2007 ANNUAL REPORT TO CONGRESS

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

U.S. DEPARTMENT OF ENERGY

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Annual Report to Congress

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

May 2008

U.S. Department of Energy

Washington, D.C.

The Secretary of Energy
Washington, D.C. 20585

April 29, 2008

The Honorable Richard B. Cheney
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

Section 316(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2286e(b)), requires the Department of Energy to submit a written report to Congress addressing the Department's activities related to the Defense Nuclear Facilities Safety Board (Board). Enclosed is the annual report entitled *Department of Energy Activities Relating to the Defense Nuclear Facilities Safety Board.*

In 2007, the Department made excellent progress in resolving open Board recommendations and implementing initiatives to further enhance the Department's programs for the protection of public health and safety. The progress on open recommendations and the associated initiatives to enhance safety management are described in the report and include: reducing risk through the stabilization of excess nuclear materials, improving the configuration management of vital safety systems, developing new requirements for the storage of nuclear materials, and maintaining a vigorous Facility Representatives program.

During 2007, the Department proposed and the Board agreed with closure of one recommendation, Recommendation 2000-2, *Configuration Management, Vital Safety Systems.* In addition, the Department received one new recommendation from the Board, Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*, and developed a plan for implementing actions to address the relevant issues.

Please be assured that the Department is committed to ensuring all Board recommendations are fully and effectively addressed and to further improving safety and health in all aspects of the Department of Energy's activities. Protection of the Department's workers, the public, and the environment is my highest priority. The Board's recommendations are an important tool for focusing our efforts on addressing safety issues and achieving our mutual goal of a high degree of safety in all aspects of operations at the Department's defense nuclear facilities.

If you have any questions, please contact me or Ms. Lisa E. Epifani, Assistant Secretary for Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,

Samuel W. Bodman

Enclosure

Executive Summary

The U.S. Department of Energy (Department) submits this Annual Report to Congress in accordance with Section 316(b) of the Atomic Energy Act of 1954, as amended (42U.S.C§?2286e (b)). This Annual Report describes the Department's activities in 2007 that are of interest to the Defense Nuclear Facilities Safety Board (Board), including the Department's key safety initiatives, status of Board recommendations, and interface activities between the Department and the Board.

Safety Initiatives in 2007. The Department is implementing many initiatives to improve performance in ensuring public health and safety on a DOE- or program-wide basis. The Office of Health, Safety and Security (HSS), established by the Secretary in October 2006, leads many of the ongoing safety activities and initiatives. One of the Secretary's goals in creating this new office was to improve safety programs across DOE by organizing resources to focus on key functional areas such as policy, technical assistance, training, independent oversight, and enforcement, and to ensure clear responsibilities and accountability for these important functions. Many other activities and initiatives were led by the Department's program offices, including the National Nuclear Security Administration and the Office of Environmental Management. Safety initiatives that were initiated or ongoing in 2007, and that are of interest to the Board include:

- In the area of nuclear safety policy and assistance, the Department issued supplemental guidance categorizing hazards, evaluated and clarified the use of justifications for continued operations, reviewed practices for control of Digital Instrumentation and Control used in safety systems, and continued efforts to develop a risk assessment policy for nuclear safety.

- The Department established an integrated plan for enhancing the incorporation of safety into the design and construction of nuclear facilities, fulfilling commitments made to the Board.

- HSS continued efforts to evaluate the status of the Department's quality assurance program and implementation of DOE Order 414.1C, *Quality Assurance*, including performance of a survey, developing one quality assurance directive, updating a quality assurance directive, and continuing efforts to enhance software quality assurance.

- In 2007, the Department continued its strong commitment to Integrated Safety Management (ISM) as its central foundation for improving safety performance and sustaining an effective and robust safety culture. ISM is being improved through implementation of the health and safety rule (10 CFR 851), a well-attended ISM workshop, and a program to revitalize ISM.

- The Department continued its efforts to improve technical and managerial capabilities of Federal staff, including revising its corrective action plan for Board Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, appointing a Chairperson for the Federal Technical Capability Panel, conducting over 30 training courses in areas such as safety system oversight, developing new courses (e.g., electrical safety and contractor oversight awareness), drafting a revision to the Department's *Federal Technical Capability Manual*, and performing assessments of the Facility Representative and safety system oversight programs.

In addition to these program-wide activities, individual DOE field elements and site contractors have made substantial progress in reducing risks at DOE sites through such efforts as material stabilization and cleanup and decommissioning of hazardous materials and excess facilities. On a site-specific basis, progress has also been made on implementation plan actions for Board recommendations, such as reducing risk by cleaning up facilities and stabilizing and consolidating nuclear materials. Noteworthy achievements in 2007 included:

- Completed cleanup of Ashtabula and transferred the site to the Office of Legacy Management.

- Disposed of over 8,500 cubic meters of transuranic waste at the Waste Isolation Pilot Plant (WIPP) through approximately 1,200 shipments.

- Obtained a permit modification allowing for the disposal of remote-handled transuranic waste and began remote-handled waste disposal operations at WIPP.

- Disposed of the last of 19,700 drums of low-activity grouted waste from West Valley Demonstration Project for disposal at the Nevada Test Site.

- Began construction on two major tank waste pretreatment and treatment plants – the Sodium Bearing Waste Treatment Unit at the Idaho National Laboratory and the Salt Waste Processing Facility at the Savannah River Site.

- At Idaho, the Idaho Cleanup Project completed grouting of all four 30,000-gallon tanks and grouted up to the dome level in the seven cleaned 300,000-gallon tanks.

Status of Board Recommendations. The Board has issued 49 recommendations to the Secretary since the Board was established in 1988. The Secretary has accepted 45 of the Board's recommendations in their entirety, and accepted four with minor exceptions and clarifications. For each accepted recommendation, the Secretary has approved the Department's implementation plan. Thirty-six of the Board's recommendations are now closed. Thirteen recommendations remain open as of the end of 2007. The Department is actively taking steps to resolve the safety issues from the open recommendations and to close them.

The Board issued one new recommendation in 2007. Specifically, the Board issued Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*, to the Secretary on April 25, 2007, which addresses the in-place measurement of nuclear materials in an existing process or location such as a duct, pipe, or glovebox without invading the component. The Secretary accepted Recommendation 2007-1 in June 2007, and the Department submitted its implementation plan on October 24, 2007.

One recommendation was closed in 2007. Specifically, in August 2007, the Board agreed to close Recommendation 2000-2, *Configuration Management, Vital Safety Systems,* which addressed the Board's concerns regarding age-related degradation, maintenance, and engineering expertise. Although the Board agreed to close the recommendation in August 2007, the Department will continue to monitor the effectiveness of long-term programs, such as the cognizant system engineer program, that are relevant to the configuration management of vital safety systems.

The Secretary has proposed closure of four of the 13 open recommendations; however, the Department recognizes that effective coordination with the Board is useful to develop a mutually agreeable path forward to achieving closure of those four recommendations. Currently, the Department is working on implementing corrective actions identified in implementation plans for the other nine recommendations. All of the implementation plans for the open recommendations have already taken, or are expected to take, more than one year to complete because of the complexity and breadth of the corrective actions. Many of the Department's safety initiatives, as summarized above, are directly related to one or more open Board recommendations.

Board Interface Activities. Since its formation in 2006 and throughout 2007, HSS has focused on improving communications with the Board. In 2007, the Department's Chief Health, Safety and Security Officer and his subordinates have met with the Board on several occasions to discuss the HSS actions and to promote interfaces (e.g., a Board staff member observed all phases of an Independent Oversight inspection in 2007). Within HSS, the Office of the Departmental Representative to the Board (Departmental Representative) manages the Department's overall interface with the Board and provides advice and direction for resolving safety issues identified by the Board. DOE Manual 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*, details the Department's processes used to interface with the Board and the Board's staff. The Department interacts with the Board and its staff on several other activities (e.g., Board review of the Department's safety directives, briefings to the Board, and Board or Board staff site visits) to further ensure adequate protection of public and worker health and safety and the environment at the Department's defense nuclear facilities. The Department completed 78 implementation plan or statutory letter commitments during 2007; issued 31 new or revised safety directives in 2007, each of which was reviewed by the Board's staff; exchanged 109 pieces

of correspondence with the Board; and hosted 115 site visits by Board members or Board staff members during 2007. Although improvements have been made in tracking actions and managing commitments to the Board, the Board determined that the Department's verification of completion of the actions for Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*, was not sufficient. The Department recognizes that additional verification actions are needed for this recommendation and that further improvements in the Department's processes for issues management at Headquarters are warranted.

Summary. In 2007, the Department made excellent progress in resolving open Board recommendations and implementing initiatives to further enhance the Department's programs for the protection of public health and safety including efforts to reduce risk through stabilization of excess nuclear materials, to improve configuration management of vital safety systems, to develop new requirements for storage of nuclear materials, and to maintain a vigorous Facility Representatives Program. The Department is making progress on the implementation plans for the open recommendations and has many ongoing safety improvement initiatives, such as revitalization of integrated safety management, that will further enhance the Department's ability to effectively manage safety at defense nuclear facilities. Further, the Department is making good progress in its efforts to clean up hazardous materials and decommission facilities and stabilize and consolidate nuclear materials; these efforts will result in eliminating or reducing risks.

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Section I.

Introduction

I. Introduction

The U.S. Department of Energy (DOE) submits this Annual Report to Congress in accordance with Section 316(b) of the Atomic Energy Act of 1954, as amended [codified at 42??U.S.C??§?2286e (b)]. This Annual Report describes the Department's activities in 2007 that are of interest to the Defense Nuclear Facilities Safety Board (Board).

The Board is an independent executive-branch agency established by Congress in 1988 to provide 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 including DOE orders, regulations and requirements relating to the design, construction, operation, and decommissioning of the Department's defense nuclear facilities.

Figure 1 provides the locations of the major Department facilities involved in defense nuclear activities across the United States.

Figure 1 - Location of Major Department Facilities

The Board communicates with the Department through a variety of mechanisms including: formal recommendations, formal reporting requirements, letters requesting action and information, letters providing suggestions, letters providing information (e.g., staff trip reports and reports on specific issues), requests from the Board and the Board's staff for information, public meetings, briefings, discussions, and site visits.

The Department and the Board share the common goal of ensuring adequate protection of public health and safety and the environment at the Department's defense nuclear facilities. To accomplish this goal, the Department's interface policy, which is contained in DOE Manual 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*, is to:

- Fully cooperate with the Board;
- Provide access to information necessary for the Board to accomplish its responsibilities;
- Thoroughly consider the recommendations and other safety information provided by the Board;
- Consistently meet commitments to the Board; and
- Conduct interactions with the Board in accordance with the highest professional standards.

The remainder of this Annual Report is organized as follows:

- Section II, Key Department Safety Initiatives, describes broad-based Departmental activities that affect environment, safety and health of interest to the Board;
- Section III, Implementation of Board Recommendations, describes Departmental activities completed in 2007 to implement Board recommendations accepted by the Secretary; and
- Section IV, Other Board Interface Activities, describes Departmental activities to maintain communications and improve interaction between the Department and the Board.

This Annual Report also includes five appendices that provide detailed information about Departmental standards of interest to the Board (Appendix A), visits of the Board and staff supported by the Department (Appendix B), key correspondence between the Board and the Department (Appendix C), site-specific activities to improve nuclear safety (Appendix D), and abbreviations and acronyms used in this report (Appendix E).

Section II.

Key Department Safety Initiatives

II. Key Department Safety Initiatives

This section describes key initiatives that the Department is implementing to improve performance in ensuring public health and safety on a DOE- or program-wide basis. The Office of Health, Safety and Security (HSS), established by the Secretary in October 2006, leads many of the ongoing safety activities and initiatives. The Secretary's goals in creating this new office included (1) improving safety programs across DOE by organizing resources to focus on key functional areas such as policy, technical assistance, training, independent oversight, and enforcement, and (2) ensuring clear responsibilities and accountability for these important functions. HSS also emphasizes the sharing and integration of information, helping the Department address Department-wide cross-cutting issues, and enhancing collaboration and the sharing of technical expertise. For example, HSS formed the Health, Safety and Security Managers Focus Group to solicit, discuss, and address topics and issues of interest to DOE managers and stakeholders to further the improvement of health, safety, environmental, and security performance within the Department. Throughout 2007, one of the major focus areas of HSS was to maintain a close and constructive working relationship with the Administrator of the National Nuclear Security Administration (NNSA) and the Under Secretaries of Energy and Science, as well as the Board. To promote these relationships and to obtain feedback on issues related to health, safety, environment, and security, HSS senior management conducted visits throughout the DOE Complex and met with program office, site office, contractor management, union representatives, and external organizations. HSS senior managers also met regularly with the Board and Board staff and provided briefings on major activities such as Independent Oversight inspections, and promoted interfaces at the working level (e.g., Board staff observing all phases of an Independent Oversight inspection).

Many other activities and initiatives were led by program offices, such as NNSA and the office of Environmental Management (EM), for their respective areas of responsibility, such as the extensive risk reduction efforts and the Chief of Nuclear Safety activities. In addition to these program-wide activities, individual DOE field elements and site contractors have made substantial progress in reducing risks at DOE sites through such efforts as material stabilization and cleanup and decommissioning of hazardous materials and excess facilities. On a site-specific basis, progress has also been made on implementation plan actions for Board recommendations. The accomplishments of the DOE field elements and site contractors at specific sites are described in Appendix D.

A. Nuclear Safety Policy and Assistance

The HSS Office of Nuclear Safety and Environment played an essential leadership role in improving the Department's nuclear safety posture in 2007. In coordination with line management, HSS led several initiatives to improve nuclear safety policy and assistance and provide a better foundation for safe operations of nuclear facilities.

- **Issuance of Supplemental Guidance for DOE Standard 1027, *Hazard Categorization*:** DOE Standard 1027 provides the process and criteria for determining the hazard categorization of DOE nuclear facilities, which then is used to determine the level of safety analysis required to identify hazard controls. The supplemental guidance (completed in May 2007) was developed in response to Board concerns that the Standard lacked clarity in some areas (such as treatment of sealed sources) and was not being consistently or appropriately implemented. A complex-wide team of safety basis experts was assembled to develop the guidance. HSS ensured coordination with and concurrence of the Chief of Nuclear Safety and Chief of Defense Nuclear Safety before issuing the new guidance.

- **Evaluation of the use of Justifications for Continued Operation:** In April 2007, the Board identified concerns that Justifications for Continued Operations (JCOs)–which are used to support operations when a nuclear facility deviates from its approved documented safety analysis) did not have a clear regulatory basis and may not have been

properly used at DOE nuclear facilities. HSS, in coordination with responsible program offices (e.g., EM and NNSA), performed an analysis of the regulatory basis and use of JCOs across the complex and determined that, although generally well performed to support operations, revisions to existing nuclear safety guides were warranted to support more consistent development and use of JCOs across the complex. HSS plans to revise these nuclear safety guides in 2008, and NNSA, EM, and other responsible program offices (e.g., Nuclear Energy and Science) and are working with their field elements to ensure use of JCOs is consistent with regulations.

- **Safety System Oversight:** HSS is leading an effort to evaluate DOE's safety system oversight (SSO) program to look for program improvements. SSO personnel are responsible for providing oversight for implementation of contractors' programs to ensure that critical safety systems will function, as needed, if an accident occurs. In 2008, HSS plans to develop a report with recommended program improvements and to work with the Program and Field Offices in their implementation.

- **Digital Instrumentation and Control:** HSS is leading an effort to review DOE and other government and industry practices to assess Digital Instrumentation and Control systems, particularly those used in safety systems, to determine whether additional DOE guidance or a DOE standard is warranted to ensure the unique aspects of Digital Instrumentation and Control are appropriately addressed when designing, maintaining, and operating safety systems. A working group consisting of subject matter experts from across the complex has been formed and the first meeting was held in December 2007. HSS anticipates the working group will complete its analysis and develop needed guidance or a standard in 2008.

- **Risk Assessment Policy for Nuclear Safety:** DOE plans to continue efforts to develop a risk assessment policy for nuclear safety. In July 2007, DOE briefed the Board on the status of the policy and the possible development of associated guidance. A draft policy and an accompanying guidance document were developed by HSS in coordination with a DOE Headquarters steering committee which included representatives from the Offices of Science, Environmental Management, and the Chiefs of Nuclear Safety. Copies of the drafts were provided to Board staff in August for comment. DOE is currently assessing their comments, which were received in November, and will develop revised drafts for broader DOE review during the second quarter of fiscal year (FY) 2008. As part of a comprehensive reevaluation of DOE directives, the Department is also considering the appropriate promulgation mechanism for the nuclear safety risk assessment policy and its place with regard to a number of DOE risk management policy and guidance documents published or in preparation pursuant to other Directives.

B. Incorporating Safety into the Design Process

In a memorandum dated December 5, 2005, the Deputy Secretary of Energy challenged his senior managers to build upon the major strengths of the Department's project management program to better integrate safety into the design of projects early in the lifecycle. In response to that challenge, the Department defined the project management process to ensure that safety becomes an integral part of the design process and documented that process in a new DOE technical standard, DOE-STD-1189, *Integration of Safety into the Design Process*. This standard addresses the hazard prevention and mitigation process in the design of DOE hazard category 1, 2, and 3 nuclear facilities and will address both radiological and chemical hazards.

DOE-STD-1189 is to be used in tandem with the Departmental directive on project management, DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets*, as well as the planned Guides to support implementation of this Order. It will also build upon and augment the facility safety criteria documented in DOE Order 420.1B, *Facility Safety*. DOE-STD-1189 will provide the key course of action for ensuring that safety is incorporated into the baseline design of the Department's nuclear facilities.

To ensure that hazard prevention and mitigation are addressed in the fundamental design of a

project, the standard establishes an integrated team approach to review the design at various stages and incorporate safety aspects. The role of the integrated team is to ensure that appropriate and reasonably conservative safety structures, systems, and components are incorporated early in the design process; that the project cost estimates include these structures, systems, and components; and that the project risks associated with the selections are specified to support informed risk decision making by the Project Approval Authorities. In alignment with DOE Order 413.3, a key aspect of integrating safety and design, as described in the new standard, is early identification of project risks and communication among project team members to achieve the best facility-specific solution for these risks. This standard will minimize the potential for significant cost and schedule impacts from changing safety system design requirements late in the project lifecycle.

DOE-STD-1189 was posted on the Department's web-based review and comment system in March 2007. DOE is currently resolving DOE and Board comments and expects to issue the Standard for implementation in spring of 2008.

C. Quality Assurance Activities

HSS serves as the Department's corporate focal point for quality assurance (QA) programs, processes, and procedures. HSS is also responsible for identifying and resolving Departmental cross-cutting QA issues and supporting line management implementation of policy and requirements for the design, procurement, fabrication, construction, and operation of Department facilities.

HSS, along with responsible program offices, periodically briefs the Board on QA and software quality assurance (SQA)-related issues and initiatives; in 2007, HSS briefed the Board twice.

DOE Order 414.1C, *Quality Assurance*

In an effort to continue gathering information to evaluate the Department's status on QA and the implementation of DOE Order 414.1C, *Quality Assurance*, HSS developed the 2007 Survey on QA Implementation. This survey expanded the 2006 focus areas to obtain additional information on SQA, Suspect/Counterfeit and Defective Items, and QA in design and construction. Departmental elements were requested to report their progress in developing Quality Assurance Program Plans and implementing their QA programs. As of December 1, 2007, sixty-five percent of the Headquarters offices that were queried responded.

Although the survey results have not been totally compiled and analyzed, a preliminary review of the results indicated that the majority of Headquarters offices have written and approved QA plans including implementing procedures as required by DOE Order 414.1C, Quality Assurance. Headquarters organizations are actively updating existing QA plans, or, in a few cases, developing their initial QA plans. As part of the institutionalization of HSS, the HSS Quality Assurance Implementation Plan was being developed. As of December 2007, the HSS Quality Assurance Implementation Plan draft was being prepared for HSS management review and comment. In addition, the majority of field offices also reported that they and their contractors have a QA plan in place. HSS expects to issue a report to the Deputy Secretary by March 2008. The next survey will be conducted in 2009, and future surveys will continue to be conducted biennially.

DOE Guide 414.1-1B, *Management and Independent Assessments*, was issued in September 2007. This version updated DOE Guide 414.1-1A. Finally, as part of the development of the 18 Guides to supplement DOE Order 413.3A (the Project Management Order), DOE Guide 413.3-2, *Quality Assurance Guide for the Acquisition of Capital Assets*, was drafted. As of December 2007, this Guide was being readied to enter into the Department's web-based review and comment system. This Guide is being written to assist the Federal Project Director with implementing DOE Order 414.1C requirements when complying with DOE Order 413.3A.

Safety Software Quality Assurance Program

The Department continues its efforts to establish a rigorous and effective safety SQA program through the implementation plan for Board Recommendation 2002-1, *Quality Assurance for Safety-Related Software*. The scope of the implementation plan includes safety software at the Department's defense nuclear facilities. Safety software includes safety system software, safety

and hazard analysis and design software, and safety management and administrative controls software.

The first phase consisted of defining a plan and schedule to outline what has been accomplished to date and the approach that will be used to resolve the gaps (identified in the toolbox code gap analysis reports) that will lead to closure of Board Recommendation 2002-1. A Safety Software Expert Working Group, composed of subject matter experts, is being established to work with the toolbox code developers to address the remaining residual gaps and document the results as addendums to the gap analysis reports.

The second phase includes development of a strategy for managing the Safety Software Central Registry, including code version changes and adding, as necessary, new codes such as safety design codes. Central Registry Management activities also include upgrading and enhancing the Software Quality Assurance/Central Registry website to maintain an updated list of safety software used by the Department, monitoring error reporting activities by code users, and developing a communication forum for the exchange of information related to safety software used within the Department. The two-phased approach was jointly developed and will be supported by HSS and the responsible program offices, such as NNSA and EM.

D. Integrated Safety Management Revitalization Activities

The Department is committed to Integrated Safety Management (ISM) as its central framework for completing work while protecting the public, the workers, and the environment. ISM is the foundation of the Department's effort to improve safety performance and sustain an effective robust safety culture. Enhancements in 2007 in the area of ISM included:

- **ISM Champions:** The Department has established DOE ISM Champions in its program offices, site offices, and contractors to support line management in developing and sustaining vital, mature ISM systems throughout the Department so that work is reliably accomplished in a safe manner. The ISM Champions Council promotes continuous learning and improvement of ISM effectiveness throughout the DOE complex through communications and the sharing of best practices and lessons learned. The Department has named two ISM Co-Champions, one from HSS and one from the line programs. During 2007, the ISM Champions Council conducted monthly calls to share best practices and lessons learned.

- **ISM System Descriptions:** A major effort during the 2007 year was development of DOE ISM system descriptions for Headquarters offices. All major DOE headquarters offices completed the descriptions to provide detail regarding the office's activities to implement the ISM core functions and guiding principles. In addition, the site offices performing EM activities completed their ISM system descriptions during 2007.

- **ISM Workshop:** The Department held its 2007 ISM workshop at the Brookhaven National Laboratory in November 2007. This workshop was well attended, with over 400 line managers, safety professionals, presenters and track leads, ISM champions, and other interested attendees. The two and a half day workshop featured five tracks of presentations on the following topics: (1) work planning and control, (2) feedback and improvement, (3) integrating management systems, (4) developing an effective safety culture, and (5) implementing DOE ISM requirements.

- **ISM Training:** The ISM Champions upgraded and provided ISM training courses to the Senior Technical Safety Managers training program and to the Nuclear Executive Leadership Training program during 2007. An ISM fundamental training course was also developed and presented in conjunction with the ISM workshop in November 2007.

- **Work Planning and Control Processes:** In 2006, site offices developed action plans to improve their work planning and control processes. During 2007, site offices implemented these action plans.

- **Feedback and Improvement Processes:** In 2006, site offices developed action plans to improve their feedback and improvement

processes. During 2007, site offices implemented these action plans.

- **ISM Directives:** During 2007, HSS reviewed and drafted a revision to the Team Leaders Handbook for performing ISM verifications. This draft revision is undergoing DOE-wide review and comment, and is expected to be finalized in 2008.

- **Building An Effective Safety Culture:** Building an effective safety culture continues to be an important objective of the Department and its ISM champions. The existing ISM systems form the foundation of this desired safety culture. The ISM Manual (DOE Manual 450.4-1), issued in November 2006, identifies four supplemental safety culture elements, that when combined with the existing ISM guiding principles, encompass the desired values, beliefs, and behaviors for an effective safety culture. In 2007, the Department gained experience working with these elements by fully articulating programs and activities to implement the ISM guiding principles and the supplemental safety culture elements in the ISM systems of various DOE program offices and site offices. The Department continues to develop a deeper understanding of the desired cultural attributes, where improvements are needed, and how best to pursue identified improvements over the coming years.

