mission essential plutonium production operations in the Plutonium Facility at Los Alamos, helping to bring this vital nuclear facility back on line safely. Continued to provide expert nuclear criticality safety technical assistance directly to Los Alamos National Laboratory to support resumption goals.
- Co-led the investigation with our Los Alamos Laboratory Management and Operating contractor of an electrical arc-flash accident at Los Alamos National Laboratory, identifying corrective actions that will minimize the possibility of similar events at Los Alamos and elsewhere in the complex. Working together assured the highest quality review and strong buy-in regarding the conclusions and subsequent corrective actions.
- Provided technical advice to Los Alamos to ensure adequate safety for storage and handling of drums similar to the one that initiated the accident at the Waste Isolation Pilot Plant.

Provided safety basis development and training support of WIPP recovery and restart efforts. Also provided continuing health physics support to WIPP recovery efforts.
- Halted the growth of deferred maintenance in NNSA nuclear facilities, helping to slow the degradation of nuclear facilities.
- Initiated an overhaul of the NNSA governance system, laying the framework for a new governance approach that takes advantage of lessons learned over the past fifteen years, and the recent recommendations of external advisory panels.

IV. FY15 Progress on Board Recommendations

A. Overview

The Board issues recommendations to the Secretary for specific measures the Department should adopt 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 Implementation Plan (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 the Secretary indicates an acceptance of the recommendation, completely or in part. Legislation requires the Secretary complete the IP within one year of issuance, or if the IP takes more than one year to complete, a report to Congress is required. The scope and technical complexity of the safety issues addressed in DOE's IPs has always required more than one year to complete. Many IP's require changes in policy directives, resource planning and scheduling, and coordination with many different sites and offices to solve complex-wide challenges.

Appendix A, Table A.1, *Open Board Recommendations*, lists the six recommendations that remained open at the end of FY15, the date of issuance of each recommendation, and the timeframe that DOE currently projects for completing the associated IP actions. There were no recommendations closed in FY15. All recommendations (both open and closed), the associated IPs, and a chronological record of related correspondence between DOE and the Board is available on the websites of the DOE Office of the Departmental Representative to the DNFSB (https://ehss.energy.gov/deprep/) and/or the DNFSB (http://www.dnfsb.gov/).

B. Open Recommendations

2014-1: Emergency Preparedness and Response
The Board issued Recommendation 2014-1 on September 3, 2014. The Secretary partially accepted Recommendation 2014-1 on November 7, 2014. On April 24, 2015, DOE transmitted

its IP. The IP identified the Department's actions and milestones to improve emergency preparedness and response core capabilities at defense nuclear facilities and addressed all issues identified in Recommendation 2014-1.

Progress to date includes the transmission of the justification memorandum to revise DOE Order 151.1C, *Comprehensive Emergency Management System*. For the revision, the Office of Emergency Operations established a team of representatives from across the DOE/NNSA complex to develop the core requirements related to DOE's Emergency Management Program. The first draft of the core emergency management program is complete and the team is working on the development of four annexes to DOE Order 151.1D: (1) Defense Nuclear Facilities; (2) Hazardous Materials; (3) Transportation, and; (4) National Response.

On October 13, 2015, the Deputy Secretary of Energy requested that DOE's Under Secretaries direct cognizant Field Element Managers overseeing the Department's defense nuclear facilities to report the status of existing deficiencies in emergency management programs to ensure the Department corrects deficiencies in a timely manner. The Office of Emergency Operations developed procedures for the electronic reporting of findings and deficiencies from the field to Headquarters.

The Office of Emergency Operations continues to execute the IP and has developed a draft approach to risk based oversight for emergency management programs. The Office of Emergency Operations is developing a criteria review and approach document to improve review of emergency management programs, as well as a training curriculum to provide a common approach to safety, security, and emergency management program oversight. The revision to DOE O 151.1D will incorporate the risk-based approach for emergency management.