E. Federal Technical Capability Program

The DOE is committed to ensuring that employees are trained and technically capable of performing their duties. In pursuit of this objective, the Federal Technical Capability Program (FTCP) was formed with the recognition that corporate leadership and line management ownership are essential to successfully implementing a program to recruit, develop, deploy, and retain technical capability at defense nuclear facilities. The FTCP consists of senior personnel, designated as Agents, to represent DOE Headquarters and field elements with defense nuclear facility responsibilities, including the NNSA. The FTCP reports to the Deputy Secretary and is responsible for overseeing the technical qualification program (TQP). The TQP includes the safety system oversight program, the Facility Representative program, the Senior Technical Safety Manager program, and other critical technical skills. The TQP also conducts periodic assessments of the effectiveness of the FTCP using internal and independent experts, and provides recommendations to senior Department officials regarding DOE technical capability.

The Department's vision, as described in the implementation plan that responds to Board Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, is for its technical personnel to be recognized among all Federal agencies for the excellence of its Federal staff. The 2004-1 implementation plan outlines actions DOE will take to upgrade Federal technical capabilities. In January 2007, the last open implementation plan commitment related to the FTCP was completed when Revision 1 of the FTCP corrective action plan was issued by the Deputy Secretary.

Enhancements to technical capabilities as a result of FTCP efforts in 2007 included:

- **Workforce Analysis.** The Workforce Analysis for NNSA, EM, HSS, and Headquarters offices was updated. The list of key positions in NNSA, EM, and HSS was prioritized, and staffing plans detailing actions to be taken and due dates for completion were developed.

- **Accreditation Process.** Nine sites are scheduled to undertake voluntary TQP accreditation in 2008.

- **Continued Enhancement of the Facility Representative Program.** The Department continued its efforts to improve Facility Representative staffing and training. Details of these efforts are provided later in Section IIF, Facility Representative Program Activities.

- **Federal Technical Capability Program Manual Update.** To accommodate changes identified by the FTCP and Board Recommendation 2004-1 activities, the FTCP prepared a revision to DOE Manual 426.1-1A, *Federal Technical Capability Manual*, which will be issued in early 2008.

- **Functional Area Qualification Standards (FAQs).** A FAQs Champion was identified. The process for developing FAQs was updated and documented. A schedule for updating FAQS was developed, and six FAQs

were updated in 2007. Several more FAQ revisions will be released in 2008. A sponsor was identified for each FAQ along with an updated list of key support personnel.

- **Safety System Oversight.** A new SSO sponsor was identified, who has established a working group to refine SSO qualification requirements and staffing basis criteria. A SSO communications forum was added to the FTCP website to enhance sharing of experiences and lessons learned.

- **Enhanced National Training Center Utilization.** Over 30 courses were conducted, including Nuclear Executive Leadership Training, Senior Technical Safety Manager Overview, SSO Duties/Responsibilities and Assessment, and General Technical Base for the Future Leaders Program. Courses in Contractor Oversight Awareness and Electrical Safety Awareness were developed.

F. Facility Representative Program Activities

Facility Representatives are highly trained Department employees who provide effective day-to-day oversight of contractor operations at the Department's most hazardous facilities. Approximately 200 Facility Representatives around the complex provide oversight of operational activities important to mission accomplishment and worker and public safety. The Department's standard, DOE-STD-1063-2006, *Facility Representatives*, defines the duties, responsibilities, and qualifications for Department Facility Representatives. The Facility Representative program supports Department managers in ensuring that Facility Representatives are competent and technically qualified to perform their jobs.

Key components of the program include:

- Complex-wide performance indicator reports provided to the Department's senior managers every quarter since 1999 for evaluation and feedback to improve the program;

- Designated Facility Representative Steering Committee members and sponsors at each field and major Headquarters program office to serve as management advocates for Facility Representatives;

- Monthly conference calls of the Facility Representative Steering Committee to discuss program development and operational oversight issues;

- Annual Facility Representatives Workshop to promote the sharing of lessons learned from Facility Representative programs across the complex; and

- Facility Representative web site *http://www.hss.energy.gov/deprep/facrep* to provide information on the Facility Representative program, qualification standards, vacancy announcements, and other useful information for the Department's Facility Representatives.

Oversight performed by Facility Representatives provides Department line managers with real-time, accurate, and objective information on the effectiveness of contractor work performance and practices, including implementation of ISM. The Department's experience has shown that when personnel are dedicated to this function, the information that they provide can be used proactively to ensure that work is completed in a safe and environmentally responsible manner. Further, Facility Representatives have obtained a strong understanding of the technical nuclear and hazardous operations needed to successfully perform in positions of increased responsibility throughout the Department.

Facility Representative of the Year

The Facility Representative of the Year award is provided annually to a Facility Representative who consistently demonstrates exceptional performance and who makes significant contributions to the safe and efficient operation of Department facilities. A total of 13 Facility Representatives were nominated for the Facility Representative of the Year Award by their field offices. A panel of senior field and Headquarters personnel selects the overall Department winner of the award from the field nominees. The 13 nominees from field offices demonstrated continued strong management support for the program and exceptional performance. This year, the award was presented to Robert C. Seal from the Idaho Operations Office.

His accomplishments are described as part of the Annual Workshop discussion below.

Secretary Bodman with 2006 Facility Representative of the Year Award Winner Bob Seal and Bob's wife Glenna Seal

Annual Workshop

The 2007 Annual Facility Representatives Workshop was held in Las Vegas, Nevada, May 15-17, 2007. The purpose of the workshop was to share lessons learned from Facility Representatives across the DOE complex and to provide information to assist Facility Representatives in carrying out their responsibilities. A total of 121 people attended, representing every major program and field office. Included in the total were 53 Facility Representatives, representing one-quarter of the Department's Facility Representative community.

Glenn Podonsky, the Department's Chief Health, Safety and Security Officer provided the keynote address. He addressed safety oversight perspective and expectations. Mr. Podonsky discussed the new HSS organization and the challenges of providing effective policy and oversight between the field and DOE Headquarters. He stressed that Facility Representatives play a key role in operational safety and effectiveness, and encouraged partnering with HSS. Also, Joseph F. Bader, a member of the Defense Nuclear Facilities Safety Board, provided constructive and insightful remarks on Facility Representative membership on integrated project teams with respect to design and construction through a facility's life cycle.

The Facility Representative Lessons Learned/Good Practice presentations were again a central component of the workshop. This exchange was highly valuable as participants provided pertinent topics and valuable lessons learned. A total of 15 Facility Representatives provided presentations on operational, technical, and programmatic topics.

Also at the workshop, the Department-wide 2006 Facility Representative of the Year Award was presented to Robert Seal of the Idaho Operations Office. Some of his noteworthy accomplishments included chairing a Type B Accident Investigation for an individual who received a severe hand injury from a table saw, participation in a three-week detail with Nuclear Regulatory Commission (NRC) Resident Inspectors to observe and learn oversight techniques, and participation on the EM Operational Readiness Review for the startup of Remote-Handled Transuranic Waste Operations at the Waste Isolation Pilot Plant (WIPP).

Continuous Improvement

The Department continued with its efforts to improve the Facility Representative program. A sound Facility Representative program is mandated by DOE Manual 426.1-1A, *Federal Technical Capability Manual*, Section II, Facility Representatives.

Field element managers are required in DOE-STD-1063-2006 to periodically (at least every three years) evaluate their Facility Representative programs relative to the standard to ensure a high and continuously improving level of performance. Field element self-assessments were conducted at the Los Alamos Site Office, Nevada Site Office, and Idaho Operations Office during 2007. Each site program was assessed in the following areas: Facility Representative qualifications; adequacy of coverage for DOE facilities; effectiveness of Facility Representative oversight of facilities; adequacy of functional support from field element management; and adequacy of performance assessment and feedback improvement processes.

On August 21, 2007, the Savannah River Operations Office hosted a one-day summit for Facility Representatives at EM sites across the DOE complex. The keynote address emphasized facility safety, and was delivered by the Hon. James A. Rispoli, Assistant Secretary for Environmental Management. The summit included a panel discussion assessing the past performance and future challenges of the EM Facility Representative Program. Panel members included the Manager of the Idaho Operations Office, the EM Deputy

Assistant Secretary of Safety Management and Operations, and a senior member of the DNFSB staff. Other presentations at the summit included site challenges, human performance improvement, and a comparative analysis of the Facility Representative programs at EM sites.

ARP MCU at Savannah River

G. Risk Reduction through Stabilization of Excess Nuclear Materials and Waste

The mission of the Department's environmental management program is safe risk reduction and cleanup of the environmental legacy of the nation's nuclear weapons program and government-sponsored nuclear energy research. The program is one of the largest and most diverse and technically complex environmental cleanup efforts in the world and includes responsibility for the cleanup of 114 sites across the country in 31 states.

The challenge is to manage projects and operate facilities in a safe, secure, compliant, and cost-effective manner. Safety is paramount to EM's success — it is EM's top priority. The EM program manages some of the most inherently hazardous materials and is responsible for some of the nation's most crucial environmental actions. Within the EM program, the Days Away from Work, Restricted or on Job Transfer (DART) and Total Recordable Case (TRC) rates have consistently declined in 2006 and 2007. At the end of FY 2007, the EM DART rate was half that of DOE as a whole and less than 10 percent of both the waste disposal and construction industries. Also, the EM TRC rate was two-thirds of DOE as a whole and less than 15 percent of the waste disposal and construction industries.

The transition to managing EM activities as projects continues with significant accomplishments in obtaining Assistant Secretary approval of critical project decisions for approving near-term baselines for cleanup projects at all EM major sites. These approvals are based upon completion of rigorous Internal Project Reviews and External Independent Reviews. All of EM's projects are now managed by qualified and certified Federal Project Directors. Additionally, at the beginning of 2007, 12 EM projects were classified as "red" or "yellow" with respect to cost or schedule. At the end of 2007, no EM projects are "red" and only one is "yellow" – the rest are "green."

Another initiative that EM has undertaken in 2007 is the conduct of a series of QA assistance visits to proactively identify and resolve QA concerns/issues for EM construction projects. The scope of these visits included Federal identification and implementation of QA requirements as well as QA programs of contractor organizations that perform work in support of the EM site mission, including onsite work activities and offsite work (e.g., performed by vendors). The reviews provided information as to whether EM's capital projects incorporate QA plans and QA management systems early in the design phase to avoid very costly project miscues later in construction, as well as unsafe conditions during eventual operations. The visits identified, at the project level, the existence of an acceptable project QA program and what enhancements were necessary. Eight reviews were performed during 2007. The outcome of the reviews was a series of actions that EM needed to take at Headquarters and the field to improve QA implementation.

WIPP Mine Rescue Teams Win Multiple Awards in National Training Competition

In addition to significant gains in project management and initiatives in quality assurance, EM is making significant progress in several other key areas including: project management, technical capabilities, nuclear materials disposition, radioactive waste disposal, and facilities/sites cleanup and closure, as discussed below.

Project Management

In 2007, EM made substantial progress in the certification process for the project baselines, and expects to have all executing projects certified by early 2008. In addition, the Environmental Management Integrated Schedule became operational and is updated on a monthly basis. EM also issued Requests for Proposals for five major procurements at Savannah River and Hanford sites during 2007.

EM is developing an Engineering and Technology Roadmap to identify technical risks and strategic initiatives to address those risks in the EM program over the next ten years. EM also piloted a process, adapted from the National Aeronautics and Space Administration and the Department of Defense, for evaluating and guiding the development of technology called the Technology Readiness Assessments process. Five technology development projects offered by four vendors were selected for funding under phase II of the Advanced Remediation Technology program. External Technical Reviews to reduce technical risks associated with EM projects were initiated, conducted, and/or completed for five activities/projects.

Technical Capabilities

EM strengthened its technical capabilities through a complex-wide human capital strategy and performed skills gap analysis by implementing a new, more rigorous human capital framework. EM also established Standard Operating Policy and Procedure requiring managers to satisfy Senior Technical Safety Manager qualification and the Nuclear Executive Leadership Training training as a requirement for delegation of safety authority. Further, EM certified 22 Federal Project Directors and recertified 10 more, and implemented corporate succession planning and skills acquisition through the EM Career Development Program.

The EM Human Capital Management Plan (developed in 2006 and currently being updated) is now being implemented and incorporates observations provided through an independent review by the National Academy of Public Administration. EM established the Professional Development Corps and hired 20 corps members (including ten engineers and four scientists with four doctorate degrees and five master's degrees) who joined EM in 2007, are assigned to Headquarters and field sites throughout the EM complex, and will complete a qualification and/or certification program. Further, in 2007, EM initiated two "best-in-class" efforts related to improving personnel capabilities. The first effort is focused on project management in which EM has teamed with the Army Corps of Engineers and an experienced project management contractor to focus on the following activities: 1) site assessments; 2) development of site five-year baselines; 3) project controls; 4) project risk management plans; and 5) assessment of identified specific projects. The second effort is focused on engineering and technical capabilities to enable EM to become a first-class engineering organization for providing the critical services and capabilities necessary to: 1) ensure the readiness of EM cleanup technologies; 2) assure that the current technologies being applied in projects are meeting or exceeding safety, cost, schedule, and technical objectives; and 3) develop new technologies that will reduce project costs, reduce the time of project completion, and provide enhanced health, safety, and technical performance capabilities.

Nuclear Materials and Spent Fuel Disposition

During 2007, the Department approved consolidation of weapons-usable plutonium from several DOE sites, most notably Hanford, to the Savannah River Site. This approval was achieved following significant interaction with the Congress and the State of South Carolina, coordination with the NNSA, and complex technical analysis and project planning. Also in 2007, the Savannah River Site started operation of the K-Area Interim Surveillance project which provides a capability to perform examinations of containers of plutonium-bearing materials awaiting disposition. This is a significant step for the site to maintain its preeminence in the DOE complex for safe plutonium operations. Idaho completed cleanout of two facilities: 1) removal and dispositioning of all special nuclear material stored in Building CPP-

602 and 2) removal of hazardous sludge and water from the spent fuel basin in CPP-603, which has been backfilled with 1.4 million gallons of grout.

Radioactive Waste Management

EM made progress at all three defense waste tank sites. For waste in tanks at the Idaho Nuclear Technology and Engineering Center, DOE issued a determination that when stabilized, residual wastes in seven large storage tanks and four smaller tanks would not need to be managed and disposed as high-level waste. During 2007, the Idaho Cleanup Project completed grouting the four smaller 30,000-gallon tanks and grouted up to the dome level in all seven large, 300,000-gallon tanks. At Savannah River, interim processing of tank waste by a deliquification, dissolution, and waste adjustment process was begun. This process separates much of the radioactivity from the tank waste for subsequent treatment in a high-level waste treatment facility, enabling the remaining decontaminated salt solution to be made into grout and disposed onsite as a saltstone material. Finally at Hanford, waste was retrieved from three aging single-shell tanks and transferred to double-shell tanks, further reducing risk at the Hanford site.

The Los Alamos National Laboratory began shipping its high-activity transuranic waste to WIPP and had shipped 25 percent of its inventory by fiscal year end. Brookhaven National Laboratory completed its transuranic waste cleanup and at the Oak Ridge Reservation, the Transuranic Waste Processing Center has now operated for five years without a lost-time accident. The Portsmouth Paducah Project Office completed the removal of more than 49,000 containers of hazardous and mixed waste from the Portsmouth Recycle and Assembly Building, supporting the complete turnover of the facility to the United States Enrichment Corporation for industrial reuse. At Paducah, more than 30,500 tons of radioactively contaminated scrap metal that had been stored outdoors for more than 30 years has been removed. The piles of scrap metal were the single largest source of surface water contamination at the site.

Facilities/Sites Cleanup and Closure

Within the cleanup program, risk reduction is accomplished by completing cleanup work activities. Until waste has been permanently disposed, risk must be managed and controlled. A summary of recent accomplishments at EM sites is provided in Table 1. Appendix D provides additional information about EM sites.

Table 1 – Risk Reduction Accomplishments at EM sites

Ashtabula

- Completed cleanup and transferred the site to Legacy Management

Idaho

- Shipped over 5,700 cubic meters of transuranic waste to WIPP and over 2100 cubic meters of mixed low-level waste (MLLW) for disposal; disposed over 27,536 cubic meters of this in onsite disposal facilities
- Reduced the number of nuclear facilities managed within the Idaho Cleanup Project from 21 to 16; completed decontaminated, decommissioning of over 24 buildings and structures; and closed 23 release sites regulated under the Comprehensive Environmental Response Compensation and Liability Act
- Substantially completed grouting of seven 300,000 gallon waste tanks at the Idaho Nuclear Technology Engineering Center
- Closed four tanks and substantively performed closure activities for seven other larger tanks at the Idaho National Laboratory

Hanford

- Demolished the liquid waste storage building (241-Z) in the Plutonium Finishing Plant Complex to slab-on-grade
- Completed the removal of containerized sludge from the K-East Basin to engineered containers within the K-West Basin and containerization of over 90% of K-West Basin standing sludge
- Treated 805 cubic meters of mixed low-level waste and disposed of the resulting waste
- Completed thermal treatment of 600 cubic meters of mixed low-level waste
- Achieved 77% design complete and 32% construction complete overall on Waste Treatment Plant
- Completed waste retrieval from Tank S-112 and performed bulk waste retrievals on two larger single-shell tanks (C-108 and C-109) during calendar year (CY) 2007
- Made an additional 1.3 million gallons of double-shell tank space available for waste retrieval and operational utilization via evaporation

Oak Ridge

- Completed over 2.1 million man-hours (600 days) without a lost workday case at East Tennessee Technology Park K-25/K-27 Decontamination and Decommissioning Project
- Completed over 8000 waste shipments from Oak Ridge totaling more than 520,000 miles without a transportation incident
- Began defueling the Molten Salt Reactor Experiment under the Fuel Salt Disposition Project and completed 1500 days without a lost time accident or recordable injury at the completion

Table 1 – Risk Reduction Accomplishments at EM sites

Portsmouth/Paducah

- Recovered 10,550 out of 15,000 metric tons of uranium contaminated with technetium-99, enabling reclamation of uranium with a current value in excess of $2 billion dollars
- Completed disposal of more than 30,500 tons of contaminated scrap metal from the Paducah Gaseous Diffusion Plant
- Completed removal of more than 49,000 containers of hazardous and mixed waste from the X-7725 Recycle and Assembly building at Portsmouth

Savannah River

- Prime contractor exceeded 7.3 million hours since last injury requiring days away from work. Construction exceeded 20.8 million hours since their last injury requiring days away from work.
- Completed first site area cleanup at the T-Area
- Sent 1,675 cubic meters of legacy transuranic waste to WIPP, successfully completing 122 shipments
- Poured 169 canisters of vitrified high-level waste at the Defense Waste Processing Facility

Waste Isolation Pilot Plant

- Received and disposed of over 8,500 cubic meters (approximately 1,020 shipments) of transuranic waste
- Received its 6,000th shipment of transuranic waste, accounting for over 2.6 million miles traveled by transuranic waste transporters without a WIPP-accountable accident
- Disposed of over 90 canisters of remote-handled transuranic waste
- Received permit to dispose remote-handled waste and began remote-handled waste disposal operations

West Valley Demonstration Project

- Shipped the last of 19,686 drums of grout-filled "drum cell" low-level waste for disposal at the Nevada Test Site

H. NNSA Chief of Defense Nuclear Safety

DOE established Central Technical Authority (CTA) positions within the Department in response to Recommendation 2004-1, *Oversight of Complex, High-Hazard Operations*, and Task Force recommendations The Department has established three CTAs, one in NNSA, one in Energy, and one in Science. The Principal Deputy Administrator is the CTA for NNSA.

For NNSA, the Chief of Defense Nuclear Safety (CDNS) provides technical support to the CTA in the area of nuclear safety. In 2007, the CDNS completed the first management self-assessment of the NNSA CTA function. The CDNS captured the results of the self-assessment in a report to the CTA and approved a corrective action plan to address the findings. Closure of findings will be completed in 2008.

Beginning in 2005, CDNS initiated biennial reviews of the implementation of nuclear safety requirements at NNSA sites that have nuclear safety responsibilities. These systematic reviews provide credible, objective, value-added information to NNSA line managers by evaluating site office and contractor performance in twenty functional areas. Specific reviews are tailored to the needs of each site by adding or deleting functional areas, based on past performance and input from Headquarters and field line management.

The first series of biennial reviews was completed in 2007, with reviews of the Los Alamos Site Office and the office of the Deputy Administrator for Defense Programs. The Defense Programs assessment was the first comprehensive assessment of its nuclear safety management responsibilities. A corrective action plan for the issues identified is currently being prepared.

The second series of biennial reviews was initiated in 2007 with a tailored review of the Pantex Site Office. The first round of biennial reviews provided senior leadership within NNSA with a solid baseline of site office and contractor performance. Continuing in 2008, the second series of reviews will help to ensure that needed corrective actions have effectively improved performance, and that good performance that was previously demonstrated has been maintained.

Additional CDNS activities and accomplishment in 2007 include the following:

- CDNS personnel worked with the Los Alamos Site Office to achieve a defensible basis for safely processing high-activity waste in the Waste Characterization, Reduction and Repackaging Facility. Improvements in the control scheme at this facility were necessary to support the permanent elimination of high-hazard nuclear waste from Los Alamos National Laboratory. CDNS led the NNSA review to verify that adequate mechanisms had been put in place to assure the safe startup and operation of the facility. By early 2008, over two hundred high-activity drums had been re-packaged in the facility, resulting in a permanent improvement in safety at Los Alamos.

- CDNS reviewed 24 new and revised directives that affected nuclear safety in support of the CTA concurrence function for nuclear safety requirements. These reviews ensure that the new or revised directives meet NNSA safety expectations for NNSA nuclear facilities.

- CDNS evaluated ten requests for exemptions to nuclear safety requirements. CDNS worked with the requesters and approval authorities to ensure that appropriate compensatory measures were put in place to ensure adequate protection of workers, the public, and the environment.

- CDNS led the Nuclear Safety portion of the Technical Independent Project Review for the new Uranium Processing Facility at Y-12. This review ensured that nuclear safety was adequately integrated into the design to allow the project to request preliminary design authority.

CDNS published three technical bulletins which disseminated lessons learned, clarification of CTA expectations, and official responses to nuclear safety questions from the site offices. The focus areas included the Differing Professional Opinion process (an official means to raise or resolve nuclear safety concerns without fear of reprisal); organizational self-assessments (as a means to improve day-to-day performance, mission accomplishment, safety and security); use of risk-informed decision methods (to prioritize the selection of safety initiatives); and the appropriate use of dose conversion factors (for safety system

classification). The bulletin disseminated summaries of two formal CTA positions on nuclear safety requirements, and more than 20 articles that provided general guidance on nuclear safety matters.

I. Chief of Nuclear Safety

Under Secretaries for Energy and Science are the CTAs for their organizations. The Chief of Nuclear Safety (CNS) was created in 2006 by the Department to ensure the availability of technical expertise and to provide operational awareness necessary for the proper implementation of nuclear safety requirements by its line management. CNS (and staff) support the functions of the CTAs, including maintaining operational awareness of complex, high-hazard nuclear operations at EM and Office of Nuclear Energy sites. CNS activities include: monitoring of reports; reviewing site-specific and complex-wide safety and technical documents; technical discussions; and onsite reviews and assessments.

The CTA functions have been fully implemented. Each of the seven CTA core responsibilities, as established by the Secretary in a memorandum dated April 26, 2005, are being executed. The functions, responsibilities, and authorities of the CTA are provided in the DOE Safety Management Functions, Responsibilities, and Authorities Manual. CNS Standard Operating Procedures were issued in 2007 and are being implemented. The CNS organization is dynamic and its roles, responsibilities, and proactive initiatives will continue to evolve as the Department's technical needs change.

Support to line oversight activities remains the primary activity of CNS staff, focusing on the implementation of DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*. Through this support, the CNS and staff have been successful in promoting a corporate approach to nuclear safety, providing technical excellence in support of nuclear safety, and facilitating mission accomplishment. Staff members assigned as leads for each of the major sites interface directly with site personnel regarding oversight schedules. CNS staff support assessments or select reviews with significant nuclear safety implications, providing subject matter expertise to facility representatives, field office staff, and headquarters assessment teams.

CNS activities and accomplishments in 2007 include the following:

DOE Order 410.1, Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements – The need for a DOE Order to identify minimum nuclear safety requirements for nuclear facility contracts and establish the CTA and CNS/CDNS responsibilities became apparent to support the changes in Headquarters' management structure required by Board Recommendation 2004-1. The CNS, in conjunction with the CDNS, drafted DOE Order 410.1, *CTA Responsibilities Regarding Nuclear Safety Requirements*, to clearly establish CTA and CNS/CDNS authorities and responsibilities. This important Order was issued on August 28, 2007. It addresses CTA authorities and actions for specific nuclear safety regulations and directives in contracts as well as any appropriate exceptions or exemptions.

Operational Awareness – The CNS and staff are integrated with Federal line management to improve the Department's technical safety management capability. The CNS and staff also review a range of activities associated with nuclear safety, including safety basis documents, nuclear facility startups and restarts, personnel training and qualification, maintenance, criticality safety, conduct of operations, and radiation protection. CNS site leads have been established for Savannah River Site, Idaho, Richland, Pacific Northwest National Laboratory, Office of River Protection, Carlsbad, West Valley, Oak Ridge, Portsmouth/Paducah, Brookhaven, and Argonne. The CNS and staff maintain awareness of project status so that the CTAs can fulfill their roles to assure that the desire to meet programmatic commitments is properly balanced with safety in a manner that is intended to not duplicate independent oversight.

Field Oversight Activities. The CNS staff performed numerous – a total of 83 – field activities in 2007, including:

- 14 Radiation Protection/Criticality Safety Reviews
- 5 Facility Safety/Authorization Basis
- 7 Facility Startup/Restart
- 13 Project Management
- 14 Quality Assurance

- 7 Site and Headquarters Oversight Program
- 6 ISM System Review
- 7 Software Quality Assurance
- 10 Contract Requirements.

Strengthening Oversight Processes – CNS has developed a Criteria Review and Approach Document (CRAD) for DOE Order 226.1A, *Implementation of Department of Energy Oversight Policy*, and interfaces with site offices to strengthen this area which is critical to maintain appropriate awareness and timely correction of any substandard conditions or performance. Further, CNS staff participates with other DOE groups to strengthen the safety system oversight program across the Energy complex.

Nuclear Criticality Safety Oversight – CNS is supplementing existing oversight processes to make criticality oversight routine and to ensure that requisite oversight activities are reviewing criticality safety evaluations, challenging technical assumptions, and ensuring standards are being met.

Leadership for Addressing Board Recommendation 2007-1, Safety-Related In Situ Nondestructive Assay of Radioactive Materials – The Secretary assigned the CNS as the Department's responsible manager for this recommendation, which addresses the in-place measurement of nuclear material in an existing process or location such as a duct, pipe, or glovebox without invading the component. The Implementation Plan, which was developed to support line oversight and minimize the need to develop additional guidance, was provided to the Board. Site reviews will be integrated into existing oversight schedules using CRAD tailored, as appropriate, for specific sites. The Implementation Plan framework uses existing industry standards to the greatest extent possible to develop specific contract language as well as potential modifications to DOE Order 420.1B, *Facility Safety*.

The first milestone described in the Implementation Plan concerns the identification of defense nuclear facilities for which a criticality safety program is required and which rely upon in situ nondestructive assay. Completion of this milestone required EM and NNSA to develop lists of these facilities by January 2008. In developing the list of facilities, the Department has asked for information regarding the use of in situ nondestructive assay techniques for safety-related purposes for non-fissile material to ensure a full understanding of the safety implications.

Improving Project Management – The CNS has conducted a detailed analysis of DOE's nuclear projects dating back to FY 2000. The purpose of this review was to understand the root causes of design issues of major nuclear projects. Three initiatives have resulted from this review:

First, a review of Board correspondence for major EM projects was performed to identify significant areas in major projects that were not meeting design expectations with regard to nuclear safety. Building upon Interim Design Guidance issued by EM in July 2006, the CNS developed draft Nuclear Safety Performance Requirements criteria for nuclear safety design for hazard category 2 facilities. This language is intended to strengthen the contract expectations for Requests for Proposals to more accurately estimate costs for hazard category 2 nuclear facilities.

Second, CNS convened a seismic lessons-learned group of experts to discuss the various aspects of seismic design involved in the design of hazard category 2 nuclear facilities. These experts, both DOE and contractor personnel, discussed lessons learned from recent DOE projects that included the Waste Treatment Plant, Salt Waste Treatment Processing Facility, Integrated (sodium-bearing) Waste Treatment Unit, Mixed Oxide Fuel, and others. The intent of this meeting was to develop expert advice for DOE Managers to ensure that the design of our nuclear facilities is conducted at the appropriate level of risk consistent with mission and safety goals of the Department. A set of lessons learned (of things to NOT do) regarding seismic design issues impacting hazard category 2 facility projects was developed.

Third, CNS is supporting the development of the DOE Standard 1189, *Integration of Safety into the Design Process*, which provides the Department's expectations for incorporating safety-in-design in new or major modifications to DOE hazard category 1, 2, and 3 nuclear facilities. CNS staff is also assisting in the development of the implementation guides for DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets*. For the guide on EM cleanup projects, CNS staff has developed guidance on the integration of environment, safety, and health processes and documentation into the project critical decision process.

Nuclear Quality Assurance Standards (NQA) and Auditor Training – NQA Lead Auditor training prepares personnel to conduct audits of DOE and its contractors against the DOE QA requirements and national standard American Society of Mechanical Engineers NQA-1-2004, *Quality Assurance Requirements for Nuclear Facility Applications*. CNS has sponsored six NQA Lead Auditor training sessions which have received strong participation from headquarters and field personnel. In addition, American Society of Mechanical Engineers International has requested the Deputy Secretary to consider DOE endorsement of NQA-1-2008 (the NRC and the Environmental Protection Agency are also reviewing this edition for endorsement). CNS staff will provide expert support to HSS in developing an endorsement process and decision.

Energy and Science Software Quality Assurance Support Group – EM and the Offices of Nuclear Energy and Science formed the CNS-sponsored SQA Support Group to provide a mechanism for their Federal assurance professionals supporting line management to be technical resources for SQA matters, to promote consistent line SQA oversight programs, and to assist in field implementation of DOE SQA requirements. The Support Group infrastructure was established and a technical paper to increase professional knowledge was issued.

Waste Treatment Plant (WTP) Quality Assurance and Seismic Certification – The CNS is supporting EM and the Office of River Protection (ORP) in their efforts to improve the implementation of Bechtel National, Incorporated's (BNI) QA program and DOE's ability to oversee BNI. CNS staff continues to place a significant amount of resources to support EM and ORP activities necessary to continue positive change in the Waste Treatment Plant QA program, including participation as advisor for the EM QA evaluation of the Plant. Some positive changes include: ORP approval of additional Federal and contracted QA engineering resources; establishment of a QA Manager position and dedicated QA organization; expanded nuclear QA auditor capability; and significant increase in the number and frequency of QA audits of contractor programs. Also, CNS concurred with the Department's certification of WTP seismic and ground motion design criteria after completing comprehensive reviews of design documentation.

Reviews in Support of Board Recommendation 2004-2 Active Confinement Systems – Recommendation 2004-2 addresses the confinement of hazardous materials at defense nuclear facilities. DOE's Implementation Plan for this recommendation included the requirement for site offices to complete facility-specific evaluation reports and the CTA to be involved to ensure that the data collected is based on the Documented Safety Analysis assumptions. Evaluations for EM High Priority Facilities were completed in accordance with the Recommendation IP. CNS staff also participated in the review of all available Medium Priority facilities and the reprioritization of the remaining Medium and Low Priority Facilities. The remaining reviews are scheduled to be completed in 2008.

J. Joint Report to Congress

On September 29, 2006, House Congress Report 109-702 on the John Warner National Defense Authorization Act for Fiscal Year 2007 (H.R. 5122) was released and approved by both houses of Congress. The Conference Report, Section 3201, requested the Board and DOE to report jointly to the congressional defense committees on their efforts to improve the timeliness of issue resolution. On July 19, 2007, the joint report was issued. It identified actions both taken and planned that are intended to promote:

- Early identification of safety requirements and strategies at the conceptual and preliminary design phases of a project; and
- More effective processes and protocols for the communication of issues to the Department and for tracking and management of these issues.

As a result of the joint report, the senior Board and DOE staffs now meet quarterly to discuss the most significant Board project concerns, to ensure that the issues are understood, and to ensure that appropriate progress is being made toward closure.

Section III.

Implementation of Board Recommendations

III. Implementation of Board Recommendations

A. Overview of Board Recommendations

Board recommendations are the most formal mechanism the Board uses to prompt action by the Department. The Board issues recommendations to the Secretary of specific measures that should be adopted to ensure adequate protection of the public health and safety. The Secretary is required to respond to each Board recommendation within 45 days of publication of the recommendation in the Federal Register. In addition, the Secretary must submit an implementation plan to the Board within 90 days of publication in the Federal Register of the Secretary's acceptance of the recommendation. The Department's policy is to begin implementation plan development in parallel with the development of the Department's response as outlined in DOE Manual 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*.

The Board has issued 49 recommendations to the Secretary since the Board was established in 1988. The Secretary has accepted 45 of the Board's recommendations in their entirety, and accepted 4 with minor exceptions and clarifications. For each accepted recommendation, the Secretary has approved the Department's implementation plan. Thirty-six of the Board's recommendations are now closed. Table 2 summarizes the status of all 49 Board recommendations. This table shows the status of all open and closed recommendations, including planned dates for completing implementation plan provisions for open recommendations.

Thirteen recommendations remain open as of the end of 2007. The Department is actively taking steps to resolve the safety issues from the open recommendations and to close them. Table 3 provides key dates for open Board recommendations.

The Board issued one new recommendation in 2007 (this recommendation is included in the 13 currently open recommendations). Specifically, the Board issued Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*, to the Secretary on April 25, 2007, and the Department submitted the implementation plan for recommendation 2007-1 on October 24, 2007 (see Section IIIC for more information).

One recommendation was closed in 2007: Recommendation 2000-2, *Configuration Management, Vital Safety Systems* (see Section IIID).

The Secretary has proposed closure of 4 of the 13 open recommendations; however, the Department recognizes that effective coordination with the Board is useful to develop a mutually agreeable path forward to achieving closure of those 4 recommendations. See Section IIIE and IIIF for more information.

In addition to the four recommendations recommended for closure, the Department is working on implementing corrective actions identified in implementation plans for nine recommendations (see Section IIIG for more information). Many of the initiatives discussed in Section II and the site-specific activities and accomplishments discussed in Appendix D are directly related to one or more open Board recommendations.

The Department is required to report on implementation plans that take more than one year to complete. As discussed in Section IIIH, all of the implementation plans for the open recommendations have already taken, or are expected to take, more than one year to complete because of the complexity and breadth of the corrective actions.

B. Historical Perspectives on Board Recommendations

The data in Table 4 reflect the historical issuance of Board recommendations. Figure 2 depicts the same information in graphical form. Figure 2.A shows the new Board recommendations for each year. Figure 2.B provides the net open Board recommendations at year end from 1990 to 2007.

Figure 2.C shows the number of recommendations closed by the Board each year from 1990 to 2007.

An analysis of the Board recommendations and trends indicates that, initially, Board recommendations addressed specific, highly technical, significant safety issues within the Department's activities. Over time, the Department has addressed these risks and established integrated programs to improve the Department's overall safety management process. The Department's success in these areas, combined with the Board's increased use of letters and other notification methods, has led to the issuance of fewer, but often broader recommendations in recent years.

Table 2 – Summary Status of Board Recommendations

REC	SUBJECT	OPEN	CLOSED	EXPECTED TIMEFRAME FOR CLOSURE OF OPEN RECOMMENDATIONS
90-1	Savannah River Operator Training		10/27/1992	
90-2	Codes and Standards		10/24/1995	
90-3	Hanford Waste Tanks		05/01/1992	
90-4	Rocky Flats Operational Readiness Reviews		02/16/1995	
90-5	Rocky Flats Systematic Evaluation Program		10/24/1995	
90-6	Rocky Flats Plutonium in the Ventilation Ducts		10/24/1995	
90-7	Hanford Waste Tanks		09/04/1996	
91-1	Safety Standards Program		10/27/1992	
91-2	Reactor Operations Management Plan		10/27/1992	
91-3	Waste Isolation Pilot Plant		10/27/1992	
91-4	Rocky Flats Building 559 Operational Readiness Review		05/01/1992	
91-5	Savannah River K Reactor Power Limits		04/07/1993	
91-6	Radiation Protection		11/08/1996	
92-1	Operational Readiness of the HB-Line at Savannah River		10/27/1992	
92-2	Facility Representatives		09/17/1996	
92-3	HB-Line Operational Readiness Reviews		02/03/1993	
92-4	Multi-Function Waste Tank Facility at Hanford	X		Secretary proposed closure on December 16, 1998. Coordination useful to develop a path forward.
92-5	Discipline of Operations During Changes		10/24/1995	
92-6	Operational Readiness Reviews		10/24/1995	
92-7	Training and Qualification		11/05/1993	
93-1	Standards Utilization in Defense Nuclear Facilities		03/25/1999	
93-2	The Need for Critical Experiments Capability		12/31/1997	
93-3	Improving Technical Capability in Defense Nuclear Programs		11/09/1999	
93-4	Environmental Restoration Management Contracts		06/28/1996	
93-5	Hanford Waste Tanks Characterization Studies		11/15/1999	
93-6	Maintaining Access to Nuclear Weapons Expertise		04/27/1999	

Table 2 (continued next page) – Summary Status of Board Recommendations

REC	SUBJECT	OPEN	CLOSED	EXPECTED TIMEFRAME FOR CLOSURE OF OPEN RECOMMENDATIONS
94-1	Improved Schedule for Remediation	X		Secretary proposed closure on June 8, 2000. Outstanding actions transferred to implementation plan for Recommendation 2000-1
94-2	Safety Standards for Low-Level Waste		12/22/1999	
94-3	Rocky Flats Seismic and Systems Safety		05/27/1999	
94-4	Deficiencies in Criticality Safety at Oak Ridge, Y-12		03/12/1999	
94-5	Integration of Rules, Orders, and Other Requirements		06/10/1999	
95-1	Improved Safety of Cylinders Containing Depleted Uranium		12/16/1999	
95-2	Safety Management		11/21/2006	
96-1	In-Tank Precipitation System at Savannah River		03/29/2002	
97-1	Safe Storage of Uranium-233	X		All implementation plan actions complete. Implementation of disposition activities ongoing.
97-2	Continuation of Criticality Safety		08/07/2003	
98-1	Resolution of Safety Issues Identified by DOE Internal Oversight	X		Secretary proposed closure on November 13, 2001. Coordination useful to develop a path forward
98-2	Safety Management at the Pantex Plant	X		2008
99-1	Safe Storage of Pits		09/09/2005	
2000-1	Prioritization for Stabilizing Nuclear Materials	X		2009
2000-2	Configuration Management, Vital Safety Systems		08/08/2007	
2001-1	High-Level Waste Management at the Savannah River Site	X		2011
2002-1	Quality Assurance for Safety-Related Software	X		2009
2002-2	Weapons Laboratory Support of the Defense Nuclear Complex		11/22/2005	
2002-3	Requirements for the Design, Implementation, and Maintenance of Administrative Controls	X		Secretary proposed closure on January 4, 2007. Additional verification activities needed.
2004-1	Oversight of Complex, High-Hazard Nuclear Operations	X		2008
2004-2	Active Confinement Systems	X		2008
2005-1	Nuclear Material Packaging	X		2008
2007-1	Safety-Related In Situ Nondestructive Assay of Radioactive Materials	X		TBD

Table 3 – Key Dates for Open Board Recommendations

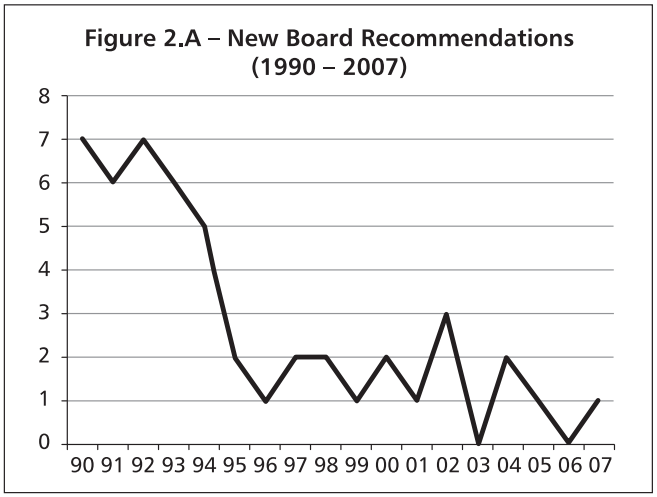
Section 315(b) of the Atomic Energy Act of 1954 requires the Secretary to accept or reject, in whole or in part, each Board recommendation within 45 days of its publication, unless an additional 45 days is requested and granted. Section 315(e) of the Atomic Energy Act of 1954 requires the Secretary to provide an implementation plan for each accepted recommendation within 90 days of publication of the acceptance, unless an additional 45 days is needed and Congress and the Board are notified. This table shows the dates of recommendations and when the Department responded to them.

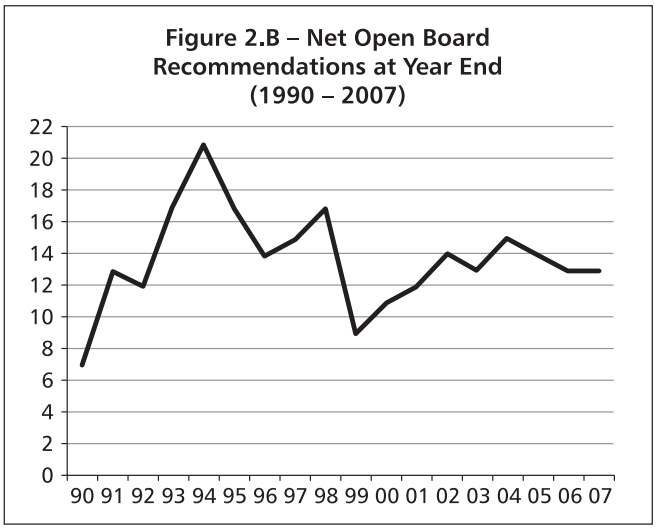
Rec	Subject	Recommendation Date	Response Date	Implementation Plan Date
92-4	Multi-Function Waste Tank Facility at Hanford	7/6/92	8/28/92	10/8/97 (Rev. 2)
94-1	Improved Schedule for Remediation	5/26/94	8/31/94	6/8/00 (Rev. 3)
97-1	Safe Storage of Uranium-233	3/3/97	4/25/97	9/29/97
98-1	Resolution of Safety Issues Identified by DOE Internal Oversight	9/28/98	11/20/98	3/10/99
98-2	Safety Management at the Pantex Plant	9/30/98	11/20/98	10/28/02 (Rev. 1 changes)
2000-1	Prioritization for Stabilizing Nuclear Materials	1/14/00	3/13/00	7/22/02 (Rev. 2) 5/3/04 (RL) 7/23/04 (LANL)
2001-1	High-Level Waste Management at the Savannah River Site	3/23/01	5/18/01	7/11/06 (Rev. 4)
2002-1	Quality Assurance for Safety-Related Software	9/23/02	11/21/02	3/13/03
2002-3	Requirements for the Design, Implementation, and Maintenance of Administrative Controls	12/11/02	1/31/03	6/26/03
2004-1	Oversight of Complex, High-Hazard Nuclear Operations	5/21/04	7/21/04	10/12/06(Rev. 2)
2004-2	Active Confinement Systems	12/7/04	3/18/05	7/12/06(Rev. 1)
2005-1	Nuclear Material Packaging	3/10/05	5/6/05	8/17/05
2007-1	Safety-Related In Situ Nondestructive Assay of Radioactive Materials	4/25/07	6/28/07	10/24/07

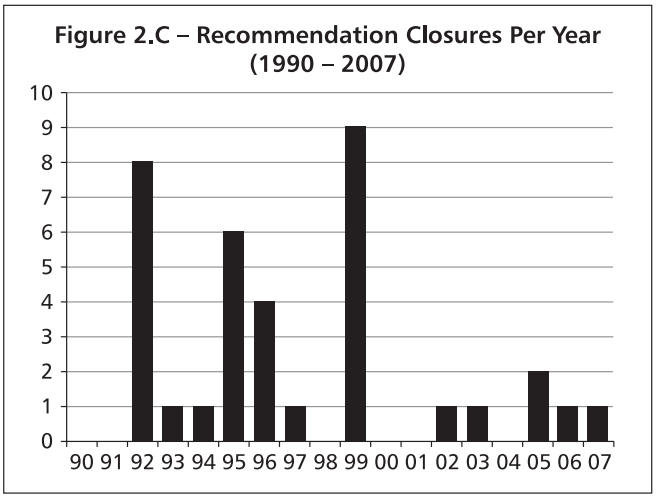
Table 4 – Historical Trend of Open Board Recommendations

Year	Recs. Issued	Recs. Closed	Net Change in Open Recs. for the Year	Open Recs. at Year End
1990	7	0	+7	7
1991	6	0	+6	13
1992	7	8	-1	12
1993	6	1	+5	17
1994	5	1	+4	21
1995	2	6	-4	17
1996	1	4	-3	14
1997	2	1	+1	15
1998	2	0	+2	17
1999	1	9	-8	9
2000	2	0	+2	11
2001	1	0	+1	12
2002	3	1	+2	14
2003	0	1	-1	13
2004	2	0	+2	15
2005	1	2	-1	14
2006	0	1	-1	13
2007	1	1	0	13

Figure 2. Historical Trends in Board Recommendations







C. New Recommendation

The Board issued one new recommendation in 2007: Recommendation 2007-1, *In Situ Nondestructive Assay of Radioactive Materials* (April 2007). It addresses the in-place measurement of nuclear material in an existing process or location, such as a duct, pipe, or glovebox, without invading the component. The Secretary accepted Recommendation 2007-1 in June 2007, noting that continuous improvement using *in situ* nondestructive assay is warranted to support nuclear safety in various activities carried out at the Department's nuclear facilities.

The Board noted in Recommendation 2007-1 that large uncertainties and imprecision have occurred in estimating the type and quantity of radioactive material using *in situ* nondestructive assay. These issues included incorrect assumptions about shielding and the spatial distribution of radioactive material, as well as improper measurement techniques. Measurement errors, in turn, could lead to potential criticality accident conditions, unexpected radiation exposure to workers, and underestimation of the amount of radioactive material available for release in accident scenarios.

In most areas of nuclear safety, the Department has captured required elements for robust site programs through its Directives system. However, the Department has not established programmatic requirements for *in situ* nondestructive assay, even though this method is heavily relied upon for nuclear safety throughout the complex and is key to DOE activities involving fissile materials, including the capability to perform accurate measurements and use the results to determine compliance with nuclear safety limits.

The Secretary assigned the CNS as the Department's responsible manager for this recommendation. The Department's implementation plan was developed consistent with ISM system principles and included the following elements:

- Evaluating the condition of *in situ* nondestructive assay programs against evaluation criteria, which will be developed
- Identifying good practices, both commercial and within the Department, in training and qualification, design requirements for new facilities and equipment, standards for

conducting *in situ* nondestructive assay, implementation of standards, and oversight

- Identifying relevant ongoing research and development activities
- Identifying needed levels and current shortfalls in personnel capabilities and training, equipment capabilities, policy and directives, quality assurance, and oversight
- Establishing requirements, programs, and guidance, as needed
- Developing a prioritized plan for implementing the above criteria and requirements and verifying their effectiveness.

The implementation plan was finalized in October 2007 to support line oversight and minimize the need for development of additional guidance. Site reviews will be integrated into existing oversight schedules using criteria review and approach documents tailored as appropriate for specific sites. The implementation plan framework uses existing industry standards to the extent possible to develop specific contract language and potential modifications to DOE Order 420.1B, *Facility Safety*.

The first milestone laid out in the implementation plan addresses the identification of defense nuclear facilities for which a criticality safety program is required and that rely upon in situ nondestructive assay. Completion of this milestone will require NNSA and EM and other affected program offices to develop lists of these facilities by January 2008. In developing the list of facilities, the Department has asked for information regarding the use of in situ nondestructive assay techniques for safety-related purposes for non-fissile material as a part of the first milestone to ensure full understanding of the safety implications.

D. Closures in 2007

The Board agreed with DOE's closure of Recommendation 2000-2, *Configuration Management, Vital Safety Systems*, on August 8, 2007.

The Board issued Recommendation 2000-2 on March 8, 2000. This recommendation addressed the Board's concern that many of the Department's defense nuclear facilities, constructed years ago, were approaching the end of their design life, and that a combination of age-related degradation and deficient maintenance could affect the reliability and ability of the vital safety systems to perform their safety functions as designed. Also of concern was the Department's capability to apply engineering expertise to maintain the configuration of these systems. Specifically, the recommendation identified possible degradation in confinement ventilation systems and noted the Department's lack of designating system engineers for systems and processes that are vital to safety.

The Secretary accepted the recommendation on April 28, 2000. The Board elaborated on the intent of Recommendation 2000-2 in a letter to the Secretary on September 8, 2000. The Secretary approved the Recommendation 2000-2 implementation plan on October 31, 2000. In January 2004, the Department completed the last implementation plan commitment. The Department has continued to focus on institutionalization of the 2000-2 actions. In May 2006, the Secretary concluded that the associated improvements were sufficiently institutionalized to propose recommendation closure. The Board agreed with DOE's closure of the recommendation in August 2007. As part of its ongoing feedback and improvement efforts, the Department will, however, continue to monitor the effectiveness of long-term programs, such as the cognizant system engineer program, that are relevant to the configuration management of vital safety systems.

E. Recommendations Proposed for Closure in 2007

The Department proposed closure of one recommendation in 2007 via a January 4, 2007, letter to the Board: Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*.