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 (DST) to ensure the removal of flammable gas from the tanks' headspace. A significant flammable gas accident would have considerable local 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 for tank ventilation flow rates and to perform other upgrades on indication systems used to perform safety-related functions. DOE accepted this recommendation on January 7, 2012, and transmitted its IP to the Board on June 6, 2013.

The Department sent the Board a letter on August 29, 2014, presenting a pragmatic and graded approach to address the IP sub-recommendations to improve flammable gas controls based on an assessment of current risks and challenges. The Department updated several milestone dates for some IP deliverables but the specific IP actions are unchanged. DOE conducted a

study to evaluate potential means to reduce the inventory of retained flammable gases contained in the DSTs in a controlled manner.

The Department is working on a modification to the IP to change the dates of deliverables and the approach. In one of the deliverables, the Department indicated that portable safety ventilation systems represent a streamlined approach for tank ventilation. This approach provides a technically sound, but more practical alternative to the current planned improvements to upgrade and classify each tank ventilation system as safety significant. The Department has briefed the Board on this approach.

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

On May 9, 2012, the Board issued Recommendation 2012-1, and on July 10, 2012, DOE accepted it. The Secretary issued the IP on December 5, 2012. The IP identified multi-year actions to reduce the hazards associated with the material at risk (MAR) that remains as residual contamination in the building's Plutonium Fuel Form facility cells 1 through 9. DOE's Savannah River Operations Office developed a Deactivation Project Plan to guide near- term activities necessary to improve the safety posture and long-term activities required to immobilize and/or remove plutonium-238 that remains because of potential dose consequence to the collocated workers and public. The Department recognizes this is the Board's main safety concern.

In November 2014, the Secretary transmitted a summary of schedule changes for the remaining IP actions and deliverables, citing unforeseeable fiscal and resource challenges that led to schedule setbacks during FY13 that carried into FY14. The changes reflected modifications to completion dates for the remaining actions and deliverables but did not change specified actions. The completion date moved 29 months to May 31, 2021.

Since transmitting the summary of changes in the IP, DOE-SRS has continued to execute actions to mitigate the hazard posed from the MAR. Progress to date includes the completion of near-term activities that removed fixed and transient combustibles from the facility, de-energized of unnecessary electrical circuits, and upgraded fire detection and alarm systems. Cumulatively, these actions significantly improved Building 235-F's safety posture and reduced the likelihood of a full facility fire leading to design basis event consequences. Planning and conducting facility drills each year demonstrates the site's ability to protect workers in all facilities and construction projects around Building 235-F.

DOE also updated safety basis documentation to cover deactivation activities. Infrastructure restoration activities in cells 6 through 9 restarted on October 7, 2015, when SRS released F-Area from a pause in operations initiated by the contractor to address performance expectation issues across all related operations activities. Due to operation pause delays, deactivation activities planned to begin in 2015 were initiated in early 2016.

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 assessment that, taken as a whole, the safety culture at the WTP was in need of prompt, major improvement and that corrective actions would be successful and enduring only if championed by the Secretary. The Secretary accepted the recommendation on June 30, 2011, and DOE transmitted its IP on December 27, 2011. On September 14, 2012, DOE delivered an IP addendum, based on information and experience accumulated to date during execution of the original IP. DOE sent a revised IP schedule on September 27, 2013.

During FY15, the Department completed all IP activities, with the exception of the WTP contract review and making appropriate changes addressing balanced priorities, including safety culture elements. In a letter to the Board dated December 19, 2014, the Secretary stated that DOE is initiating contract negotiations and when such negotiations are complete, DOE will provide the contract documents to the Board.

The IP activities completed in FY15 represent substantial progress toward improving and sustaining safety culture at WTP, as well as throughout the DOE Complex. In a series of correspondence provided to the Board, DOE PSOs for NNSA, EM, and the Office of Science transmitted site-specific safety culture sustainment tools. DOE also communicated each of these PSO's approval of these sustainment tools. In its letter dated April 7, 2015, the Board stated, "*DOE has taken numerous actions to assess and improve the nuclear safety culture at the Waste Treatment and Immobilization Plant (WTP) and across the DOE defense nuclear complex."*

The Board conducted two public hearings on Recommendation 2011-1 in FY15. At the October 7, 2014, public hearing, the Secretary discussed his insights on safety culture and shared his vision for future improvements. In addition to the Secretary's testimony, the Board also received testimonies from the NNSA Principal Deputy Administrator and from the EM Acting Assistant Secretary regarding progress and initiatives to improve safety culture within their respective Program Offices.