On December 11, 2002, the Board issued Recommendation 2002-3. The Department issued its implementation plan on June 26, 2003, establishing a methodology and a course of actions that included:

- Reviewing existing requirements and guidance to determine whether supplemental guidance is needed to address safety-related administrative controls (now called specific administrative controls);

- Issuing supplemental guidance on specific administrative controls and providing training;
- Evaluating safety basis documents to determine whether existing administrative controls meet Department expectations and identifying actions to upgrade controls when necessary;
- Evaluating field implementation of specific administrative controls; and
- Strengthening Departmental processes to ensure that specific administrative controls are properly designed, implemented, and maintained.

The Department has completed all actions and commitments in the implementation plan for Board Recommendation 2002-3, including:

- Developing a Nuclear Safety Management Technical position;
- Developing training materials for contractors and Federal employees;
- Conducting reviews of facility safety bases to ensure that specific administrative controls are properly implemented; and
- Revising DOE-STD-3009-94, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports*, to address specific administrative controls.

The Department proposed closure of this recommendation in its January 2007 letter based upon completion of all deliverables. However, a follow-up review by the Board found that some major defense nuclear facilities had not yet fully implemented the recommendation, indicating that DOE audits and self-assessments, as specified in Commitment 4.7 of the Implementation Plan to assess the overall effectiveness of the program, were ineffective. DOE agreed with the Board's conclusions, and DOE (NNSA, EM, and HSS Independent Oversight) have taken action to improve their assessment processes for ensuring appropriate implementation of specific administrative controls. DOE will re-evaluate the Department's implementation of specific administrative controls using the improvement assessment processes.

F. Recommendations Proposed for Closure Prior to 2007

The Department proposed closure of three recommendations prior to 2007:

- Recommendation 94-1, *Improved Schedule for Remediation*;
- Recommendation 98-1, *Resolution of Safety Issues Identified by DOE Internal Oversight*; and
- Recommendation 92-4, *Multi-Function Waste Tank Facility at Hanford Tank Farms*

These three recommendations remain open.

In the case of Recommendation 94-1, the corrective actions and milestones that were identified in the Implementation Plan for Recommendation 94-1 have been subsumed into the implementation plan for another recommendation, Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*. Closure of Recommendation 94-1 is tied to closure of Recommendation 20001, and the ongoing actions are being managed under the Implementation Plan for Recommendation 2000-1. Therefore, while the Department is not actively working on a separate Implementation Plan for Recommendation 94-1, there is an eventual path to closure.

However, for the other two recommendations, additional Departmental management attention and coordination with the Board would be useful. For these recommendations, the Department initially recommended closure years ago (in 2001 for 98-1 and 1998 for 94-1) and, in the case of Recommendation 98-1, has completed additional actions specified in Board correspondence. Further, the Department is not actively working on an implementation plan and does not currently have an identified set of actions for achieving closure. The Board has identified some of the areas that they are following relative to these two issues but has not clearly identified specific expectations for additional actions by the Department. The Department recognizes a need to better coordinate with the Board to identify and resolve residual issues. On behalf of the Department, HSS will coordinate with Board in early 2008 to develop a mutually agreeable path forward.

Additional information relating to these three recommendations is provided below.

Recommendation 94-1, *Improved Schedule for Remediation*

Recommendation 94-1, *Improved Schedule for Remediation*, addressed the hazards and risks involving the storage of nuclear materials within the Department's defense nuclear facilities complex. The most urgent safety issues described in the recommendation have either been corrected or had compensatory measures put in place to protect workers and the public until stabilization can be completed. To re-emphasize the urgency the Board placed on the remaining nuclear material stabilization activities, the Board issued Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*, in January 2000.

The Secretary proposed closure of Recommendation 94-1 in a June 8, 2000, letter to the Board because the Department views the scope of Recommendation 2000-1 as essentially the same as the remaining activities for Recommendation 94-1; the Department's 2000-1 implementation plan includes all remaining 94-1 activities. Accordingly, with the approval and delivery of the 2000-1 implementation plan in June 2000, the Secretary proposed closure of 94-1 to the Board because Recommendation 94-1 is essentially redundant to Recommendation 2000-1, which is being satisfactorily implemented. However, the Board has not agreed with DOE that Recommendation 94-1 should be closed and is monitoring progress on Recommendations 94-1 and 2000-1 concurrently, through its review of the 2000-1 implementation plan.

Recommendation 98-1, *Resolution of Safety Issues Identified by DOE Internal Oversight*

On September 28, 1998, the Board issued Recommendation 98-1, *Resolution of Safety Issues Identified by DOE Internal Oversight*, which addressed specific weaknesses identified in the Department's processes to effectively address and resolve findings identified by its internal independent Office of Oversight. The Secretary accepted the recommendation on November 20, 1998 and approved the Department's implementation plan on March 10, 1999. The plan identified a systematic approach for developing, tracking, reporting, and effectively resolving Office of Oversight-identified findings. This implementation plan outlined specific actions, deliverables, and milestones for establishing a consistent and disciplined approach to improving the Department's corrective action processes. It included establishing clear roles, responsibilities, and authorities; a process for elevating disagreements up to the Secretary; promoting senior management involvement; implementing corrective action tracking and reporting; and verifying corrective action closure. By September 2000, the Department had completed the implementation plan's commitments.

The Secretary proposed closure of Recommendation 98-1, *Resolution of Safety Issues Identified by DOE Internal Oversight*, in a November 13, 2001, letter to the Board. The Department also submitted a final report to the Board for Recommendation 98-1 in November 2001. The report outlined an action summary to resolve the issues noted in the Board's recommendation, providing a basis for closure of the recommendation. In January 2002 the Board acknowledged these accomplishments, but indicated that an update to three program-specific functions, responsibilities, and authorities (FRA) documents is necessary for Board closure. Subsequently, these three organizations – the NNSA, the Office of Independent Oversight and Performance Assurance, and the Office of Environment, Safety, and Health – issued their FRA documents. All of these FRA documents were updated by October 2003. Following formation of the HSS in October 2006, the FRA was again updated in 2007 to reflect new HSS roles and responsibilities with respect to corrective action processes.

During 2007, the Department's Corrective Action Management Program (CAMP) has continued to coordinate and assist line management in improving the tracking, reporting, and effectively completing 633 corrective actions. CAMP personnel added 168 findings, identified in 14 new reports, to the Corrective Action Tracking System database during FY 2007. These reports included environment, safety, and health (ES&H) and emergency management assessments; Type A accident investigations; aviation safety program reviews; and other assessments as directed by the Secretary and Deputy Secretary. The Department has also continued to implement and enhance elements of the Department's 98-1 implementation plan during 2007, including continual updating of the DOE CAMP web site; continued close coordination with the Corrective Action Management Team; continued DOE-wide reporting on the status of corrective action effectiveness reviews; and continued coordination, information, and assistance to Department Headquarters and

field element managers and assessing organizations regarding CAMP activities.

The Department believes that the actions taken in response to Board Recommendation 98-1 are implemented and institutionalized, and intends to continue the performance of these activities in the future. However, the Board has indicated that it will continue to focus on the Department's effectiveness in defining safety management responsibilities through the development and regular updating of FRAs for Headquarters elements. While requirements for FRAs are established and FRAs have been developed, the Department recognizes that in some instances FRAs have not been revised and updated in a timely manner and that additional specificity in safety management responsibilities is needed. The Department will initiate efforts to coordinate with the Board to develop a mutually agreeable path forward.

Recommendation 92-4, *Multi-Function Waste Tank Facility at Hanford*

Recommendation 92-4, *Multi-Function Waste Tank Facility at Hanford*, addressed safety issues at the Tank Waste Remediation System Multi-Function Waste Tank Facility project at the Hanford Site. The recommendation identified three areas of concern: project management structure, design bases (systems engineering) for the Multi-Function Waste Tank Facility, and technical and managerial competence. In developing an implementation plan to address these issues, the Department expanded the scope of its response to apply an integrated systems approach to define, plan, control, and execute the overall Hanford mission. While implementing this approach, the Department re-evaluated the need for the Multi-Function Waste Tank Facility project, canceled the project, and altered other Tank Waste Remediation System projects.

The Department completed 38 plan milestones, including all program management and site systems engineering commitments, in the original implementation plan, as well as all milestones in revision one to the implementation plan. The final implementation plan deliverable was completed and provided to the Board in July 1998. The Secretary proposed closure of Recommendation 92-4 in a December 16, 1998, letter to the Board. However, the Board has not agreed with DOE's closure recommendation more than nine years after the Department proposed closure. While the specific items in the implementation plans are complete, the Board continues to focus on related areas, such as a system engineering approach to design and technical and managerial competence in managing nuclear safety. At this time, the Department and Board have not identified a mutually agreeable set of actions to achieve closure, and the Department is not actively working on an implementation plan for closure of this recommendation.

This longstanding situation indicates effective coordination with the Board would be useful. The Department will initiate efforts to coordinate with the Board to develop a mutually agreeable path forward in early 2008.

G. Other Open Recommendations

The Department currently is actively working on implementation plans for nine Board recommendations. Department progress on the active implementation plans for open Board recommendations is described below.

In addition to the information below, Section II provided information about DOE-wide initiatives, many of which are relevant to the open recommendations. In addition, Appendix D also provides a summary of activities and accomplishments of DOE and its site contractors; many of these activities and accomplishments are directly related to one or more open Board recommendations.

Recommendation 2005-1, *Nuclear Material Packaging*

The Board issued Recommendation 2005-1 on March 10, 2005, recommending development of requirements for nuclear material packaging. The Secretary accepted the recommendation on May 6, 2005, and approved the associated implementation plan on August 17, 2005.

The Department's implementation plan includes several interim milestones and formal deliverables that will result in issuance of a new interim packaging and storage requirements document for nuclear materials, DOE Manual 441.1-1, *Nuclear Material Packaging Manual*; preparation of a methodology for assessing and, if necessary,

prioritizing the repackaging of materials in order to comply with the new requirements document; and development of both site-specific and Department-wide schedules for implementing the new requirements. Although not explicitly required by the implementation plan, drop tests were conducted for several existing containers to develop a better understanding of their ability to withstand the type of abnormal events that could reasonably occur during handling operations.

Due to the complexity of existing storage configurations, the time required to publish a new requirements document, and the time needed to develop site implementation plans and consolidate them into a Department-wide plan, final completion will require more than one year. The last deliverable is currently expected to be issued in Spring of 2008.

Recommendation 2004-2, *Active Confinement Systems*

The Board issued Recommendation 2004-2 on December 7, 2004. The recommendation addressed the benefit for the Department to change its safety policy to require active confinement ventilation systems for all new and existing hazard category 2 and 3 defense nuclear facilities with the potential for a radiological release. The Board recommended that the Department enhance and update associated Department directives and standards and evaluate all new and existing facilities in light of the new requirements.

On March 18, 2005, the Secretary accepted the recommendation. The Department developed an implementation plan and provided it to the Board on August 22, 2005. The implementation plan addresses the Board's recommendation by committing to review 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 plan, priority will be given to design and construction projects, including ongoing major modifications of existing facilities.

The first step of the review is for DOE to establish criteria to exclude certain facilities and operations from further review based on sound safety considerations. For facilities not excluded, the focus of review will be to (a) verify that appropriate performance criteria are derived for ventilation systems; (b) verify that these systems can meet the performance criteria, if applicable; and (c) determine whether any physical modifications are necessary to enhance safety performance. The implementation plan further commits to revise DOE directives and standards to formalize the evaluation criteria and capture lessons learned. On September 19, 2005, the Board accepted the implementation plan.

Six actions were completed in 2006. Guidance for the evaluation of both safety-related and non-safety-related ventilation was completed. A list of hazard category 3 facilities that utilize active confinement ventilation systems was compiled, as well as a list of facilities that require ventilation system evaluations. An independent review panel was established to serve as a review and quality check for the ventilation system evaluations. The responsible program offices (e.g., NNSA and EM) have completed pilot studies of the implementation of the ventilation system evaluation guidance. They issued reports on these pilots in 2007, along with the independent review panel's review of the reports, and based on these reviews, minor modifications and clarifications to the evaluation guidance were made. EM site offices have completed ventilation system evaluations for all of their defense nuclear facilities, and NNSA field offices have completed most of the high and medium priority ventilation system evaluations. The responsible program offices will complete their reviews of the ventilation evaluations and develop plans for any needed ventilation system improvements in 2008. The independent review panel will continue to support the development and reviews of the ventilation reports.

Implementation of 2004-2 will require more than one year to complete due to the magnitude and scope of the actions, including site assessments and revision of Department standards and directives. The Department currently projects completion of the commitments in the 2004-2 implementation plan in 2008.

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

The Board issued Recommendation 2004-1 on May 21, 2004, noting concerns regarding a number of safety issues related to central technical authority, delegations of safety responsibilities, technical capability, nuclear safety research, lessons learned from significant external events, and ISM. The

Secretary accepted the recommendation on July 21, 2004; approved the associated implementation plan on December 23, 2004; and approved revision 2 to this implementation plan on October 12, 2006.

Cask is returned to its shipping container after being loaded

In response to the Board's recommendation, the Department's implementation plan identified three broad areas for improvement:

- Strengthening Federal safety assurance;
- Learning from internal and external operating experience; and
- Revitalizing ISM implementation.

During 2007, the Department completed the following implementation plan actions:

- In January 2007, NNSA completed full implementation of the NNSA CTA function. In October 2007, the Under Secretary of Energy completed implementation of the Energy CTA function;
- In April 2007, EM completed a self-assessment on proper implementation of assigned safety responsibilities within the EM Headquarters organization;
- In May 2007, NNSA completed application of new requirements on the delegation of safety responsibilities to NNSA field offices;
- In May 2007, EM completed its DOE program office ISM system description. In August 2007, HSS completed its DOE program office ISM system description. In November 2007, NNSA completed its program office ISM system description;
- In July 2007, HSS completed revision and re-issuance of DOE Order 226.1A, I*mplementation of Department of Energy Oversight Policy*;
- In November 2007, the EM site offices completed their ISM system descriptions; and
- In March 2007 and October 2007, the Department provided briefings to the Board on the Department's status in implementing the 2004-1 implementation plan.

Throughout the year, the Department continued on a number of activities related to the 2004-1 implementation plan, including: (1) developing a Departmental approach for identifying, selecting, and conducting nuclear safety research and development activities, (2) implementing line oversight and contractor assurance systems, (3) implementing the Operating Experience program, (4) implementing the Differing Professional Opinion process, (5) improving Work Planning and Control Process effectiveness, (6) improving Feedback and Improvement process effectiveness, and (7) improving Federal technical capability, as described in Section II.

This plan will require more than one year to complete because of the magnitude and complexity of the issues being addressed. Complex and lasting change in large organizations requires multiple years to implement and verify. The last milestone contained in the current 2004-1 implementation plan has a 2008 completion date.

Recommendation 2002-1, *Quality Assurance for Safety-Related Software*

The Board issued Recommendation 2002-1 on September 23, 2002. This recommendation addressed the Board's concern regarding the quality of the software used to analyze and guide safety-related decisions, the quality of software used to design or develop safety-related controls, and the proficiency of personnel using the software. In addition, the Board noted that software performing safety-related functions requires appropriate QA controls to provide adequate protection for the public, workers, and the environment.

The Secretary accepted the Recommendation in November 2002 and approved the 2002-1 implementation plan in March 2003. Implementation leadership is assigned to the Office of Corporate Safety Analysis within the HSS.

DOE briefed the Board on the status of 2002-1 activities on October 4, 2007. At that time, the Department committed to provide the Board with a plan to address the residual actions associated with Commitment 4.2.1.3 of the Department's 2002-1 Implementation Plan. In December 2007, the Department provided the Board a two-phased approach or path forward for further addressing residual actions.

The first phase consists of a path forward that includes a plan and schedule outlining what has been accomplished to date, along with the approach that will be used to resolve the gaps identified in the toolbox code gap analysis reports to allow closure of Board Recommendation 2002-1. A Safety Software Expert Working Group composed of subject matter experts is being established to work with the toolbox code developers to address the remaining residual gaps and document the results as addenda to the gap analysis reports.

The second phase of the path forward includes development of a strategy on how the Safety Software Central Registry will be managed including code version changes and adding, as necessary, new codes such as safety design codes. Central Registry Management activities also include upgrading and enhancing the Software Quality Assurance/Central Registry website to maintain an updated list of safety software used by the Department, monitoring error reporting activities by code users, and the development of a Communication Forum to exchange information related to safety software used within the Department. The two-phased approached was jointly developed and will be supported by EM, NNSA, and HSS.

Completion of implementation of the 2002-1 plan required more than a year to complete due to the technical complexity and widespread actions necessary to fully meet all commitments outlined in the plan. The Department estimates completion of all actions and milestones for the 2002-1 implementation plan in 2009.

Recommendation 2001-1, *High-Level Waste Management at the Savannah River Site*

The Board issued Recommendation 2001-1 on March 23, 2001. The recommendation addressed the margin of safety and the amount of tank space in the Savannah River Site (SRS) high-level waste system to enable timely stabilization of nuclear materials.

The Secretary accepted the recommendation and provided an initial implementation plan on May 18, 2001. The Board amplified its expectations for this recommendation in a May 24, 2001, letter to the Secretary. The Secretary approved and issued revision 1 to the 2001-1 implementation plan on September 14, 2001. The implementation plan was subsequently revised to reflect significant salt disposition program changes and schedule delays driven by litigation relative to the Department's process for classifying waste for disposal. Six implementation plan commitments remain open.

Key accomplishments related to implementing the Department's 2001-1 plan during 2007 are as follows:

- In August, the Department resolved a mandatory stay of the Saltstone Permit Modification and subsequently resumed Saltstone processing of salt waste in October;
- In September, the Department completed integrated startup testing of the Modular CSSX Unit/Actinide Removal Project;
- In September, the Department established a baseline cost and schedule for the Salt Waste Processing Facility project. Field work commenced for installation of utilities and construction of a foundation mat; and
- In October, the Department issued an update to the SRS Life-Cycle Liquid Waste Disposition System Plan.

Completion of this plan has taken more than one year due to the associated work scope to fully complete the planned activities. The Department estimates completion of all actions and milestones for the 2001-1 implementation plan in September 2011.

Recommendation 2000-1, *Prioritization for Stabilizing Nuclear Materials*

The Board issued Recommendation 2000-1 on January 14, 2000. This recommendation addressed the urgency for completing nuclear material stabilization activities that the Department previously agreed to pursue in the Recommendation 94-1 implementation plan. Recommendation 2000-1 calls for an accelerated 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.

Revision 1 of the 2000-1 implementation plan was provided on January 19, 2001, to reflect changes in the schedule for stabilization activities at Los Alamos National Laboratory (LANL) as outlined in the June 2000 plan and consistent with the July 2000 letter. On July 22, 2002, the Secretary approved revision 2 of the 2000-1 implementation plan that incorporated an improved schedule for stabilization activities at LANL and SRS, as well as several previously approved milestone changes. It further designated the Chief Operating Officer in EM as the Responsible Manager for EM sites, and the NNSA Deputy Administrator for Defense Programs as the Responsible Manager for LANL and Laurence Livermore National Lab. On November 28, 2005, the Secretary approved a revision of the 2000-1 implementation plan specific to the Hanford Site to reflect new information on the techniques necessary to safely handle the sludge in the K-Basins at Hanford and appropriate contingency plans for related risks.

The key accomplishments related to implementing the Department's plan for Recommendation 2000-1 during 2007 are:

- Completing bulk sludge containerization in K-West
- Completing transfer of sludge from K-East
- Processing and stabilization of 165 kg of non-weapons-grade pluotonium at LANL.

As previously reported, the 2000-1 implementation plan requires more than one year to complete due to the technical complexity and diversity of material requiring stabilization at affected defense nuclear sites. Only two sites have additional 2000-1 stabilization activities to complete: Hanford and LANL. The Department estimates completion of all actions and milestones for the 2000-1 implementation plan in December 2009.

Recommendation 98-2, *Safety Management at the Pantex Plant*

The Board issued Recommendation 98-2 on September 30, 1998. This recommendation addressed the need to accelerate safety improvements for nuclear explosive operations at the Pantex Plant. Recommendation 98-2 represents a combination of issues raised in prior Board recommendations and staff observations of Pantex activities.

The Secretary accepted Recommendation 98-2 on November 28, 1998. The Secretary approved the implementation plan and provided it to the Board on April 22, 1999. Leadership for implementation is assigned to the NNSA Assistant Deputy Administrator for Military Applications and Stockpile Management.

The implementation plan was revised and provided to the Board on September 25, 2000. Revision 1 introduced a fundamental change in the Department's approach by increasing the focus on and priority of making safety improvements applicable to multiple nuclear weapon processes. The Department continues to apply the concepts of Seamless Safety for the 21st Century (SS-21) to individual weapon processes in accordance with the Integrated Weapons Activity Schedule. However, the Department believes that major safety improvements can be gained by focusing on improved engineering controls applicable to multiple weapon programs and processes. Thus, the Department can achieve tangible improvements in safety on a near-term basis, allowing weapon project teams to focus on further eliminating or reducing hazards through process redesign, as required.

On October 25, 2002, the Department provided the Board with change 1 to revision 1 of the implementation plan. This change updated the dates of several remaining commitments and added a new commitment to accelerate SS-21 tooling for the W78 and W88 weapon systems.

On March 13, 2007, the Department provided the Board with the final deliverables and notified the Board that all implementation plan commitments

were completed. The Board expressed concern that one of the deliverables, DOE Standard DOE-NA-STD-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*, was not being adequately implemented at the laboratories. On November 23, 2007, the NNSA plan for verifying adequate implementation of DOE-NA-STD-3016-2006 was provided to the Board. This plan calls for verification to be performed in the first quarter of FY 2008 and a summary results report to be issued in January 2008, after which formal closure of Board Recommendation 98-2 will be requested.

The plan for Recommendation 98-2 required more than a year to complete due to the magnitude and complexity of changes.

The New Hope Center serves as Y-12's new public face

Recommendation 97-1, *Safe Storage of Uranium-233*

The Board issued Recommendation 97-1 on March 3, 1997. This recommendation addressed safety issues for storing the existing inventories of materials bearing unirradiated uranium-233 (U-233). The Department accepted the recommendation on April 25, 1997. The Secretary approved the implementation plan and provided it to the Board on September 29, 1997. The Secretary assigned leadership of plan implementation to a task team reporting to the Department's Assistant Secretaries for Defense Programs and EM.

The Department has an inventory of approximately two metric tons of uranium mixed or alloyed with U-233 in many different chemical and physical forms and stored under a variety of conditions throughout the complex. The largest quantities are located at the Oak Ridge National Laboratory (ORNL) and the Idaho National Laboratory (INL), with lesser amounts at LANL and other sites.

All specific implementation plan commitments were completed by July 1999. The Department is in the process of developing plans for the disposition of its U-233 inventories at INL and ORNL.

After evaluating several options, INL decided to dispose of its U-233 inventory as low-level radioactive waste. INL, with appropriate members of the Nevada Test Site (NTS) staff, is evaluating the INL U-233 inventory against the waste acceptance criteria for the NTS for possible disposal. All INL U-233 material is safely and securely managed within dry storage and will remain so until a disposition path is determined and executed.

At ORNL, Isotek Systems, LLC, was awarded a contract in 2003 to perform disposition activities for U-233 and extract isotopes for medical use. In 2005, Congress directed DOE to terminate the Medical Isotope Production and Building 3019 Complex Shutdown project at the ORNL. Congress also directed that responsibility for disposition of the U-233 be transferred to the Defense EM program per DOE's recommendation, and provided resources for the disposition of the material stored in Building 3019. In 2007, Isotek assumed operational responsibility for Building 3019 and the materials containing U-233, and is focusing on ensuring safe and secure storage while developing processes to disposition the U-233. Regardless of the final disposition strategy for the U-233, the Department continues to focus on transforming the U-233 material into a safer and more secure form in the most expeditious and cost effective manner possible.

The 97-1 implementation plan required more than one year to execute due to complexity of the actions. Although the Department continues its with efforts to institutionalize actions set in motion by its implementation plan and achieve final disposition, all milestones in the plan were met as of July 1999 and the Department expects to propose closure in 2008.

H. Report on Implementation Plans Requiring More Than One Year

The Department has taken more than one year to complete most of the implementation plans for Board recommendations. The more-than-one-year timeframes are necessary for a variety of reasons, including the size and scope of issues being addressed and the challenges in accomplishing complex-wide changes. The Department routinely submits the required Congressional notification in conjunction with the Department's Annual Report to Congress on Board activities (i.e., this report), which is also required by the Board's enabling legislation, Chapter 21, Section 315 (f)(1) of the Atomic Energy Act of 1954 [42 U.S.C. § 2286d (f)(1)]. The following implementation plans for open recommendations have already required, or are expected to require, more than one year to complete:

- 92-4, Multi-Function Waste Tank Facility at Hanford Tank Farms;
- 94-1, Improved Schedule for Remediation;
- 97-1, Safe Storage of Uranium-233;
- 98-1, Resolution of Safety Issues Identified by DOE Internal Oversight;
- 98-2, Safety Management at the Pantex Plant;
- 2000-1, Prioritization for Stabilizing Nuclear Materials;
- 2001-1, High-Level Waste Management at the Savannah River Site;
- 2002-1, Quality Assurance for Safety-Related Software;
- 2002-3, Requirements for the Design, Implementation, and Maintenance of Administrative Controls;
- 2004-1, Oversight of Complex, High-Hazard Nuclear Operations;
- 2004-2, Active Confinement Systems;
- 2005-1, Nuclear Material Packaging; and
- 2007-1, Safety-Related *In Situ* Nondestructive Assay of Radioactive Materials

With the exception of the new recommendation in 2007 (2007-1), all of the above open recommendations have been previously reported as requiring more than one year for completion of the implementation plan actions.

Section IV.

Other Board Interface Activities

IV. Other Board Interface Activities

Since its formation in 2006 and throughout 2007, HSS has focused on improving communications with the Board. In 2007, the Department's Chief Health, Safety and Security Officer and his subordinates have met with the Board on several occasions to discuss HSS actions and interfaces. For example, with the support of HSS and the Board, a Board staff member participated as an observer during all phases of an Independent Oversight inspection in 2007 and planned to observe a 2008 Independent Oversight inspection.

Within HSS, the Office of the Departmental Representative to the Board manages the Department's overall interface with the Board and provides advice and direction for resolving safety issues identified by the Board. DOE Manual 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*, details the Department's process used to interface with the Board and the Board's staff. In addition to the activities relating to the Board outlined in the prior sections of this report, the Department interacts with the Board and its staff on several other activities to further ensure adequate protection of public and worker health and safety and the environment at the Department's defense nuclear facilities. These activities are listed below and discussed further in the subsections below:

- Coordination of the Board's review of the Department's safety directives;
- Briefings, site visits, and other Board interactions;
- Responses to Board reporting requirements;
- Attendance and presentations at the Board's public meetings;
- Secretary briefings with the Board members;
- Safety Issues Management System (SIMS);
- Maintenance of the information archive of Board-related documents; and
- Interface workshops and Interface Manual.

A. Coordination of Board Review of Department Safety Directives

One of the Board's significant responsibilities is to review and evaluate the Department's safety directives and standards that apply to the design, construction, operation, and decommissioning of the Department's defense nuclear facilities. The Board reviews the body of the Department's directives (including rules, policies, notices, orders, manuals, handbooks, guides, and standards) that it has identified as "of interest" to the Board because of their applicability to pubic health and safety at the Department's defense nuclear facilities. Whenever the Department develops changes to the identified directives or identifies new directives potentially "of interest" to the Board, the Board is provided an opportunity to review and comment on the changes prior to approval of the changes by Department management. The Departmental Representative's Office coordinates this review process with the Board to ensure that the Board and its staff are notified of each change and given an opportunity for review and comment prior to issuance or re-issuance of the directives. Appendix A provides a listing of the orders identified by the Board as "of interest" and a listing of Departmental safety directives "of interest" to the Board that were changed in 2007.

B. Briefings, Site Visits, and Other Board Interactions

The Department, the Board, and the Board's staff are in regular contact to identify and resolve safety issues at the Department's defense nuclear facilities. The Department provides briefings to the Board on a regular basis in order to update the Board on: the Department's progress toward resolving issues identified in Board recommendations, the Department's safety initiatives, and specific safety issues as requested by the Board. These briefings include briefings by program office and site personnel on issues specific to particular sites. In addition, HSS routinely provides briefings on its activities. For example, the HSS Office of Independent Oversight briefs the

Board after inspections of defense nuclear facilities about the results of reviews of ISM elements and functionality of essential systems at nuclear facilities.

The Board and the Board's staff regularly visit the Department's defense nuclear facilities to perform reviews of the Department's safety initiatives, safety facilities, and operations, and to attend briefings at the sites. Appendix B provides a summary of site visits supported by the Department during 2007. In addition, Department personnel conducted numerous teleconferences and video conferences to exchange information and resolve safety issues.

C. Responses to Board Reporting Requirements

The Board communicates with the Department through a variety of channels, including formal recommendations and reporting requirements, letters requesting action and information, and letters providing suggestions and information (such as staff issue reports and trip reports). Communication channels also include Board and Board's staff requests for information, public meetings, briefings and discussions, and site visits. The Board's choice of communication vehicle suggests the level of the Board's concern, with the more formal channels used for clearly-defined safety issues that require prompt attention by Departmental managers. During 2007, the Board issued 12 sets of formal reporting requirements, pursuant to Chapter 21, Section 313(d) of the Atomic Energy Act of 1954 [42 U.S.C. 2286b(d)], as shown in Table 5. Table 6 lists active reporting requirements from prior years. Table 7 lists the statutory letter commitments completed in 2007.

D. Board Public Meetings

The Board holds public meetings periodically to review significant safety issues in a public forum. The Board provides advance public notice for these meetings pursuant to the provision of the "Government in the Sunshine Act" (5 U.S.C. 552b). During 2007, the Department supported public meetings conducted by the Board on March 22, 2007, regarding incorporation of safety into design and construction, and on December 5, 2007, regarding safety issues and DOE oversight at the LANL.

E. Safety Issues Management System

The Department established a Department-wide commitment management tool, SIMS, in August 1995. Using this tool, the Department has reduced the number of outstanding commitments related to Board recommendations from 694 in August 1995 to 98 in early December 2007, which includes 31 commitments entered in November 2007 from the implementation plan for Board Recommendation 2007-1. The total number of overdue commitments related to Board recommendations has also declined significantly, from 245 in August 1995 to 9 in early December 2007.

In addition to commitments and actions related to Board recommendations, SIMS is also used to manage commitments and actions related to other interactions between the Department and the Board, such as Board written requests for action or information and Department commitments in letters to the Board. In early December 2007, the Department was tracking 28 open letter commitments to the Board, of which none were overdue.

The Departmental Representative conducts qualitative and technical reviews of the Department's implementation plans and other outgoing correspondence to the Board to identify and capture Department commitments. Commitment information identified from these documents is entered into the SIMS database. Monthly summary reports on the status of commitments that are overdue and coming due in the near term are distributed to responsible Department managers, points of contact, and Secretarial Officers. Quarterly SIMS reports are also prepared to focus attention where needed. Department personnel can access detailed SIMS information and use various view, sort, and report formats via an on-line, Internet-based user interface.

The use of SIMS has been effective in most instances and contributed to timely actions and tracking of commitments. However, the Department did not adequately manage some aspects of efforts to close Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*. As indicated in Section III, the Board determined that verification of completion of the actions was not sufficient, and the Department recognizes that

additional verification actions are needed. In addition, the HSS Office of Independent Oversight identified weaknesses in the NNSA processes for issues management, and issued a finding that requires a formal corrective action plan.

F. Information Archive of Board-Related Documents

A key part of identifying, understanding, and resolving safety issues is maintaining effective communication between the Department and the Board. One of the key mechanisms to facilitate communication is regular correspondence between the Department and the Board. A large portion of the written communication involves the Board's recommendations and the associated deliverables, schedules, and reporting requirements contained in the Department's recommendation IPs. In addition, the Department receives and responds to trip reports detailing visits by the Board and the Board's staff to Department facilities. The Department also receives specific requests from the Board and the Board's staff for particular information or action by the Department. Appendix C provides a summary of key correspondence between the Department and the Board for 2007; this summary does not include transmittal of requested information and routine distribution of assessments and evaluations.

The Departmental Representative maintains an information archive of all correspondence, reports, plans, assessments, and transmittals between the Department and the Board on-line at http//www.hss.energy.gov/deprep/default.asp. The web site provides an efficient way for the Department to share unclassified, non-sensitive information pertaining to defense nuclear facilities activities. Consistent with DOE information security policies, information classified as official use only or higher is not available on the web site and is protected in accordance with applicable requirements based on its classification.

The following types of documents are included in the information archive:

- Board recommendations
- Department responses and implementation plans
- Department letters to the Board
- Board letters to the Department
- Selected key letters concerning the status of recommendations
- Policy statements from the Secretary and the Board
- Annual Reports to Congress from the Secretary and the Board concerning Board-related matters
- Resumes of the Board members
- Department Manual for Interface with the Board
- Board staff issue reports provided to the Department by the Board.

G. Interface Manual

The Department, through the Departmental Representative, must ensure that the Department's personnel are provided with appropriate Board interface protocols and directions to ensure:

- The integrity of the Department's efforts in resolving safety issues identified by the Board; and
- That all affected Departmental elements are actively involved in properly resolving safety issues and meeting recommendation IP commitments, Board reporting requirements, and letter commitments.

The Department's key tool for establishing Board interface requirements is DOE Manual 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*, which outlines the Department's processes for interfacing with the Board and the Board's staff. It is available to Departmental personnel through the Departmental Representative's web site or office.

Table 5 – Formal Reporting Requirements Established by the Board in 2007

Date	Reporting Requirements	Days to Report
January 18, 2007	Transuranic waste operations at the Los Alamos National Laboratory	45
March 13, 2007	Briefing regarding the continued safe operations of the 9212 Complex	180 (6 months)
March 13, 2007	Annual assessment of the 9212 Complex, and the progress on the Uranium Processing Facility (UPF)	365 (1 year)
March 30, 2007	Lightning protection at the Pantex Plant	30
April 24, 2007	Quality of technical procedures for nuclear and nuclear explosive operations at Pantex	30
May 10, 2007	Expert elicitation, expert judgment, and peer review processes by the design agencies and DOE-NA-STD-3016, *Hazard Analysis Reports for Nuclear Explosive Operations*	30
May 16, 2007	Risk Assessment Policy for Nuclear Safety	45
July 16, 2007	Adherence to DOE requirements for safe startup of weapon program activities at the Pantex Plant	30
July 30, 2007	Regarding the implementation of Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*.	45
September 10, 2007	Overall strategy and key milestones for the upgrade of the LANL Materials Accountability and Safeguards System (MASS).	90
October 16, 2007	Report and briefing describing specific actions NNSA has taken to (1) facilitate timely and effective implementation of ongoing safety improvement initiatives for nuclear operations, (2) rapidly increase confidence in safety systems currently relied upon in operating nuclear facilities, and (3) improve the Federal oversight of safety systems at LANL.	60
October 23, 2007	Report and briefing describing (1) safety rationale for continuing the operation of Chemistry and Metallurgy Research (CMR) facility at LANL, and (2) a detailed schedule of NNSA's actions to assure safe operations of this facility.	60

Table 6 – Active Reporting Requirements Established by the Board in Prior Years

Date	Reporting Requirements	Days to Report
9/9/05	Briefing on the contents of the annual revision to the Pantex Nuclear Material Management Program	Annually
8/7/03	Annual Report on the Department's Nuclear Criticality Safety Program	Annually

Table 7 – Statutory Letter Commitments Completed in 2007

Letter #	Commitment Title	Date Completed
SL03-031	Annual Rpt on Nuclear Criticality Safety Program	3/12/2007
SL05-026	Briefing - Pantex Nuc. Mat'l Program Mgt. Plan Rev	9/6/2007
SL07-001	Preliminary Design issues at Solid Waste Processing Facility (SWPF)	2/9/2007
SL07-002	Report - Risk reduction at Area G LANL to WIPP	4/9/2007
SL07-002	Briefing - Risk reduction at Area G LANL to WIPP	3/1/2007
SL07-004	Briefing on Bldg. 9212 Annual Safety Assessments	10/4/2007
SL07-005	Lightning Effects Briefing	5/23/2007
SL07-006	Pantex Explosive Operations Procedures Improvement	5/23/2007
SL07-008	Plans for Verifying Implementation of DOE-NA-STD-3	6/19/2007
SL07-009	Briefing on Risk Assessment Schedule	7/10/2007
SL07-010	Pantex Startup Preparations and Assessments	8/14/2007
SL07-011	Briefing on DOE Actions to Implement 2002-3	10/23/2007
SL07-012	LANL MASS upgrades	12/17/2007
SL03-031	Annual Rpt on Nuclear Criticality Safety Program	3/12/2007
SL05-026	Briefing - Pantex Nuc. Mat'l Program Mgt. Plan Rev	9/6/2007
SL07-001	Preliminary Design issues at SWPF	2/9/2007
SL07-002	Report - Risk reduction at Area G LANL to WIPP	4/9/2007
SL07-002	Briefing - Risk reduction at Area G LANL to WIPP	3/1/2007
SL07-004	Briefing on Bldg. 9212 Annual Safety Assessments	10/4/2007
SL07-005	Lightning Effects Briefing	5/23/2007
SL07-006	Pantex Explosive Operations Procedures Improvement	5/23/2007
SL07-007	Rec 2007-1 SR *In Situ* Nondestructive Assay of Radioactive Materials	6/28/2007

Appendices

APPENDIX A

Department Safety Orders and Directives "of Interest" to the Board

Table A.1 - Group 1 - Currently Active Orders of Interest to the Board

Order Number	Title
DOE O 151.1C	Comprehensive Emergency Management System
DOE O 153.1	Departmental Radiological Emergency Response Assets
DOE O 210.2	DOE Corporate Operating Experience Program
DOE O 225.1A	Accident Investigations
DOE O 226.1A	Implementation of Department of Energy Oversight Policy
DOE O 231.1A Chg 1	Environment, Safety, and Health Reporting
DOE O 251.1B	Departmental Directives Program
DOE O 252.1	Technical Standards Program
DOE O 341.1A	Federal Employee Health Services
DOE O 360.1B	Federal Employee Training
DOE O 410.1	Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements
DOE O 413.3A	Program and Project Management for the Acquisition of Capital Assets
DOE O 414.1C	Quality Assurance
DOE O 420.1B	Facility Safety
DOE O 425.1C	Startup and Restart of Nuclear Facilities
DOE O 430.1B	Real Property Asset Management
DOE O 433.1A	Maintenance Management Program for DOE Nuclear Facilities
DOE O 435.1 Chg 1	Radioactive Waste Management
DOE O 440.1B	Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees
DOE O 442.1A	Department of Energy Employee Concerns Program
DOE O 450.1 Admin Chg 1	Environmental Protection Program
DOE O 451.1B Chg 1	National Environmental Policy Act Compliance Program
DOE O 452.1C	Nuclear Explosive and Weapon Surety Program
DOE O 452.2C	Nuclear Explosive Safety
DOE O 452.3	Management of the Department of Energy Nuclear Weapons Complex
DOE O 460.1B	Packaging and Transportation Safety
DOE O 460.2A	Departmental Materials Transportation and Packaging Management
DOE O 461.1A	Packaging and Transfer or Transportation of Materials of National Security Interest
DOE O 470.2B	Independent Oversight and Performance Assurance Program
DOE O 470.4A	Safeguards and Security Program
DOE O 541.1B	Appointment of Contracting Officers and Contracting Officer Representatives
DOE O 5400.5, Chg 2	Radiation Protection of the Public and the Environment
DOE O 5480.4, Chg 4	Environment Protection, Safety, and Health Protection Standards
DOE O 5480.19, Chg 2	Conduct of Operations Requirements for DOE Facilities

DOE O 5480.20A, Chg 1	Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities
DOE O 5480.30, Chg 1	Nuclear Reactor Safety Design Criteria
DOE O 5660.1B	Management of Nuclear Materials

Table A.1 – Group 2 – National Nuclear Security Administration Policy Letters

Order Number	Title
None Issued to Date	Documents will be added to this table if NNSA issues Policy Letters related to safety.

Table A.1 – Group 3 – Archived or Deleted Orders of Interest to the Board Cited in Current Contracts

Order Number	Title
DOE N 153.2	Connectivity to National Atmospheric Release Advisory Center (NARAC)
DOE O 210.1	Performance Indicators and Analysis of Operations Information
DOE O 232.1A	Occurrence Reporting arid Processing of Operational Information
DOE O 473.1	Physical Protection Program
DOE O 474.1A	Control and Accountability of Nuclear Materials
DOE O 1300.2A	Department of Energy Technical Standards Program
DOE O 1360.2B	Unclassified Computer Security Program
DOE O 1540.2, Chg 1	Hazardous Material Packaging for Transport – Administrative Procedures
DOE O 1540.3A	Base Technology for Radioactive Material Transportation Packaging Systems
DOE O 3790.1B	Federal Employee Occupational Safety and Health Program
DOE O 4330.4B	Maintenance Management Program
DOE O 4700.1	Project Management System
DOE O 4700.4	Project Manager Certification
DOE O 5000.3B, Chg 1	Occurrence Reporting and Processing of Operations Information
DOE O 5400.1	General Environmental Protection Program
DOE O 5400.2A Chg1	Environmental Compliance Issue Coordination
DOE O 5400.3	Hazardous and Radioactive Mixed Waste Program
DOE O 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DOE O 5480.21	Unreviewed Safety Questions
DOE O 5480.22, Chg 2	Technical Safety Requirements
DOE O 5480.23, Chg 1	Nuclear Safety Analysis reports
DOE O 5440.1E	National Environmental Policy Act Compliance Program
DOE O 5480.1B Chg 5	Environmental, Safety and Health Program for DOE Facilities
DOE O 5480.3	Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes

DOE O 5480.5, Chg 2	Safety of Nuclear Facilities
DOE O 5480.6	Safety of Department of Energy-Owned Nuclear Reactors
DOE O 5480.7A	Fire Protection
DOE O 5480.8A Chg 2	Contractor Occupational Medical Program
DOE O 5480.9A	Construction Safety and Health Program
DOE O 5480.10	Contractor Industrial Hygiene Program
DOE O 5480.11	Radiation Protection for Occupational Workers
DOE O 5480.15	Department of Energy Laboratory Accreditation Program for Personnel Dosimetry
DOE O 5480.17	Site Safety Representatives
DOE O 5480.18B	Nuclear Facility Training Accreditation Program
DOE O 5480.24	Nuclear Criticality Safety
DOE O 5480.25	Safety of Accelerator Facilities
DOE O 5480.26 Indicators	Trending and Analysis of Operations Information Using Performance
DOE O 5480.28	Natural Phenomena Hazards Mitigation
DOE O 5480.29	Employee Concerns Management System
DOE O 5480.31	Startup and Restart of Nuclear Facilities
DOE O 5481.1B Chg 1	Safety Analysis and Review System
DOE O 5482.1B Chg 1	Environment, Safety, and Health Appraisal Program
DOE O 5483.1A	Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities
DOE O 5484.1B	Environmental Protection, Safety and Health Protection Information Reporting Requirements
DOE O 5500.1B	Emergency Management System
DOE O 5500.2B Chg 1	Emergency Categories, Classes, and Notification and Reporting Requirements
DOE O 5500.3A Chg 1	Planning and Preparedness for Operational Emergencies
DOE O 5500.4A	Public Affairs Policy and Planning Requirements for Emergencies
DOE O 5500.7B	Emergency Operating Records Protection Program
DOE O 5500.10	Emergency Readiness Assurance Program
DOE O 5600.1	Management of the Department of Energy Weapon Program and Weapon Complex
DOE O 5610.10	Nuclear Explosive and Weapon Safety Program
DOE O 5610.11	Nuclear Explosive Safety
DOE O 5610.12	Packaging and Offsite Transportation of Nuclear Components, and Special Assemblies Associated with the Nuclear Explosive and Weapon Safety Program
DOE O 5632.1C	Protection and Control of Safeguards and Security Interests
DOE O 5632.11	Physical Protection of Unclassified Irradiated Reactor Fuel in Transit
DOE O 5700.6C Chg 1	Quality Assurance
DOE O 5820.2A	Radioactive Waste Management
DOE O 6430.1A	General Design Criteria

Table A.1 – Group 4 - Related Documents Setting Forth Safety-related Requirements or Guidance

Order Number	Title
DOE SEN-35-91	Nuclear Safety Policy
DOE M 140.1-1B	Interface with the Defense Nuclear Facilities Safety Board
DOE P 141.2	Public Participation and Community Relations
DOE G 151.1-series	Emergency Management Guide (1A, 2 through 5)
DOE G 200.1-1 series	Software Engineering Methodology Guide Chapters 1 through 10
DOE G 225.1A-1	Implementation Guide for Use with DOE Order 225.1, Accident Investigations
DOE P 226.1A	Department of Energy Oversight Policy
DOE G 231.1-1	Occurrence Reporting and Performance Analysis Guide
DOE M 231.1-1A Chg 2	Environment, Safety and Health Reporting Manual
DOE M 231.1-2	Occurrence Reporting and Processing of Operations Information
DOE G 231.1-2	Occurrence Reporting Causal Analysis Guide
DOE P 251.1A	Directives System Policy
DOE M 251.1-1B	Directives System Manual
DOE G 252.1-1	Technical Standards Program Guide
DOE G 341.1-1A	Guide on Federal Employee Occupational Medical Programs
DOE G 341.1-2A	Guide on Federal Employee Assistance Programs
DOE M 360.1-1B	Federal Employee Training Manual
DOE P 410.1A	Promulgating Nuclear Safety Requirements
DOE P 411.1	Safety Management Functions, Responsibilities, and Authorities Policy
DOE M 411.1-1C	Safety Management Functions, Responsibilities, and Authorities Manual
DOE P 413.1	Program and Project Management Policy for the Planning, Programming, Budgeting, and Acquisition of Capital Assets
DOE P 413.2	Value Engineering
DOE M 413.3-1	Project Management for the Acquisition of Capital Assets
DOE G 414.1-1B	Management and Independent Assessments Guide for Use with 10 CFR Part 830, Subpart A, and DOE O 414.1C, Quality Assurance; DOE M 450.4-1, Integrated Safety Management System Manual; and DOE O 226.1A, Implementation of Department of Energy Oversight Policy
DOE G 414.1-2A	Quality Assurance Management System Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance
DOE G 414.1-3	Suspect/Counterfeit Items Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1B, Quality Assurance
DOE G 414.1-4	Safety Software Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance
DOE G 414.1-5	Corrective Action Program Guidance
DOE G 420.1-1	Nonreactor Nuclear Safety Design Criteria and Explosive Safety Criteria Guide for Use with DOE Order 420.1, Facility Safety
DOE G 420.1-2	Guide for Mitigation of Natural Phenomena Hazards for DOE Nuclear Facility and Non-Nuclear Facilities
DOE G 420.1-3	Implementation Guide for DOE Fire Protection and Emergency Services Programs for Use with DOE O 420.1B, Facility Safety
DOE G 421.1-1 series	Criticality Safety Good Practices Program Guide for DOE Nonreactor Nuclear Facilities

DOE G 421.1-2	Implementation Guide for Use in Developing Documented Safety Analyses to Meet Subpart B of 10 CFR 830
DOE G 423.1-1	Implementation Guide for Use in Developing Technical Safety Requirements
DOE G 424.1-1A	Implementation Guide for use in Addressing Unreviewed Safety Question Requirements
DOE P 426.1	Federal Technical Capability Policy for Defense Nuclear Facilities
DOE M 426.1-1A	Federal Technical Capability Manual
DOE P 430.1	Land and Facility Use Planning
DOE G 430.1-2	Implementation Guide for Surveillance and Maintenance During Facility Transition and Disposition
DOE G 430.1-3	Deactivation Implementation Guide
DOE G 430.1-4	Decommissioning Implementation Guide
DOE G 430.1-5	Transition Implementation Guide
DOE G 433.1-1	Nuclear Facility Maintenance Management Program Guide for Use with DOE Order 433.1
DOE M 435.1-1 Chg 1	Radioactive Waste Management Manual
DOE G 435.1-1 series	Implementation Guide for Use with DOE Manual 435.1-1 Chapters 1 through 4
DOE M 440.1-1A	DOE Explosives Safety Manual
DOE G 440.1-x series	Guides for Use with DOE Order 440.1
DOE G 440.1-7A	Implementation Guide for Use with 10 CFR Part 850, Chronic Beryllium Disease Prevention Program
DOE G 440.1-8	Implementation Guide for Use with 10 CFR Part 851, Worker Safety and Health Programs
DOE G 441.1-1B	Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection
DOE P 441.1	DOE Radiological Health and Safety Policy
DOE G 442.1-1	DOE Employee Concerns Program Guide
DOE P 442.1	Differing Professional Opinions on Technical Issues
DOE M 442.1-1	Differing Professional Opinions Manual for Technical
DOE G 450.1-x series	Implementation Guide for Use with DOE Order 450.1 Volumes 1A, 2, and 4
DOE P 450.2A	Identifying, Implementing and Complying with Environment, Safety and Health Requirements
DOE P 450.3	Authorizing Use of the Necessary and Sufficient Process for Standards-Based Environment, Safety and Health Management
DOE M 450.3-1	DOE Closure Process for Necessary and Sufficient Sets of Standards
DOE G 450.3-x series	Documentation for Work Smart Standards Applications Volumes 1 Through 3
DOE P 450.4	Safety Management System Policy
DOE M 450.4-1	Integrated Safety Management System Manual
DOE G 450.4-1B series	Integrated Safety Management System Guide Volumes 1 through 2
DOE P 450.7	Environment, Safety and Health (ESH) Goals
DOE M 452.2-1	Nuclear Explosive Safety
DOE P 454.1	Use of Institutional Controls
DOE G 454.1-1	Institutional Controls Implementation Guide for Use with DOE P 454.1, Use of Institutional Controls

DOE P 455.1	Use of Risk-Based End States
DOE G 460.1-1 series	Implementation Guide for Use with DOE Order 460.1A, Packaging and Transportation Safety
DOE G 460.2-1	Implementation Guide for Use with DOE Order 460.2, Departmental Materials Transportation and Packaging Management
DOE M 460.2-1	Radioactive Material Transportation Practices Manual
DOE M 461.1-1 Chg 1	Packaging and Transfer of Materials of National Security Interest Manual
DOE M 470.4-6 Chg 1	Nuclear Material Control and Accountability
10 CFR 820	Procedural Rules for DOE Nuclear Activities
10 CFR 830,Subpart A	Quality Assurance Requirements
10 CFR 830,Subpart B	Nuclear Safety Management
10 CFR 835	Occupational Radiation Protection
10 CFR 851	Worker Safety and Health Program
48 CFR 970.5204-2	Laws, Regulations, and DOE Directives
48 CFR 970.5215-3	Conditional Payment of Fee, Profit, and Other Incentives – Facility Management Contracts
48 CFR 970.5223-1	Integration of Environment, Safety, and Health Into Work Planning and Execution
Various	DOE Handbooks and Technical Standards cited in Orders and related documents of interest to the Board as listed in the tables, above.