At the August 26, 2015, public hearing in Kennewick, WA, the Board received testimonies from senior DOE Headquarters officials, the Manager, DOE Hanford ORP, and the WTP Federal Project Director, regarding the status of DOE efforts to improve safety culture at WTP. DOE officials also discussed actions underway to assess improvements in safety culture and tools to track future progress.

A key focus of this hearing was the DOE Office of Enterprise Assessments report, *Follow-up Assessment of Safety Culture at the Hanford Site Waste Treatment and Immobilization Plant* (June 2015). This report was the third DOE-EA assessment of the WTP safety culture since 2011. The EA assessment concluded that overall the Office of River Protection (ORP) and the contractor, Bechtel National, Incorporated, have made improvements since the 2014 assessment. Both organizations have developed and started to implement strategies and

practices that, if pursued conscientiously over the next several years, offer the promise of a safety culture commensurate with nuclear expectations and the unique character of the WTP. However, these improvements are in the early stages, and progress could easily stall if attention lapses, resources are diverted, or management priorities shift.

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 Code of Federal Regulations (C.F.R.) Part 830, *Nuclear Safety Management*, to require methods in DOE Standard (DOE-STD) 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses (DSA*). The Recommendation also requested a revision to DOE-STD-3009-94 to clarify criteria for hazard and accident analysis methodologies, and identification of hazard controls. The Board also recommended a clearly defined approval authority for safety analyses at defense nuclear facilities that exceeds the established Evaluation Guideline. The Secretary partially accepted the recommendation on February 28, 2011, and DOE transmitted its IP on September 26, 2011. DOE sent a revised IP schedule 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 analyses and the identification of safety controls. As part of the Department's IP efforts, DOE completed the revision of DOE-STD-3009-94 in FY15, issuing the revised DOE STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, in November 2014. This revision included significant efforts to incorporate the perspectives of key stakeholders, including DOE site offices, contractors, and the DNFSB. In June 2015, the Department issued Operating Experience Level 1 (OE-1), *Evaluation of Existing Facilities to DOE Standard 2014*). The OE-1 document requires the evaluation of existing defense nuclear facilities Documents Safety Analyses to the requirements contained in DOE-STD-3009. The OE-1 document also requires completion and approval of the evaluation by December 2016.

In FY15, DOE also completed and issued the revised DOE-STD-1104-2014, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*. In addition, DOE revised and issued DOE Order 420.1C, *Facility Safety*, to require use of DOE-STD-1104-2014 and to prescribe the set of DOE nuclear facilities that must use DOE-STD-3009-2014. The DOE Office of Enterprise Assessments (DOE-EA) also completed and transmitted to the Board its Criteria Review and Approach Document, entitled, *Nuclear Safety Delegations for Documented Safety Analysis Approval*.

FY15 activities also included development of revisions for DOE-STD-1189-2008, *Integration of Safety into the Design Process*; DOE-STD-3011-2002, *Guidance for Preparation of Basis for Interim Operation (BIO) Documents*; and DOE-STD-1120-2005, *Integration of Environment, Safety, and Health into Facility Disposition Activities*. These technical standards are in the DOE review and comment process.

In an October 18, 2014, letter to the Board, the Secretary transmitted the Department's report entitled, *Regulatory Analysis of Potential Changes to Requirements Documents to Invoke Documented Safety Analysis Development and Review Criteria*. In this letter, the Secretary also communicated the Department's conclusion that no change to 10 C.F.R. Part 830, *Nuclear Safety Management*, is necessary, and committed to implement specific changes to DOE Order 420.1C in order to improve the DOE framework for developing and reviewing nuclear facility DSAs.