Table A.2 – Department Safety-related Directives Coordinated with the Board Staff and Issued in 2007

Order Number	Title	Date Issued
DOE-STD-1131-2007	General Employee Radiological Training	December 2007
DOE-STD-1146-2007	General Technical Base Qualification Standard	December 2007
DOE-STD-1137-2007	Fire Protection Engineering Functional Area Qualification Standard	December 2007
DOE-STD-1130-2007	Radiological Worker Training	December 2007
DOE-STD-1183-2007	Nuclear Safety Specialist Functional Area Qualification Standard	November 2007
DOE-STD-1138-2007	Industrial Hygiene Functional Area Qualification Standard	November 2007
DOE O 341.1A	Federal Employee Health Services	October 18, 2007
DOE G 341.1-1A	Guide on Federal Employee Occupational Medical Programs	October 18, 2007
DOE G 341.1-2A	Guide on Federal Employee Assistance Programs	October 18, 2007
DOE-STD-1185-2007	Nuclear Explosive Safety Study Functional Area Qualification Standard	September 2007
DOE G 414.1-1B	Management and Independent Assessments Guide for Use with 10 CFR Part 830, Subpart A, and DOE O 414.1C, Quality Assurance; DOE M 450.4-1, Integrated Safety Management System Manual; and DOE O 226.1A, Implementation of Department of Energy Oversight Policy	September 27, 2007
DOE G 420.1-3	Implementation Guide for DOE Fire Protection and Emergency Services Programs for Use with DOE O 420.1B, Facility Safety	September 27, 2007
DOE O 410.1	Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements	August 28, 2007
DOE-STD-1170-2007	Electrical Systems and Safety Oversight Functional Area Qualification Standard	August 2007
DOE-STD-1090-2007	Hoisting and Rigging (formerly Hoisting and Rigging Manual)	August 2007
DOE O 226.1A	Implementation of Department of Energy Oversight Policy	July 31, 2007
DOE G 151.1-1A	Emergency Management - Management Fundamentals and the Operational Emergency Base	July 11, 2007
DOE G 151.1-2	Emergency Management - Technical Planning Basis	July 11, 2007
DOE G 151.1-3	Emergency Management - Programmatic Elements	July 11, 2007
DOE G 151.1-4	Emergency Management - Response Elements	July 11, 2007
DOE G 151.1-5	Emergency Management - Biosafety Facilities	July 11, 2007

DOE O 153.1	Departmental Radiological Emergency Response Assets	June 27, 2007
DOE M 231.1-1A Chg 2	Environment, Safety and Health Reporting Manual	June 12, 2007
DOE G 440.1-1A	Worker Protection Program for DOE (including the National Nuclear Security Administration) Federal Employees Guide for Use with DOE O 440.1B	June 4, 2007
DOE P 226.1A	Department of Energy Oversight Policy	May 25, 2007
DOE O 470.4A	Safeguards and Security Program	May 25, 2007
DOE O 440.1B	Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees	May 17, 2007
DOE-STD-5506-2007	Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities	April 2007
DOE-HDBK-1129-2007	Tritium Handling and Safe Storage	March 2007
DOE G 441.1-1B	Radiation Protection Programs Guide for use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection	March 1, 2007
DOE-STD-3025-2007	Quality Assurance Inspection and Testing of HEPA Filters	February 2007
DOE-STD-3007-2007	Guidelines for Preparing Criticality Safety Evaluations at Department of Energy Non-Reactor Nuclear Facilities	February 2007
DOE O 433.1A	Maintenance Management Program for DOE Nuclear Facilities	February 13, 2007
DOE O 450.1 Admin Chg 1	Environmental Protection Program	January 3, 2007

Table A.3 – Descriptions of Department Orders and Safety Directives Designated by the Board as "of Interest"

Series 100—Leadership/Management/Planning

DOE O 151.1C, *Comprehensive Emergency Management System*
Establishes policy, assigns, and describes roles and responsibilities for the Department of Energy (DOE) Emergency Management System, which provides the framework for development, coordination, control, and direction of all emergency planning, preparedness, readiness assurance, response, and recovery actions.

DOE O 153.1, *Departmental Radiological Emergency Response Assets*
Establishes requirements and responsibilities for the DOE/National Nuclear Security Administration (NNSA) national radiological emergency response assets and capabilities and Nuclear Emergency Support Team assets.

Series 200—Information and Leadership

DOE O 210.2 *DOE Corporate Operating Experience Program*
Establishes a DOE-wide program for management of operating experience to prevent adverse operating incidents and to expand the sharing of good work practices among DOE sites.

DOE O 225.1A, *Accident Investigations*
Prescribes requirements for conducting investigations of certain accidents occurring at DOE operations and sites to prevent the recurrence of such accidents and to contribute to improved environmental protection and safety and health of DOE employees, contractors, and the public.

DOE O 226.1A, *Implementation of Department of Energy Oversight Policy*
Provides direction for implementing DOE P 226.1A, Department of Energy Oversight Policy, dated 5-25-07, which establishes DOE policy for assurance systems and processes established by DOE contractors and oversight programs performed by DOE line management and independent oversight organizations.

DOE O 231.1A Chg 1, *Environment, Safety, and Health Reporting*
Ensures timely collection, reporting, analysis, and dissemination of information on environment, safety, and health issues as required by law or regulations or as needed to ensure that the DOE and NNSA are kept fully informed on a timely basis about events that could adversely affect the health and safety of the public or the workers, the environment, the intended purpose of DOE facilities, or the credibility of the Department.

DOE O 251.1B, *Departmental Directives Program*
Establishes requirements for the development, coordination, and review of certain internal Directives System documents (Policies, Orders, Notices, Manuals, and Guides.) This ensures issuance of clear, succinct, cost-effective, and outcome-oriented Directives System documents; early involvement of affected organizations; and timely development, coordination, and issuance of Directives System documents.
DOE O 252.1, Technical Standards Program
Promotes the use of voluntary consensus standards by the DOE, provides DOE with the means to develop needed technical standards, and manages overall technical standards information, activities, issues, and interactions. DOE Technical Standards cover performance-based or design-specific technical specifications and related management systems practices, and span classification of components; delineation of procedures; specification of materials, products, performance, design, or operations; and definitions of terms or measurements of quality and quantity in describing materials, products, systems, services, or practices.

Series 300—Human Resources

DOE O 341.1A, *Federal Employee Health Services*
Establishes requirements and responsibilities for occupational medical, employee assistance, and workers' compensation programs for Federal employees.

DOE O 360.1B, *Federal Employee Training*
Establishes requirements and assigns responsibilities for DOE Federal employee training, education, and development under the Government Employees Training Act of 1958. The objective is to improve workforce performance related to the mission and

strategic objectives of DOE through a cyclical program of training planning, needs analysis and assessment, design, development, implementation, and evaluation.

View of the Highly Enriched Uranium Materials Facility under construction at Y-12

Series 400—Work Process

DOE O 410.1, *Central Technical Authority Responsibilities Regarding Nuclear Safety Requirements*
Establishes Central Technical Authority and Chief of Nuclear Safety/Chief of Defense Nuclear Safety responsibilities and requirements directed by the Secretary of Energy in the development and issuance of DOE regulations and directives that affect nuclear safety.

DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets*
Provides the DOE, including the NNSA, project management direction for the acquisition of capital assets that are delivered on schedule, within budget, and fully capable of meeting mission performance and environmental safety and health standards.

DOE O 414.1C, *Quality Assurance*
Establishes quality process requirements to be implemented under a quality assurance program for the control of suspect/counterfeit items, safety issue corrective actions, and safety software. Ensures that DOE, including NNSA, products and services meet or exceed customers' expectations.

DOE O 420.1B, *Facility Safety*
Establishes facility and programmatic safety requirements for DOE facilities, which includes nuclear and explosives safety design criteria, fire protection, criticality safety, natural phenomena hazards mitigation, and the System Engineer Program.

DOE O 425.1C, *Startup and Restart of Nuclear Facilities*
Establishes the requirements for the DOE, including the NNSA, for startup of new nuclear facilities and for the restart of existing nuclear facilities that have been shut down. The requirements specify a readiness review process that must, in all cases, demonstrate that it is safe to start (or restart) the applicable facility.

DOE O 430.1B, *Real Property Asset Management*
Establishes an integrated corporate-level, performance based approach to the life-cycle management of our real property assets. It links real property asset planning, programming, budgeting and evaluation to the Department's multi-faceted missions.

DOE O 433.1A, *Maintenance Management Program for DOE Nuclear Facilities*
Defines the safety management program required by 10 CFR 830.204(b)(5) for maintenance and the reliable performance of structures, systems, and components that are part of the safety basis required by 10 CFR 830.202.1 at hazard category 1, 2, and 3 DOE nuclear facilities.

DOE O 435.1 Chg 1, *Radioactive Waste Management*
Ensures that all DOE radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment.

DOE O 440.1B, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*
Establishes the framework for an effective worker protection program that will reduce or prevent injuries, illnesses, and accidental losses by providing DOE, including NNSA, Federal workers with a safe and healthful workplace.

DOE O 442.1A, *Department of Energy Employee Concerns Program*
Ensures that employee concerns related to such issues as the environment, safety, health, and management of DOE and NNSA programs and facilities are addressed through prompt identification, reporting, and resolution of employee concerns regarding DOE facilities or operations in a manner that provides the highest degree of safe operations; free and open expression of employee concerns that results in an independent, objective evaluation; and supplementation of existing processes with an independent avenue for reporting concerns.

DOE O 450.1 Admin Chg 1, *Environmental Protection Program*
Implements sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources impacted by DOE operations and by which DOE cost effectively meets or exceeds compliance with applicable environmental, public health, and resource protection laws, regulations, and DOE requirements.

DOE O 451.1B Chg 1, *National Environmental Policy Act Compliance Program*
Establishes DOE internal requirements and responsibilities for implementing the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality Regulations Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and the DOE NEPA Implementing Procedures (10 CFR Part 1021). The goal is to ensure efficient and effective implementation of DOE's NEPA responsibilities through teamwork while controlling the costs and time for the NEPA process.

DOE O 452.1C, *Nuclear Explosive and Weapon Surety Program*
Establishes DOE requirements and responsibilities to ensure safety, security, and control of nuclear explosives and nuclear weapons in the Nuclear Explosive Weapons Surety Program.

DOE O 452.2C, *Nuclear Explosive Safety*
Establishes specific Nuclear Explosive Safety Program requirements to implement the DOE nuclear explosive safety standards and related criteria for routine and planned nuclear explosive operations.

DOE O 452.3, *Management of the Department of Energy Nuclear Weapons Complex*
Defines and affirms the authorities and responsibilities of the NNSA for the management of the DOE nuclear weapons complex and emphasizes that the management of the United States nuclear weapons stockpile is the DOE's highest priority for the NNSA and the DOE nuclear weapons complex.

DOE O 460.1B, *Packaging and Transportation Safety*
Establishes safety requirements for the proper packaging and transportation of DOE/NNSA offsite shipments and onsite transfers of hazardous materials and for modal transport.

DOE O 460.2A, *Departmental Materials Transportation and Packaging Management*
Establishes requirements and responsibilities for management of DOE, including NNSA, materials transportation and packaging to ensure the safe, secure, efficient packaging and transportation of materials, both hazardous and nonhazardous.

DOE O 461.1A, *Packaging and Transfer or Transportation of Materials of National Security Interest*
Establishes requirements and responsibilities for offsite shipments of naval nuclear fuel elements, Category I and Category II special nuclear material (SNM), nuclear explosives, nuclear components, special assemblies, and other materials of national security interest; onsite transfers of naval nuclear fuel elements, Category I and II SNM, nuclear components, special assemblies, and other materials of national security interest; and certification of packages for Category I and II SNM, nuclear components, and other materials of national security interest.

DOE O 470.2B, *Independent Oversight and Performance Assurance Program*
Enhances the Department's safeguards and security, cyber security, and emergency management programs and provides the Department and contractor managers, Congress, and other stakeholders with an independent evaluation of the effectiveness of DOE policy and line management performance in safeguards and security, cyber security, emergency management, and other critical functions, as directed by the Secretary.

DOE O 470.4A, *Safeguards and Security Program*
Establishes roles and responsibilities for the Department of Energy Safeguards and Security Program.

Series 5400—Environmental Quality and Impact

DOE O 541.1B, *Appointment of Contracting Officers and Contracting Officer Representatives*
Establishes procedures governing the selection, appointment, and termination of DOE/NNSA contracting officers and contracting officer representatives. Also, ensures that, within the scope of this Order, only trained, qualified procurement and financial assistance professionals serve as contracting officers.

DOE O 5400.5 Chg 2, *Radiation Protection of the Public and the Environment*
Establishes the standards and requirements for operations of the DOE and DOE contractors with respect to operating its facilities and conducting its activities so that (a) radiation exposures to members of the public are maintained within the established limits and to control radioactive contamination through the management of real and personal property and (b) the environment is protected from radioactive contamination to the extent practical.

DOE O 5480.4 Chg 4, *Environment Protection, Safety, and Health Protection Standards*
Specifies requirements for the application of the mandatory environment, safety, and health (ES&H) standards applicable to all DOE and DOE contractor operations and provides a listing of reference ES&H standards; and identifies the sources of the mandatory and reference ES&H standards.

DOE O 5480.19 Chg 2, *Conduct of Operations Requirements for DOE Facilities*
Provides requirements and guidelines for Departmental elements, including the NNSA, to use in developing directives, plans, and/or procedures relating to the conduct of operations at DOE facilities. The implementation of these requirements and guidelines should result in improved quality and uniformity of operations.

DOE O 5480.20A Chg 1, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*
Establishes selection, qualification, and training requirements for management and operating contractor personnel involved in the operation, maintenance, and technical support of DOE and NNSA Category A and B reactors and non-reactor nuclear facilities.

DOE O 5480.30 Chg 1, *Nuclear Reactor Safety Design Criteria*
Establishes nuclear safety design criteria applicable to the design, fabrication, construction, testing, and performance requirements of nuclear reactor facilities and safety-class structures, systems, and components within these facilities.

Series 5600—Defense Programs

DOE O 5660.1B, *Management of Nuclear Materials*
Establishes requirements and procedures for the management of nuclear materials within the DOE in order to implement a comprehensive nuclear materials management program to conserve valuable nuclear material resources; distribute nuclear materials needed for DOE and other programs for research, development, and other purposes; optimize nuclear materials production, processing, and inventory management operations; and conduct studies and prepare plans for the future use and disposition of nuclear materials, including operation of DOE nuclear materials production, processing, and storage facilities.

Related Documents Setting Forth Safety-Related Requirements

SEN-35-91, *Nuclear Safety Policy*
Establishes the basic nuclear safety policy from which specific safety rules, orders, standards, and other requirements shall follow.

DOE M 140.1-1B, *Interface with the Defense Nuclear Facilities Safety Board*
Presents the process the DOE will use to interface with the Defense Nuclear Facilities Safety Board and its staff. The requirements and guidance in this Manual apply to Departmental personnel, including employees of the NNSA, who are to use this Manual to facilitate the quality and responsiveness of the Departmental interactions with the Board and its staff.

DOE P 141.2, *Public Participation and Community Relations*
Ensures that public participation and community outreach are integral and effective parts of DOE activities and that decisions are made with the benefit of significant public perspectives.

DOE G 151.1-1A, *Emergency Management Guide – Emergency Management Fundamentals and the Operational Emergency Base Program*
Provides information about the emergency management fundamentals imbedded in the requirements of DOE O 151.1C, as well as acceptable methods of meeting the requirements for the Operational Emergency Base Program, which ensures that all DOE facilities have effective capabilities for all emergency response.

DOE G 151.1-2, *Emergency Management Guide - Technical Planning Basis*
Assists DOE/NNSA field elements and operating contractors in identifying and analyzing hazards at facilities and sites to provide the technical planning basis for emergency management programs.

DOE G 151.1-3, *Emergency Management Guide - Programmatic Elements*
Provides acceptable methods for meeting the requirements of DOE O 151.1C for programmatic elements that sustain the emergency management program and maintain the readiness of the program to respond to an emergency.

DOE G 151.1-4, *Emergency Management Guide - Response Elements*
Provides acceptable methods for meeting the requirement of DOE O 151.1C for response elements that respond or contribute to response as needed in an emergency.

DOE G 151.1-5, *Emergency Management Guide - Biosafety Facilities*
Assists DOE/NNSA field elements and operating contractors in incorporating hazardous biological agents/toxins into emergency management programs, as required by DOE O 151.1C.

DOE G 200.1-1 series, *Software Engineering Methodology Guide Chapters 1 through 10*
Provides guidance for software engineering, project management, and quality assurance practices and procedures. The primary purpose of the methodology is to promote the development of reliable, cost-effective, computer-based software products while making efficient use of resources. Use of the methodology will also aid in the status tracking, management control, and documentation efforts of the project.

DOE G 225.1A-1, *Implementation Guide for Use with DOE Order 225.1, Accident Investigations*
Provides guidance regarding acceptable methods for implementing the requirements addressed in DOE O 225.1A. The approach to investigations described in the Guide is similar to and consistent with methods used by other government agencies and private industry. It provides an organized and proven methodology for effectively and efficiently conducting Type A and Type B accident investigations.

DOE P 226.1A, *Department of Energy Oversight Policy*
Establishes a Department-wide oversight process to protect the public, workers, the environment, and national security assets effectively through continuous improvement.

DOE G 231.1-1, *Occurrence Reporting and Performance Analysis Guide*
Supplements DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*, by meeting identified needs for added occurrence reporting guidance, clarification, or interpretations.

DOE M 231.1-1A Chg 2, *Environment, Safety and Health Reporting Manual*
Supplements DOE O 231.1A and provides detailed requirements for implementing Department of Energy reporting requirements, including time schedules for reporting and data elements to be reported. The page change modifies policy previously established that requires recording and reporting occupational injuries and illnesses of subcontractor employees.

DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*
Provides detailed information for reporting occurrences and managing associated activities at DOE facilities, including NNSA facilities.

DOE G 231.1-2, *Occurrence Reporting Causal Analysis Guide*
Intends to assist personnel in determining the Apparent Cause(s) of specific reportable occurrences and to explain the structure and nodes of the Causal Analysis Tree for use in occurrence reporting and causal analysis.

DOE P 251.1A, *Directives System Policy*
Provides formal and organized communication of the Department's expectations for performance of work within the DOE complex.

DOE M 251.1-1B, *Directives System Manual*
Defines requirements and responsibilities for implementing the DOE Directives Program in support of DOE P 251.1A, Directives System Policy, and DOE O 251.1B, *Departmental Directives Program*.

DOE G 252.1-1, *Technical Standards Program Guide*
Describes Technical Standards Program management systems and procedures that help the DOE comply with Federal law and Federal and DOE policy, which are implemented through requirements in DOE O 252.1, *Technical Standards Program*. It also outlines how day-to-day Technical Standards Program activities involving technical standards are conducted in support of DOE.

DOE G 341.1-1A, *Guide on Federal Employee Occupational Medical Programs*
Supplements the requirements and responsibilities specified in DOE O 341.1A, *Federal Employee Health Services*, and provides preferred implementing methods and procedures.

DOE G 341.1-2A, *Guide on Federal Employee Assistance Programs*
Supplements the requirements and responsibilities specified in DOE O 341.1A, *Federal Employee Health Services*, and applies only to Federal employees.

DOE M 360.1-1B, *Federal Employee Training Manual*
Provides detailed requirements to supplement DOE O 360.1B, *Federal Employee Training*. The information in this Manual is intended to assist in improving Federal workforce performance under DOE-managed Federal employee training.

DOE P 410.1A, *Promulgating Nuclear Safety Requirements*
Establishes policy for use of notice and comment rulemaking to promulgate requirements on nuclear safety issues currently covered by DOE orders, and issuance of notices of proposed rulemaking with respect to important nuclear safety requirements in existing DOE orders as expeditiously as practicable. The use of notice and comment rulemaking gives members of the public the opportunity for meaningful participation in the development of nuclear safety requirements.

DOE P 411.1, *Safety Management Functions, Responsibilities and Authorities Policy*
Defines DOE safety management functions, responsibilities, and authorities to ensure that work is performed safely and efficiently. Develops and implements requirements and standards that are necessary to provide reasonable assurance that workers, the public, and the environment are adequately protected, defines essential safety management functions, and establishes unambiguous DOE roles, responsibilities, and authorities for executing them to accomplish the authorized work.

DOE M 411.1-1C, *Safety Management Functions, Responsibilities, and Authorities Manual*
Defines safety management functions, responsibilities, and authorities for DOE senior management with responsibilities for line, support, oversight, and enforcement actions.

DOE P 413.1, *Program and Project Management Policy for the Planning, Programming, Budgeting, and Acquisition of Capital Assets*
Establishes DOE program and project management policy for the planning, programming, budgeting, and acquisition of capital assets consistent with the Office of Management and Budget circulars.

DOE P 413.2, *Value Engineering*
Establishes DOE value engineering policy that meets the requirements of Public Law 104-106, Section 4306 as codified by 41 United States Code 432.

DOE M 413.3-1, *Project Management for the Acquisition of Capital Assets*
Provides requirements and guidance to DOE employees, including NNSA employees, on the planning and acquisition of capital assets.

DOE G 414.1-1B, *Management and Independent Assessments Guide for Use with 10 CFR Part 830, Subpart A, and DOE O 414.1C, Quality Assurance; DOE M 450.4-1, Integrated Safety Management System Manual; and DOE O 226.1A, Implementation of Department of Energy Oversight Policy*
Provides information on establishing processes for performing effective assessments. The revision to the Guide reflects updated assessment practices, international standards, and changes in DOE expectations.

DOE G 414.1-2A, *Quality Assurance Management System Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance*
Provides information on principles and practices used to establish and implement an effective quality assurance program or quality management system in accordance with the requirements of 10 CFR 830.

DOE G 414.1-3, *Suspect/Counterfeit Items Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1B, Quality Assurance*
Provides guidance to assist DOE/NNSA and its contractors in mitigating the safety threat of suspect/counterfeit items.

DOE G 414.1-4, *Safety Software Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance*
Provides information and acceptable methods for implementing the safety software quality assurance requirements of DOE O 414.1C, *Quality Assurance*.

DOE G 414.1-5, *Corrective Action Program Guidance*
Assists DOE organizations and contractors in the development, implementation, and follow-up of corrective action programs utilizing the feedback and improvement core safety function within DOE's Integrated Safety Management System. This Guide outlines some of the basic principles, concepts, and lessons learned that DOE managers and contractors might consider when implementing corrective action programs based on their specific needs.

DOE G 420.1-1, *Nonreactor Nuclear Safety Design Criteria and Explosive Safety Criteria Guide for Use with DOE Order 420.1, Facility Safety*
Provides guidance on the application of requirements for nonreactor nuclear facilities and explosives facilities of DOE O 420.1, *Facility Safety, Section 4.1, Nuclear and Explosives Safety Design Criteria*.

DOE G 420.1-2, *Guide for Mitigation of Natural Phenomena Hazards for DOE Nuclear Facility and NonNuclear Facilities*
Provides guidance in implementing the natural phenomena hazard mitigation requirements of DOE O 420.1, *Facility Safety, Section 4.4, Natural Phenomena Hazards Mitigation*. This Guide does not establish or invoke any new requirements. Any apparent conflicts arising from this Guide would defer to the requirements in DOE O 420.1.

DOE G 420.1-3, *Implementation Guide for DOE Fire Protection and Emergency Services Programs for Use with DOE O 420.1B, Facility Safety*
Facilitates the implementation of requirements of DOE O 420.1B by providing an acceptable approach to meet the requirements for Fire Protection Programs.

DOE G 421.1-1, *Criticality Safety Good Practices Program Guide for DOE Nonreactor Nuclear Facilities*
Establishes DOE nuclear criticality safety interpretation and guidance to assist in implementation of nuclear criticality safety across the DOE complex and provides examples for the development of nuclear criticality safety procedures and manuals for DOE contractors.

DOE G 421.1-2, *Implementation Guide for Use in Developing Documented Safety Analyses to Meet Subpart B of 10 CFR 830*
Elaborates on the documented safety analysis (DSA) development process and the safe harbor provisions of the Appendix to 10 CFR 830 Subpart B. Subpart B, Safety Basis Requirements, requires the contractor responsible for a DOE nuclear facility to analyze the facility, the work to be performed, and the associated hazards and to identify the conditions, safe boundaries, and hazard controls necessary to protect workers, the public, and the environment from adverse consequences.

DOE G 423.1-1, *Implementation Guide for Use in Developing Technical Safety Requirements*
Provides elaboration for the content of Technical Safety Requirements (TSRs). Title 10 CFR 830.205 of the Nuclear Safety Management rule requires DOE contractors responsible for category 1, 2, and 3 DOE nuclear facilities to develop TSRs, which identify the limitations to each DOE-owned, contractor-operated nuclear facility based on the documented safety analysis and any additional safety requirements established for the facility.

DOE G 424.1-1A, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*
Provides information to assist in implementation of 10 CFR 830.203, Unreviewed Safety Question Process, of the Nuclear Safety Management Rules for category 1, 2, and 3 nuclear facilities owned or operated by the DOE, including the NNSA.

DOE P 426.1, *Federal Technical Capability Policy for Defense Nuclear Facilities*
The Federal Technical Capability Program provides for the recruitment, deployment, development, and retention of Federal personnel with the demonstrated technical capability to safely accomplish the Department's missions and responsibilities. It is institutionalized through DOE directives to establish the program's objective, guiding principles, and functions. The program is specifically applicable to those offices and organizations performing functions related to the safe operation of defense nuclear facilities.

DOE M 426.1-1A, *Federal Technical Capability Manual*
Provides requirements and responsibilities to ensure recruitment and hiring of technically capable personnel to retain critical technical capabilities within the Department at all times.

DOE P 430.1, *Land and Facility Use Planning*
Establishes a corporate, holistic, and performance-based approach to real property life-cycle asset management that links real property asset planning, programming, budgeting, and evaluation to program mission projections and performance outcomes.

DOE G 430.1-2, *Implementation Guide for Surveillance and Maintenance During Facility Transition and Disposition*
Provides guidance on surveillance and maintenance activities conducted as part of facility transition and disposition activities for DOE facilities that have been declared or are forecast to be excess to any current or future mission requirements.

DOE G 430.1-3, *Deactivation Implementation Guide*
Aids in the development, planning, and implementation of deactivation requirements and activities at DOE facilities that have been declared excess to any future mission requirements. This is one of four Guides developed to provide guidance for facility transition and disposition activities.

DOE G 430.1-4, *Decommissioning Implementation Guide*
Aids in the planning and implementation of decommissioning activities at DOE facilities that have been declared excess to any future mission requirements. This is one of four Guides developed to provide guidance for facility transition and disposition activities.

DOE G 430.1-5, *Transition Implementation Guide*
Aids in the development, planning, and implementation of requirements and activities during the transition phase at DOE facilities that have been declared or are forecast to become excess to any future mission requirements.

DOE G 433.1-1, *Nuclear Facility Maintenance Management Program Guide for Use with DOE Order 433.1*
Describes a maintenance management program that would be acceptable to DOE for meeting the requirements of DOE O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*.

DOE M 435.1-1 Chg 1, *Radioactive Waste Management Manual*
Describes the requirements and establishes specific responsibilities for implementing DOE O 435.1, *Radioactive Waste Management*, for the management of DOE high-level waste, transuranic waste, low-level waste, and the radioactive component of mixed waste. Change 1, dated 6/19/01, removes the requirement that Headquarters is to be notified and the Office of Environment, Safety and Health consulted for exemptions for use of non-DOE treatment facilities.

DOE G 435.1-1 series, *Implementation Guide for Use with DOE Manual 435.1-1 Chapters 1 through 4*
Aids in implementing the requirements of DOE M 435.1-1, *Radioactive Waste Management Manual*.

DOE M 440.1-1A, *DOE Explosives Safety Manual*
Describes the Department's explosive safety requirements applicable to operations involving the development, testing, handling, and processing of explosives or assemblies containing explosives.

DOE G 440.1-x series, *Guides for Use with DOE Order 440.1*
Provides suggestions and alternative approaches that DOE elements may consider in implementing their worker protection program.

DOE G 440.1-7A, *Implementation Guide for Use with 10 CFR Part 850, Chronic Beryllium Disease Prevention Program*
Establishes regulatory requirements for the Chronic Beryllium Disease Prevention Program in 10 CFR 850.

DOE G 440.1-8, *Implementation Guide for Use with 10 CFR Part 851, Worker Safety and Health Programs*
Provides supplemental information and describes implementation practices to assist contractors in effectively developing, managing, and implementing worker safety and health programs required by 10 CFR 851, *Worker Safety and Health Program*.

DOE G 441.1-1B, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*
Amplifies the regulatory requirements of 10 CFR 835 and provides explanations and examples of the basic requirements for implementing those requirements.

DOE P 441.1, *DOE Radiological Health and Safety Policy*
Establishes the DOE Radiological Health and Safety Policy as a basis for the Department's radiological control programs.

DOE G 442.1-1, *DOE Employee Concerns Program Guide*
Ensures that DOE employees and any contractor or subcontractor fulfilling DOE's mission have the right and responsibility to report concerns relating to the ES&H or management of Department operations.

DOE P 442.1, *Differing Professional Opinions on Technical Issues*
Establishes a policy to facilitate dialogue and resolution if differing professional opinions related to ES&H at DOE facilities and activities.

DOE M 442.1-1, *Differing Professional Opinions Manual for Technical*
Provides requirements for implementing the DOE Differing Professional Opinion Process to encourage and facilitate dialogue and resolution with employees for technical issues involving ES&H.

DOE G 450.1-x series, *Implementation Guide for Use with DOE Order 450.1 Volumes 1A, 2, and 4*
Provides background information, an overview of the integration process, and guidance in order to meet the requirements of DOE O 450.1, *Environmental Protection Program*.

DOE P 450.2A, *Identifying, Implementing and Complying with Environment, Safety and Health Requirements*
Establishes a policy for an integrated review of safety requirements for ensuring adequate protection for workers, the public and the environment. Establishes the requirement for developing an appropriate set of ES&H requirements to ensure adequate protection.

DOE P 450.3, *Authorizing Use of the Necessary and Sufficient Process for Standards-Based Environment, Safety and Health Management*
Establishes the policy for a Necessary and Sufficient process as one means of addressing the selection of ES&H standards to ensure adequate protection against the hazards associated with the work of the Department.

DOE M 450.3-1, *DOE Closure Process for Necessary and Sufficient Sets of Standards*
Establishes the implementing process for Necessary and Sufficient sets of standards as one means of addressing the selection of ES&H standards.

DOE G 450.3-1, *Documentation for Work Smart Standards Applications: Characteristics and Considerations*
Provides guidance on the characteristics and considerations for documentation of the set of Work Smart Standards and the closure process for successful development of a standards-based system.

DOE G 450.3-2, Attributes of Effective Implementation
Establishes a framework to guide implementation of sets of standards approved using the Work Smart Standards closure process.

DOE G 450.3-3, *Tailoring for Integrated Safety Management Applications*
Illustrates how tailoring work management functions facilitates the safe and effective accomplishment of work (including design), and demonstrates that tailoring is integral to the ISM system.

DOE P 450.4, *Safety Management System Policy*
Provides a formal, organized process whereby people plan, perform, assess, and improve the safe conduct of work. The Safety Management System is institutionalized through DOE directives and contracts to establish the Department-wide safety management objective, guiding principles, and functions.

DOE M 450.4-1, *Integrated Safety Management System Manual*
Provides requirements and guidance for DOE and contractors to ensure development and implementation of an effective Integrated Safety Management System (ISMS) that is periodically reviewed and continuously improved.

DOE G 450.4-1B series, *Integrated Safety Management System Guide Volumes 1 through 2*
Assists DOE contractors in developing, describing, and implementing an ISMS and assists DOE line managers and contracting officers who provide ISMS guidance and requirements, review and approve ISMS products, verify implementation of the ISMS, and perform various integrating activities that complement for the ISMS.

DOE P 450.7, *Environment, Safety and Health (ESH) Goals*
Establishes ES&H goals for DOE personnel and its contractors to establish Departmental ES&H expectations for: 1) DOE and contractor personnel ES&H behaviors and attitudes in the conduct of their daily work activities, and 2) operational performance regarding worker injuries and illnesses, regulatory enforcement actions, and environmental releases.

DOE M 452.2-1, *Nuclear Explosive Safety*
Provides supplemental details to support the requirements of DOE O 452.2C, *Nuclear Explosive Safety*.

DOE P 454.1, *Use of Institutional Controls*
Delineates how the DOE, including the NNSA, will use institutional controls in the management of resources, facilities, and properties under its control and to implement its programmatic responsibilities. The Policy will guide site-specific and programmatic decisions on DOE's own planning, maintenance, and implementation of institutional controls; address responsibilities related to DOE's role as a steward of Federal lands and properties; and identify activities that DOE needs to accomplish.

DOE G 454.1-1, *Institutional Controls Implementation Guide for Use with DOE P 454.1, Use of Institutional Controls*
Provides information to assist DOE program and field offices in understanding what is necessary and acceptable for implementing the provisions of DOE P 454.1, Use of Institutional Controls.

DOE P 455.1, *Use of Risk-Based End States*
Focuses the Department line management officials on conducting cleanup that is aimed at, and achieves, clearly defined, risk-based end states. Risk-based end states are representations of site conditions and associated information that reflect the planned future use of the property and are appropriately protective of human health and the environment consistent with that use.

DOE G 460.1-1 series, *Implementation Guide for Use with DOE Order 460.1A, Packaging and Transportation Safety*
Assists in the development of implementation plans to effectively carry out the requirements and responsibilities of DOE O 460.1A, *Packaging and Transportation Safety*.

DOE G 460.2-1, *Implementation Guide for Use with DOE Order 460.2, Departmental Materials Transportation and Packaging Management*
Assists those responsible for transporting and packaging Department materials, and to provide an understanding of Department policies on activities that supplement regulatory requirements.

DOE M 460.2-1, Radioactive Material Transportation Practices Manual
Establishes standard transportation practices for Departmental programs to use in planning and executing offsite shipments of radioactive materials, including radioactive waste. This directive is to be used with DOE O 460.2, *Departmental Materials Transportation and Packaging Management*.

DOE M 461.1-1 Chg 1, *Packaging and Transfer of Materials of National Security Interest Manual*
Establishes requirements for operational safety controls for onsite operations and provides DOE TSRs and policy objectives for development of an Onsite Packaging and Transfer Program, pursuant to DOE O 461.1A, *Packaging and Transfer or Transportation of Materials of National Security Interest*.

DOE M 470.4-6 Chg 1, *Nuclear Material Control and Accountability*
Establishes a program for the control and accountability of nuclear materials within the DOE, including the NNSA.

10 CFR Part 820, *Procedural Rules for DOE Nuclear Activities*
Sets forth the procedures to govern the conduct of persons involved in DOE nuclear activities and, in particular, to achieve compliance with the DOE nuclear safety requirements by all persons subject to those requirements.

10 CFR Part 830, *Nuclear Safety Management, Subpart A, Quality Assurance Requirements*
Sets forth rules for contractors responsible for a DOE nuclear facility to conduct work in accordance with quality assurance criteria; develop and submit for approval by DOE a quality assurance program for the work; and implement that program, as approved and modified by DOE.

10 CFR Part 830, *Nuclear Safety Management, Subpart B, Nuclear Safety Management*
Sets forth rules describing how responsible contractors must prepare a documented safety analysis that in part, describes the facility, activities, and operations; provides systematic identification of hazards; evaluates normal, abnormal, and accident conditions; and derives hazard controls to provide an adequate level of safety to the public, workers and the environment.

10 CFR Part 835, *Occupational Radiation Protection*
Establishes radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities.

10 CFR Part 851, *Worker Safety and Health Program*
Establishes the framework for a worker protection program that will reduce or prevent occupational injuries, illnesses, and accidental losses by requiring DOE contractors to provide their employees with safe and healthful workplaces, as well as procedures for investigating whether a requirement has been violated, for determining the nature of such violations, and for imposing appropriate remedy.

48 CFR 970.5204-2, *Laws, Regulations, and DOE Directives*
Requires that in performing work under contract, the contractor shall comply with the requirements of applicable Federal, State, and local laws and regulations (including DOE regulations), unless relief has been granted in writing by the appropriate regulatory agency. Regardless of the performer of the work, the contractor is responsible for compliance with the requirements of this clause. The contractor is responsible for flowing down the requirements of this clause to subcontracts at any tier to the extent necessary.

48 CFR 970.5215-3, *Conditional Payment of Fee, Profit, or Other Incentives – Facility Management Contracts*
Requires that in order for the contractor to receive all otherwise earned fee, fixed fee, profit, or share of cost savings under the contract in an evaluation period, the contractor must meet the minimum requirements as described.

48 CFR 970.5223-1, *Integration of Environment, Safety, and Health Into Work Planning and Execution*
This acquisition regulation requires that the contractor shall perform work safely, in a manner that ensures adequate protection for employees, the public, and the environment, and shall be accountable for the safe performance of work. The contractor shall exercise a degree of care commensurate with the work and the associated hazards. The contractor shall ensure that management of ES&H functions and activities becomes an integral but visible part of the contractor's work planning and execution processes.

APPENDIX B

Site Visits Supported by the Department in 2007

Albuquerque, NM

- On February 12-15, 2007, the Board's staff traveled to Albuquerque to participate in the Los Alamos National Laboratory Chemistry and Metallurgy Research Replacement monthly meeting.
- On March 19-23, 2007, the Board's staff traveled to Albuquerque for the Enhanced Surveillance Campaign Biennial Review.
- On May 7-11, 2007, the Board's staff traveled to Albuquerque to attend the Nuclear Explosive Safety Annual Conference.
- On May 29-June 1, 2007, the Board staff traveled to Albuquerque to support one Board member's site visit and to participate in the recommendation 2005-1 workshop.

Atlanta, GA

- On April 30-May 4, 2007, the Board's staff traveled to Atlanta to attend the Energy Facility Contractors Group Integrated Safety Management (ISM) Chemical Safety/Life Cycle Management Task Group Semi-Annual Meeting.

Boston, MA

- On April 10-11, 2007, the Board's staff traveled to Boston for a seismic design review of the Integrated Waste Treatment Unit.
- On July 31-August 1, 2007, the Board's staff traveled to Boston to conduct a seismic and structural design review of the Integrated Waste Treatment Unit.

Brookhaven National Laboratory, Upton, NY

- On November 26-30, 2007, the Board staff traveled to Brookhaven National Laboratory to attend the 2007 DOE ISM Workshop and the Semi-Annual Federal Technical Capability Panel (FTCP) Face-to-Face meeting.

Chicago, IL

- On April 9-11, 2007, the Board's staff traveled to Chicago to attend the Chemistry and Metallurgy Research Replacement building design meeting at Sargent and Lundy, LLC.

Columbus, OH

- On May 7-9, 2007, the Board's staff traveled to Columbus to review simulated High-Level Waste testing, and the next set of tests for tank AY-102.

Denver, CO

- On March 6-9, 2007, the Board's staff traveled to Denver to participate in the Integrated Waste Treatment Unit seismic design meeting.
- On August 28-30, 2007, the Board's staff traveled to Denver to review the changes made to the Pit Disassembly and Conversion Facility design.

Greenville, SC

- On August 28-31, 2007, the Board's staff traveled to Greenville to attend the Energy Facility Contractors Group ISM working group meeting.

Hanford, WA

- On January 29 - February 2, 2007, the Board's staff traveled to Hanford to support the Board's visit.
- On January 29-February 2, 2007, the Board's staff traveled to Hanford to participate in the

DOE Readiness Review Working Group Workshop.

- On February 27-March 2, 2007, the Board's staff traveled to Hanford to attend Radiological Worker II training.
- On March 5-9, 2007, the Board's staff traveled to Hanford to review the Hanford site electrical system and fire protection. The sludge treatment electrical system and fire protection at the Cold Vacuum Drying Facility were also part of the review.
- On April 16-20, 2007, the Board's staff traveled to Hanford to review the Nuclear Criticality Safety at the Solid Waste Operation Complex and at the K-Basin Closure Project.
- On June 13-15, 2007, the Board staff traveled to Hanford to support the Board members' site visit.
- On August 7-10, 2007, the Board's staff traveled to Hanford to attend the Spent Nuclear Fuel Program strategy meeting.
- On August 27-31, 2007, the Board's staff traveled to Hanford to review multiple Hanford projects.
- On September 13, 2007, the Board members and staff participated in a video briefing with Hanford staff to discuss Plutonium Finishing Plant de-inventory status, life extension evaluations, and nondestructive analysis program status.

Idaho National Laboratory, Idaho Falls, ID

- On January 10-11, 2007, two Board staff traveled to Idaho to support one Board member's visit.
- On April 9-13, 2007, the Board's staff traveled to the Idaho National Laboratory to support the Board's visit.
- On July 17-20, 2007, the Board's staff traveled to Idaho Falls to participate in the National Transuranic Corporate Board meeting.
- On July 30-August 3, 2007, the Board's staff traveled to the Idaho National Laboratory to review the Idaho Nuclear Technologies and Engineering Center, Accelerated Retrieval Project, and the Advanced Mixed Waste Treatment Project.
- On August 21-23, 2007, the Board's staff traveled to Idaho Falls to review the Instrumentation & Control design for the Integrated Waste Treatment Unit.
- On November 13-16, 2007, the Board's staff traveled to Idaho National Laboratory to support the Board's site visit.

Las Vegas, NV

- On May 14-17, 2007, the Board's staff traveled to Las Vegas to attend the 2007 Annual Facility Representatives Workshop and the Annual Federal Technical Capability Panel Face-to-Face meeting.
- On October 29-November 1, 2007, the Board's staff traveled to Las Vegas to attend the Energy Facility Contractors Group Chemical Safety and Lifecycle Management Task Group meeting.

Lawrence Livermore National Laboratory, Livermore, CA

- On March 19-23, 2007, the Board's staff traveled to the Lawrence Livermore National Laboratory to attend the Nuclear Criticality Safety General Course.
- On March 26-30, 2007, the Board's staff traveled to the Lawrence Livermore National Laboratory to support the Board's visit.
- On June 25-29, 2007, the Board's staff traveled to the Lawrence Livermore National Laboratory to discuss the path forward for resolving the remaining lightning issues.
- On November 5-9, 2007, the Board's staff traveled to the Lawrence Livermore National Laboratory to review of various topics.

Los Alamos National Laboratory, Los Alamos, NM

- On January 16-18, 2007, the Board staff traveled to the Los Alamos National Laboratory to discuss the following: 1) Godiva, 2) Control Room, and 3) Nuclear Instrumentation Design Review.
- On February 12-16, 2007, the Board's staff traveled to the Los Alamos National Laboratory to conduct an Aqueous Nitrate Processing Review.
- On March 27-29, 2007, the Board's staff traveled to the Los Alamos National Laboratory for a Comet Design Review.
- On April 30-May 3, 2007, the Board's staff traveled to the Los Alamos National Laboratory to review Technical Area – 55 (TA-55) infrastructure.
- On June 4-8, 2007, the Board's staff traveled to the Los Alamos National Laboratory to review Criticality Safety, vault operations and, the updated Seismic Hazards Analysis, and to participate in the Chemistry and Metallurgy Research Replacement project meetings.
- On July 23-27, 2007, the Board's staff traveled to the Los Alamos National Laboratory for a maintenance review and to tour TA-55.
- On July 26, 2007, the Board's staff traveled to the Los Alamos National Laboratory to participate in the Senior Management Team meeting.
- On August 27-31, 2007, the Board's staff traveled to the Los Alamos National Laboratory to review of the corrective actions for several recent accidents.
- On August 27-31, 2007, the Board's staff traveled to the Los Alamos National Laboratory for the Chemistry and Metallurgy Research facility life extension risk assessment.
- On October 29-November 2, 2007, the Board's staff traveled to the Los Alamos National Laboratory to review Work Planning Control, and observe the Office of Health, Safety and Security oversight activities.
- On November 5-9, 2007, the Board's staff traveled to the Los Alamos National Laboratory to attend the Energy Facility Contractors Group Safety Analysis Working Group meeting.
- On November 12-16, 2007, the Board's staff traveled to the Los Alamos National Laboratory to prepare for the Board's site visit in December.

Nevada Test Site, NV

- On February 26-March 2, 2007, the Board's staff traveled to the Nevada Test Site for a site visit.
- On April 30-May 3, 2007, the Board's staff traveled to the Nevada Test Site to support two Board members' site visit.
- On July 9-13, 2007, the Board's staff traveled to the Nevada Test Site to observe the Operational Readiness Review for the glovebox at the Device Assembly Facility (DAF).
- On August 13-17, 2007, the Board's staff traveled to the Nevada Test Site to observe and discuss the Device Assembly Facility activities, Joint Actinide Shock Physics Experimental Research (JASPER) activities, the Criticality Experiments Facility Project, and subcritical experiments, and to complete required training.
- On September 17-21, 2007, the Board's staff traveled to the Nevada Test Site to attend the W84 Project Team meeting and discuss the Device Assembly Facility and Joint Actinide Shock Physics Experimental Research (JASPER) activities.
- On October 22-26, 2007, the Board's staff traveled to the Nevada Test Site to review the Device Assembly Facility Probabilistic Seismic Hazard Analysis and Seismic Soil-Structure Interaction Analysis and to discuss the DAF, Joint Actinide Shock Physics Experimental Research (JASPER), and subcritical experiment activities.

Oak Ridge National Laboratory, Oak Ridge, TN

- On March 26-30, 2007, the Board's staff traveled to Oak Ridge to attend the annual budget and planning meeting for the DOE Nuclear Criticality Safety Program and the quarterly meeting of the Criticality Safety Support Group.
- On November 27-29, 2007, the Board staff traveled to the Oak Ridge Transuranic Waste Processing Center to discuss the revised Documented Safety Analysis and Technical Safety Requirements, and prepare for the January 2008 Operational Readiness Review for remote-handled transuranic waste.

Pantex Plant, Amarillo, TX

- On January 16-19, 2007, the Board staff traveled to Pantex to support two Board members' visit.
- On February 5-9, 2007, the Board's staff traveled to Pantex for an Authorization Basis Review.
- On February 12-16, 2007, the Board's staff traveled to Pantex for a Conduct of Operations Review.
- On February 19-23, 2007, the Board's staff traveled to Pantex to review the W76-1 Nuclear Explosive Safety Study.
- On February 26-March 2, 2007, the Board's staff traveled to Pantex to participate in the Pit Management Meeting, conduct Phase II of the Authorization Basis Review, to perform an electrostatic discharge and lightning effects review, and to review the W76-1 Nuclear Explosive Safety Study.
- On April 9-13, 2007, the Board's staff traveled to Pantex to review the Nuclear Explosive Safety Study for the W76-1 assembly.
- On April 16-20, 2007, the Board's staff traveled to Pantex to review the Nuclear Explosive Safety Study for the W76-1 assembly.
- On April 23-27, 2007, the Board's staff traveled to Pantex to conduct an Authorization Basis Review.
- On May 14-18, 2007, the Board's staff traveled to Pantex to review the Nuclear Explosive Safety Study for the restart of W88 cell assembly operations.
- On June 25-29, 2007, the Board's staff traveled to Pantex to observe the bays and cells Nuclear Explosive Safety master study.
- On July 9-13, 2007, the Board's staff traveled to Pantex to observe the bays and cells Nuclear Explosive Safety master study.
- On July 16-20, 2007, the Board's staff traveled to Pantex to observe the bays and cells Nuclear Explosive Safety master study.
- On July 23-27, 2007, the Board's staff traveled to Pantex to observe the bays and cells Nuclear Explosive Safety master study.
- On July 30-August 3, 2007, the Board's staff traveled to Pantex to observe the bays and cells Nuclear Explosive Safety master study.
- On August 27, 2007, the Board's staff traveled to Pantex to review the W80 Nuclear Explosive Safety Study.
- On August 28-31, 2007, the Board's staff traveled to Pantex to attend the Nuclear Weapons Council Lightning Committee meeting.
- On September 4-7, 2007, the Board's staff traveled to Pantex to support the Board's visit.
- On September 24-26, 2007, the Board's staff traveled to Pantex to attend the Weapons Program Dismantlement meeting.
- On October 2-4, 2007, the Board's staff traveled to Pantex for an Authorization Basis Review.
- On November 26-30, 2007, the Board staff traveled to Pantex to review the Nuclear Explosive Safety Study for the W88 SS-21 bay and satellite operations.

Richland, WA

- On March 5-8, 2007, the Board's staff traveled to Richland to attend the Fundamentals of Actinide Chemistry training.