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

The seismic risk posed by an earthquake at PF-4 remains among the Board's greatest safety concerns. 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 on July 13, 2010.

Over the past six years, DOE has conducted extensive technical seismic analysis, facility modifications, structural upgrades, and removal of hazards and nuclear materials to make the facility safer in the event of a large earthquake. These actions were prudent, given the potential exposure consequences to the public, and provided definite and measurable facility safety improvements. DOE completed all IP actions, with the exception of providing an updated project execution plan for the seismic-related structural, system, and component upgrades.

In late 2014, NNSA and LANL engaged a Seismic Expert Panel, including members of the National Academy of Engineering, to review the analyses and recommend actions to ensure PF-4 seismic safety. In the spring of 2015, the Panel issued its report and briefed NNSA management. The Panel recommendations included completing upgrades currently underway, inspections and testing (column capitals), operational controls, and limited additional analyses based on the inspection results.

Based on comparisons of analyses, the Panel concluded that PF-4 meets DOE safety requirements and noted that upgrades underway are prudent given the additional PF-4 margin in performance between earthquakes that result in varying categories of damage. LANL estimates that the upgrades reduce the overall building failure probability by about a third.

As part of a longer-term strategy, NNSA and LANL established a working group to develop a request for proposal to obtain a state-of-the-art seismic performance analysis of the upgraded PF-4 configuration. The next analysis will build upon prior analyses and further improve the understanding of and confidence in PF-4's long-term seismic performance.

V. Interface Activities

In addition to formal recommendations, the Board and its staff regularly communicate with DOE through correspondence, site visits at the Department's defense nuclear facilities to review the implementation of safety programs and initiatives, assessments of defense nuclear facilities and their respective operations, and briefings. Information about DNFSB interactions with DOE, including all related correspondence, is available on the Departmental Representative website at https://ehss.energy.gov/deprep/ and categorized by Fiscal Year and Departmental sites.

In addition to completing IP actions, DOE responds to the Board's issuance of formal letters establishing reporting requirements pursuant to 42 U.S.C. Section 2286b(d). During FY15, DOE completed actions related to such reporting requirements. Appendix A, Table A.2, outlines these actions. Appendix A, Table A.3 summarizes the three public hearings held by the Board in FY15.

Appendix A.: FY15 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
2014-1	Emergency Preparedness and Response	09/03/2014	2017
2012-2	Hanford Tank Farms Flammable Gas Safety Strategy	09/28/2012	2017
2012-1	SRS Building 235-F Safety	05/09/2012	2020
2011-1	Safety Culture at the WTP	06/09/2011	Only one IP commitment is not complete
2010-1	Safety Analysis Requirements for Defining Adequate Protection for the Public and the Workers	10/29/2010	2016
2009-2	LANL Plutonium Facility Seismic Safety	10/26/2009	Only one IP commitment is not complete

Table A.2 DOE Reports Required by DNFSB Letters - Completed In 2015

Date Completed	Reporting Requirements	Date of Board Letter
11/24/2014	An updated plan and schedule for addressing the Board's concerns with potential releases of ammonia at the WTP.	9/24/2014
12/29/2014	A report and briefing on DOE's federal safety oversight capability and its criteria for evaluating the effectiveness of federal safety oversight of high hazard nuclear operations at DOE's defense nuclear facilities.	5/1/2014
2/11/2015	A report on DOE's plan to include the updated volcanic ash fall hazard assessment into the WTP design and safety basis.	10/23/2014
2/13/2015	An updated plan and schedule for completing the alternate seismic analysis of the PF-4.	12/17/2014
3/9/2015	A Report documenting DOE's plan to address all design basis melter accident scenarios to support development of safety basis for the High-Level Waste facility at the WTP.	12/5/2014
5/18/2015	A report and quarterly briefings on NNSA's path forward for resolution of safety basis issues at the Radioassay and Nondestructive Testing Shipping Facility at the LANL.	12/9/2014
6/5/2015	A report documenting DOE's path forward for developing a nuclear safety control strategy for hydrogen explosion hazards in the High-Level Waste Facility at the Hanford WTP.	1/21/2015
6/9/2015	A report documenting DOE's federal oversight activities and risk assessments associated with the computer program RadCalc.	3/16/2015
6/12/2015	Annual report on the Department's nuclear criticality safety program.	1/29/2008

Date Completed	Reporting Requirements	Date of Board Letter
7/24/2015	A report documenting DOE plan to develop a nuclear safety control strategy for the confinement ventilation system under the effects of a seismic design basis accident in the High-Level Waste Facility at the Hanford WTP.	2/2/2015
8/21/2015	A briefing on DOE's rationale for use of RadCalc Version 4.1.1 at defense nuclear facilities and what compensatory measures are in place to offset deviating from the essential oversight requirements of DOE Order 414.1D, *Quality Assurance*, and DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*.	8/10/2015
9/11/2015	A report on the design methodology and technical basis associated with the design of the UPF confinement ventilation system in a post-seismic condition.	6/25/2015

Table A.3 DNFSB Public Meetings/Hearings Conducted

Date	Topic	Location	Discussion Areas
10/7/2014	Safety Culture and Board Recommendation 2011-1 (Part 3)	DNFSB Headquarters, Washington D.C.	Discussion concerning the Secretary's vision for a stronger DOE safety culture. Concerns identified in NNSA and EM safety culture assessments and means of addressing them. Safety culture in NNSA and EM contractor organizations.
4/29/2015	Safety During Recovery of the WIPP and resumption of waste operations	Walter Gerrells Performing Arts and Exhibition Center Carlsbad, NM	Session I – Testimony from DOE senior official on actions taken by DOE to safely recover the WIPP underground from events following a salt haul truck fire and a separate radiological release. Session II – Testimony from DOE senior managers. Session III – Discussion DOE's strategy for improving the effectiveness of federal oversight of contractor activities, including specific actions to ensure that improvements made by the site contractor and DOE are sustained over the long term. Session IV – An update to the public on the Board's proposed oversight actions associated with safe recovery of the underground, and oversight of corrective actions to resume and sustain safe waste operations.
8/26/2015	Improve Safety Culture at WTP	Three Rivers Convention Center Kennewick, WA	Discussion the current status of DOE efforts to improve safety culture at WTP and actions taken by DOE to assess the effectiveness of their improvements in safety culture and the tools being used to track future progress.

Appendix B. Acronyms and Abbreviations

AIB	Accident Investigation Board
Board	Defense Nuclear Facilities Safety Board
C.F.R.	Code of Federal Regulations
CNS	Chief of Nuclear Safety
CSDR	Conceptual Safety Design Reports
CSOOT	Continued Safe Operating Oversight Team
Department	U.S. Department of Energy
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DR	Departmental Representative
DSA	Documented Safety Analysis
DST	Double Shell Tank
EA	Office of Enterprise Assessments
ELP	Extended Life Programs
EM	Office of Environmental Management
FY	Fiscal Year
Hanford	Hanford Site
IP	Implementation Plan
LANL	Los Alamos National Laboratory
NELA	Nuclear explosive-like assembly
NCS	Nuclear Criticality Safety
NES	Nuclear Explosives Safety
NNSA	National Nuclear Security Administration
NPH	Natural Phenomena Hazards
OE-1	Operating Experience Level 1
ORP	Office of River Protection
PF-4	LANL Plutonium Facility
PSO	Program Secretarial Office
RA	Department Readiness Assessment
SASSI	System for Analysis of Soil-Structure Interaction
SCWE	Safety Conscious Work Environment
Secretary	Secretary of Energy
SRS	Savannah River Site
STA	Senior Technical Advisors

TRU	Transuranic
TWF	TRU Waste Facility
UPF	Uranium Processing Facility
U.S.C.	United States Code
V&V	Verify and Validate
WIPP	Waste Isolation Pilot Plant
WTP	Waste Treatment and Immobilization Plant
Y-12	Y-12 National Security Complex