San Francisco, CA

- On March 5-8, 2007, the Board's staff traveled to San Francisco to attend the Waste Treatment Plant (WTP) seismic response peer review panel.

Sandia National Laboratories, Albuquerque, NM

- On January 22-26, 2007, the Board staff traveled to Sandia National Laboratories to attend the Energy Facility Contractors Group Safety Analysis Working Group meeting.
- On February 26-March 2, 2007, the Board's staff traveled to Sandia National Laboratories to attend the War Reserve 708 Weapons Development Course (WR-708).
- On March 19-22, 2007, the Board's staff traveled to the Sandia National Laboratories to review Authorization Basis and ISM.
- On April 30-May 3, 2007, the Board's staff traveled to Sandia National Laboratories to review Technical Area – 55 (TA-55) infrastructure.
- On May 8-10, 2007, the Board's staff traveled to Sandia National Laboratories to review the B53 Program and attend the Seamless Safety for the 21st Century (SS-21) team meetings.
- On June 20-22, 2007, the Board staff traveled to Sandia to support two Board members' site visit.
- On July 16-19, 2007, the Board's staff will attend the DOE-NA-STD-3016 implementation workshop at Sandia National Laboratories.
- On July 16-20, 2007, the Board's staff traveled to Sandia National Laboratories to participate in the DOE Electrical Safety Workshop.
- On July 24, 2007, the Board's staff traveled to Sandia National Laboratories to participate in the lightning meeting.
- On August 21-24, 2007, the Board's staff traveled to Sandia National Laboratories to attend the B53 Project Team/Program Review meeting.
- On August 27-31, 2007, the Board's staff traveled to Sandia National Laboratories to attend weapons training.
- On October 15-18, 2007, one Board staff member traveled to Sandia National Laboratories for a site familiarization visit.
- On November 5-9, 2007, the Board's staff traveled to Sandia National Laboratories to attend the Energy Facility Contractors Group Safety Analysis Working Group meeting.
- On November 13-14, 2007, the Board's staff traveled to Sandia National Laboratories to attend the Nuclear Weapons Complex Lightning Committee meeting.
- On November 27-30, 2007, The Board staff traveled to Sandia National Laboratories for a B53 Project Team meeting

Savannah River Site, Aiken, SC

- On January 22-24, 2007, the Board staff traveled to the Savannah River Site to participate in the DOE-STD-3013 Surveillance and Monitoring Annual Meeting.
- On February 12-16, 2007, the Board's staff traveled to the Savannah River Site for a Work Planning Review and High-Level Waste Review.
- On February 20-21, 2007, the Board's staff traveled to the Savannah River Site to participate in the DOE/Citizen Advisory Board meeting.
- On February 26-March 2, 2007, the Board's staff traveled to the Savannah River Site to conduct a Fire Department Review.

- On April 9-12, 2007, the Board's staff traveled to the Savannah River Site to review the Modular Caustic Side Solvent Extraction Unit Simulant Testing.

- On April 16-17, 2007, the Board's staff traveled to the Savannah River Site to review structural issues regarding the Salt Waste Processing Facility.

- On April 24-26, 2007, the Board's staff traveled to the Savannah River Site to review receipt and storage of spent nuclear fuel.

- On May 14-18, 2007, the Board's staff traveled to the Savannah River Site to observe the DOE Operational Readiness Review for the K-Area Interim Surveillance Project.

- On June 18-22, 2007, the Board staff traveled to the Savannah River Site to review the Salt Waste Processing Facility and H-Canyon operations and to observe the emergency preparedness drill.

- On August 6-10, 2007, the Board's staff traveled to the Savannah River Site to review H-Canyon operations.

- On August 20-24, 2007, the Board's staff traveled to the Savannah River Site to review the Salt Waste Processing Facility chemical processes and to participate in a panel at the Environmental Management Facility Representative Summit.

- On October 1-5, 2007, the Board's staff traveled to the Savannah River Site to observe the Modular Caustic Side Solvent Extraction Unit and the Actinide Removal Process Integrated Runs.

- On October 9-12, 2007, the Board's staff traveled to the Savannah River Site to support the Board's site visit.

Waste Isolation Pilot Plant, Carlsbad, NM

- On February 12-14, 2007, the Board's staff traveled to the Waste Isolation Pilot Plant to support the Board's visit.

- On October 1-5, 2007, the Board's staff traveled to Carlsbad to review conduct of operations at the Waste Isolation Pilot Plant.

Y-12 Site Office, Oak Ridge, TN

- On February 27-28, 2007, the Board's staff traveled to Y-12 to support two Board members' visit.

- On March 5-9, 2007, the Board's staff traveled to Y-12 to observe the Uranium Processing Facility Technical Independent Project Review.

- On April 2-5, 2007, the Board's staff traveled to Y-12 to conduct a Specific Administrative Controls review.

- On April 17-18, 2007, the Board's staff traveled to Y-12 to review the Authorization Basis and Critical Decision 1 readiness for the Uranium Processing Facility.

- On April 23-27, 2007, the Board's staff traveled to Y-12 to conduct a Highly Enriched Uranium Materials Facility Oversight Review.

- On July 30-31, 2007, the Board's staff traveled to Y-12 to support two Board members' Uranium Processing Facility discussion.

- On August 16-17, 2007, the Board's staff traveled to Y-12 to discuss nuclear material packaging.

- On September 18-20, 2007, the Board's staff traveled to Y-12 to review the design and safety of the new glovebox project.

APPENDIX C

Key Correspondence Between the Department and the Board in 2007

From the Board

January

- On **January 10, 2007**, the Board sent a letter to the Department establishing a 30-day reporting requirement regarding the structural design of the Salt Waste Processing Facility at the Savannah River Site.

- On **January 18, 2007**, the Board sent a letter to the Department accepting the revised schedule of deliverables in the Department's revised 2005-1 implementation plan, *Nuclear Material Packaging.*

- On **January 18, 2007**, the Board sent a letter to the Department with a 45-day reporting requirement regarding transuranic waste operations at the Los Alamos National Laboratory.

- On **January 22, 2007**, the Board sent a letter to the Department regarding Board recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls.*

- On **January 24, 2007**, the Board sent a letter to the Department regarding the Integrated Waste Treatment Unit (IWTU) at the Idaho National Laboratory.

- On **January 24, 2007**, the Board sent an announcement of a Third Public Meeting regarding the incorporation of safety into the design and construction of new DOE defense nuclear facilities and into modification of existing facilities. The meeting is scheduled for March 22, 2007 at 9 AM at the Defense Nuclear Facilities Safety Board Headquarters in Washington, D.C.

- On **January 29, 2007**, the Board sent a letter to the Department regarding the Container Surveillance and Storage Capability (CSSC) Project at the Savannah River Site.

- On **January 29, 2007**, the Board sent a letter to the Department regarding worker protection during transuranic (TRU) waste operations.

- On **January 30, 2007**, the Board sent a letter to the Department commending DOE's Environmental Management for addressing issues relative to and its efforts to improve the readiness review process in safely starting up hazardous facilities.

February

- On **February 1, 2007**, the Board sent a letter to the Department regarding program evaluation of the high-level waste system at the Savannah River Site.

- On **February 1, 2007**, the Board sent a letter to the Department regarding improving safety at Los Alamos National Laboratory.

- On **February 15, 2007**, the Board sent a letter to the Department forwarding the First Quarterly Report to Congress on the Status of Significant Unresolved Issues with the Department of Energy's Design and Construction Projects.

- On **February 28, 2007**, the Board sent a letter to the Department forwarding its 17th Annual Report to Congress.

March

- On **March 13, 2007**, the Board sent a letter to the Department regarding the Department's revised 2004-2 implementation plan, *Active Confinement Systems.*

- On **March 13, 2007**, the Board sent a letter to the Department with both (1) a 6-month reporting requirement for a briefing regarding the continued safe operations of

the 9212 Complex, and (2) an annual reporting requirement on the annual assessment of the 9212 Complex, and the progress on the Uranium Processing Facility (UPF).

- On **March 30, 2007**, the Board sent a letter to the Department with a 30-day reporting requirement regarding lightning protection at the Pantex Plant.

April

- On **April 19, 2007**, the Board sent a letter to the Department regarding use of justifications for continuing operations (JCOs) at defense nuclear facilities.

- On **April 24, 2007**, the Board sent a letter to the Department with a 30-day reporting requirement regarding quality of technical procedures for nuclear and nuclear explosive operations at Pantex.

- On **April 25, 2007**, the Board sent a letter to the Department forwarding Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials.*

May

- On **May 10, 2007**, the Board sent a letter to the Department with a 30-day reporting requirement regarding expert elicitation, expert judgment, and peer review processes by the design agencies and DOE-NA-STD-3016, *Hazard Analysis Reports for Nuclear Explosive Operations.*

- On **May 16, 2007**, the Board sent a letter to the Department with a 45-day reporting requirement on Risk Assessment Policy for Nuclear Safety.

June

- On **June 1, 2007**, the Board sent a letter to the Department expressing satisfaction on actions taken by DOE and its contractors to resolve safety issues relative to the design of the Salt Waste Processing Facility at the Savannah River Site.

- On **June 6, 2007**, the Board sent a letter to the Department congratulating Mr. Robert Seal of Idaho Operations Office for being honored as the 2006 DOE Facility Representative of the Year.

- On **June 20, 2007**, the Board sent a letter to the Department forwarding the Second Quarterly Report to Congress on the Status of Significant Unresolved Issues with the Department's Design and Construction Projects.

- On **June 25, 2007**, the Board sent a letter to the Department forwarding the Second Quarterly Report to Congress on the status of significant unresolved technical issues between the Board and DOE concerning design and construction of DOE's defense nuclear facilities.

- On **June 26, 2007**, the Board sent a letter to the Department forwarding the Fourth Annual Report to Congress on Plutonium Storage at the Savannah River Site.

- On **June 26, 2007**, the Board sent a letter to the Department commending Admiral Kirkland Donald, Deputy Administrator of Naval Reactors, NNSA, for the outstanding performance report on radiological waste disposal and environment monitoring, occupational safety and health, and occupational radiation exposure, and the annual overview of the Naval Reactors program.

July

- On **July 16, 2007**, the Board sent a letter to the Department with a 30-day reporting requirement regarding adherence to Department of Energy requirements for safe startup of weapons program activities at the Pantex Plant.

- On **July 30, 2007**, the Board sent a letter to the Department with a 45-day reporting requirement regarding the implementation of Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls.*

- On **July 30, 2007**, the Board sent a letter to the Department regarding authorization basis documents review at the Pantex Plant.

August

- On **August 8, 2007**, the Board sent a letter to the Department closing Board Recommendation 2000-2, *Configuration Management, Vital Safety Systems*.
- On **August 9, 2007**, the Board sent a review status letter to the Department regarding the Uranium Processing Facility (UPF) at Y-12.
- On **August 29, 2007**, the Board sent a letter to the Department regarding DOE's plans for low-temperature aluminum dissolution and subsequent storage of aluminum-rich supernate in Tank 11 at the Savannah River Site's high-level waste tank farms.

September

- On **September 10, 2007**, the Board sent a letter to the Department with a 90-day reporting requirement regarding the overall strategy and key milestones for the upgrade of the Los Alamos National Laboratory Materials Accountability and Safeguards System (MASS).
- On **September 14, 2007**, the Board sent a letter to the Department regarding the Uranium-233 Downblending and Disposition Project in Building 3019 at Oak Ridge National Laboratory.

October

- On **October 15, 2007**, the Board sent a letter to the Department regarding the full assumption of responsibility and accountability for managing and operating all nuclear and radiological facilities at the Nevada Test Site by National Security Technologies, LLC (NSTec). The Board supports the transition, but will be closely following the implementation of actions required to satisfy NNSA's objective.
- On **October 16, 2007**, the Board sent a letter to the Department establishing a 60-day reporting requirement and briefing requirement describing specific actions NNSA has taken to (1) facilitate timely and effective implementation of ongoing safety improvement initiatives for nuclear operations, (2) rapidly increase confidence in safety systems currently relied upon in operating nuclear facilities, and (3) improve the federal oversight of safety systems at LANL.
- On **October 17, 2007**, the Board sent a letter to the Department regarding the Third Quarterly Report to Congress on the Status of Significant Unresolved Issues with the Department of Energy's Design and Construction Projects.
- On **October 23, 2007**, the Board sent a letter to the Department establishing a 60-day reporting requirement and briefing requirement regarding (1) safety rationale for continuing the operation of Chemistry and Metallurgy Research (CMR) facility at Los Alamos National Laboratory, and (2) a detailed schedule of NNSA's actions to assure safe operations of this facility.

November

- On **November 1, 2007**, the Board sent an announcement of a Public Meeting regarding the safety posture at Los Alamos National Laboratory, including actions taken in response to the Board's letter, dated February 1, 2007, to the Acting Administrator of the National Nuclear Security Administration.

December

- No correspondence received

From the Department

January

- On **January 4, 2007**, the Secretary sent a letter to the Board informing the Board that the Department has completed its actions and commitments in the 2002-3 implementation plan and requesting closure of Board recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls.*

- On **January 8, 2007**, the Director for the Office of Economic Impact and Diversity sent a letter to the Board regarding DOE Order 442.1A, *Department of Energy Employee Concerns Program.*

- On **January 9, 2007**, the Chief Health, Safety and Security Officer sent a letter to the Board to provide a copy of the revised draft policy on DOE *Risk Assessment Policy for Nuclear Safety.*

- On **January 17, 2007**, the Deputy Secretary sent a letter to the Board forwarding the *Federal Technical Capability Program (FTCP) Corrective Action Plan, Revision 1*, Deliverable B for Commitment 13 in the 2004-1, Revision 2 implementation plan, *Implementation Plan to Improve Oversight of Nuclear Operations.*

- On **January 22, 2007**, the Principal Assistant Deputy Administrator for Operations sent a letter to the Board reporting completion of Commitments 502, 504, and 509 in the 2000-1 implementation plan, *Stabilization and Storage of Nuclear Materials*, which requires 50 percent stabilization of weapons grade plutonium, 50 percent stabilization of non-weapons grade plutonium, and 50 percent stabilization of the 248 kg of the materials through the Recovery Evaluation Process (REP), respectively, at the Los Alamos National Laboratory.

- On **January 23, 2007**, the Deputy Administrator for Defense Programs sent a letter to the Board regarding the NNSA Chief of Defense Nuclear Safety (CDNS) biennial review reports.

- On **January 25, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board forwarding the EM Pilot Facility Review Reports as the deliverable for Commitment 8.6.5 in the 2004-2 implementation plan, *Active Confinement Systems*.

- On **January 30, 2007**, the Central Technical Authority for the National Nuclear Security Administration (NNSA) sent a letter to the Board reporting completion of NNSA's portion of Commitment 3 in Revision 2 of the 2004-1 implementation plan, which requires the full implementation of the Central Technical Authority function within the NNSA.

February

- On **February 7, 2007**, the Chief Health, Safety and Security Officer sent a letter to the Board regarding implementation of DOE Order 425.1C, *Startup and Restart of Nuclear Facilities*.

- On **February 9, 2007**, the Assistant Secretary for Environmental Management sent a letter to the Board providing a report on the geotechnical and structural design of the Salt Waste Processing Facility at the Savannah River Site.

- On **February 13, 2007**, the Acting Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board providing status of NNSA activities to complete Commitment 9B in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*.

- On **February 15, 2007**, the Deputy Administrator for Defense Nuclear Nonproliferation sent a letter to the Board regarding the Pit Disassembly and Conversion Facility (PDCF) ventilation system review results.

- On **February 28, 2007**, the Departmental Representative to the Board sent a letter to the Board forwarding two DOE internal memoranda regarding ventilation system evaluations relative to Commitment 8.6 in the 2004-2 implementation plan, *Active Confinement Systems.*

March

- On **March 6, 2007**, the Director of the Office of Nuclear Safety and Environment sent a letter to the Board reporting completion of Deliverable 8.6.4 in the 2004-2 implementation plan, *Active Confinement Systems*, which requires the Department to revise the Ventilation System Evaluation Guidance document based on experience and lessons learned from the pilot facility evaluations.

- On **March 9, 2007**, the Chief Health, Safety and Security Officer sent a letter to the Board regarding the *draft Nuclear Material Packaging Manual* in relation to the 2005-1 implementation plan, *Nuclear Material Packaging.*

- On **March 12, 2007**, the Deputy Administrator for Defense Programs sent a letter to the Board forwarding the Nuclear Criticality Safety Program report for calendar year 2006.

- On **March 13, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board providing status on Commitments 120E and 122E in the 2000-1 implementation plan, *Prioritization for Stabilizing Nuclear Materials.*

- On **March 13, 2007**, the Assistant Deputy Administrator for Military Application and Stockpile Operations Defense Programs sent a letter to the Board reporting completion of Commitments 4.2.2, 4.4.6, and 4.5.1 in the 98-2 implementation plan, *Safety Management at the Pantex Plant.*

- On **March 14, 2007**, the Secretary sent a letter to the Board forwarding the 2006 Annual Report to Congress on DOE's activities relating to the Defense Nuclear Facilities Safety Board.

- On **March 15, 2007**, the Chief Health, Safety and Security Officer sent a letter to the Board providing updated information on the revision of four DOE Technical Standards for High Efficiency Air Particulate (HEPA) filters.

- On **March 23, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board reporting completion of EM's portion of commitment 8.9.1 in the 2004-2 implementation plan, *Active Confinement Systems*.

April

- On **April 4, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board forwarding the EM Self-Assessment report completing Commitment 9C in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations.*

- On **April 9, 2007**, the Deputy Secretary sent a letter to the Board forwarding the NNSA report on the disposition of transuranic (TRU) waste at Los Alamos National Laboratory.

- On **April 24, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board providing status of and plan to complete Commitment 2.9 in the 2001-1 implementation plan, *High-Level Waste Management at the Savannah River Site*, which calls for the disposition of 100K gallons of salt solutions in the Saltstone Disposal Facility.

May

- On **May 1, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board reporting completion of the EM portion of Commitment 22C in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*, which requires the issuance of an approved EM Integrated Safety Management System Description (ISMSD).

- On **May 7, 2007**, the Chief Health, Safety and Security Officer sent a letter to the Board regarding DOE Standard 1027, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Report*.

- On **May 11, 2007**, the Assistant Secretary for Environmental Management sent a letter to the Board regarding structural analysis and design of the Salt Waste Processing Facility (SWPF).

- On **May 21, 2007**, the Acting Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board reporting completion of NNSA portion of Commitment 9B in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*, which required a report to the Secretary on the process and criteria for delegating safety authorities to the field.

June

- On **June 4, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board reporting completion of Commitments 120E and 122E in the 2000-1 implementation plan, *Prioritization for Stabilizing Nuclear Materials*, which requires the complete bulk sludge and final pass sludge removal from the K East Basin.

- On **June 8, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board forwarding the EM High Priority Facility Review Reports relative to Commitment 8.6.3 in the 2004-2 implementation plan, *Active Confinement Systems.*

- On **June 19, 2007**, the Acting Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board regarding NNSA plans and criteria for review and approval of the design agencies' (DAs) expert elicitation, expert judgment, and peer review processes as specified in DOE-NA-STD-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations.*

- On **June 22, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board providing status on issues with the Sodium-Bearing Waste Treatment Project.

- On **June 28, 2007**, the Secretary sent a letter to the Board accepting Board recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials.*

- On **June 29, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board reporting the conclusion of EM's review of site procedures and safety bases mechanisms using the 25 rem evaluation guideline to satisfy Commitment 8.9.1 in the 2004-2 implementation plan, *Active Confinement Systems*.

- On **June 29, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board informing the Board of a delay in the issuance of the Savannah River Site Waste Disposition System Plan relative to Commitment 3.11 in the 2001-1 implementation plan, *High-Level Waste Management at the Savannah River Site*.

July

- On **July 12, 2007**, the Deputy Secretary of Energy sent a letter to the Board providing status and path forward regarding implementation of DOE Standard DOE-STD-1189, *Integration of Safety into the Design Process.*

- On **July 19, 2007**, Letter forwarding a Joint Report to Congress by the Department and the Board on improving the identification and resolution of safety issues during the design and construction of DOE defense nuclear facilities.

- On **July 19, 2007**, the Acting Manager of the Office of River Protection sent a letter to the Board providing status of structural steel fire protection at the Waste Treatment and Immobilization Plant.

- On **July 26, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board reporting completion of Commitment 119W in the 2000-1 implementation plan, *Prioritization for Stabilizing Nuclear Materials*, which calls for the completion of bulk sludge containerization at K West Basin.

August

- On **August 13, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board providing status on the Savannah River Site Life-cycle Liquid Waste Disposition System Plan.

- On **August 14, 2007**, the Acting Deputy Administrator for Defense Programs sent a letter to the Board regarding Safe Startup of Weapon Program Activities at the Pantex Plant.

- On **August 16, 2007**, the Assistant Secretary for Environmental Management sent a letter to the Board regarding aluminum removal from sludge batch 5 in Tank 51 at the Savannah River Site.

- On **August 20, 2007**, the Departmental Representative to the Defense Nuclear Facilities Safety Board sent a letter to the Board reporting completion of the Office of Health, Safety and Security (HSS) portion of Commitment 22C in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*, which requires the issuance of an approved HSS Integrated Safety Management System Description.

- On **August 20, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board forwarding the Corrective Action Plan (CAP) for Environmental Management Headquarters Safety Functions and Responsibilities Associated with Nuclear Facilities.

- On **August 20, 2007**, the Administrator sent a letter to the Board providing status in developing a directives system for the National Nuclear Security Administration.

- On **August 29, 2007**, the Secretary sent a letter to the Board regarding the revised schedule for Implementation Plan 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, Commitment 5, Deliverable A for the Oversight Guide.

- On **August 30, 2007**, the Principal Assistant Deputy Administrator for Operations sent a letter to the Board providing an update to a previous letter to the Board (March 27, 2006) describing progress made in NNSA closing out remaining tasks related to historical supplemental directives from field elements.

September

- On **September 10, 2007**, the Chief Operating Officer for Environmental Management sent a letter to the Board regarding Commitment 8.6.3 for Department of Energy implementation plan for Board recommendation 2004-2, *Active Confinement Systems.*

October

- On **October 1, 2007**, the Principal Assistant Deputy Administrator for Operations Defense Programs sent a letter to the Board transmitting NNSA Central Technical Authority (CTA) guidance to the Office of the Deputy Administrator for Defense Programs regarding expectations that the safety bases and controls be finalized and approved before a Contractor Readiness Assessment begins.

- On **October 16, 2007**, the Deputy Secretary sent a letter to the Board reporting the Central Technical Authority for the Department of Energy had completed Commitment 3, Revision 2 of the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*.

- On **October 24, 2007**, the Secretary sent a letter to the Board forwarding the Implementation Plan for Board Recommendation 2007-1, *Safety-related In Situ Nondestructive Assay of Radioactive Materials*.

- On **October 24, 2007**, the Secretary sent a letter to the Board regarding Commitments 2.9, 2.10, and 2.13 for the Department's Implementation Plan for Board Recommendation 2001-1, *High-Level Waste Management at the Savannah River Site*.

- On **October 26, 2007**, the Manager of the Savannah River Operations Office sent a letter to the Board regarding the Savannah River Site Life-Cycle Liquid Waste Disposition System Plan, Revision 14.

November

- On **November 1, 2007**, the Chief Operations Officer for Environmental Management (EM) sent a letter to the Board reporting completion of EM portion of Commitment 22D in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*, which requires field offices with defense nuclear facilities to develop DOE Integrated Safety Management System Descriptions (ISMSDs) that meet the requirements of the new DOE ISMS Manual.

- On **November 1, 2007**, the NNSA Senior Advisor for Environment, Safety and Health sent a letter to the Board transmitting NNSA Integrated Safety Management Systems Descriptions, NA-1 Supplemental Directive 450.4-1, which fulfills Commitment 22C in the 2004-1 implementation plan, *Oversight of Complex, High-Hazard Nuclear Operations*.

- On **November 2, 2007**, the Principal Assistant Deputy Administrator for Operations sent a letter to the Board reporting the results of the review of NNSA site office and contractor procedures and mechanisms for using the 25 rem evaluation guideline as required under Deliverable 8.9.1 of the Implementation Plan 2004-2, *Active Confinement Systems*.

- On **November 23, 2007**, the Principal Deputy Administrator sent a letter to the Board regarding the approval of NNSA review plan for the design agency (DA) implementations of DOE-STD-3016-2006, Hazard Analysis Reports for Nuclear Explosive Operations.

- On **November 30, 2007**, the Principal Assistant Deputy Administrator for Operations Defense Program sent a letter to the Board summarizing the results regarding the completion of Phase 1 and Phase 2 assessments of the Safety Management Programs and safety related Structures, Systems and Components at the Device Assembly Facility (DAF) at the Nevada Test Site.

December

- On **December 10, 2007**, the Chief Operating Officer for Environmental Management (EM) sent a letter to the Board transmitting EM's Low Priority Facility Review Reports to satisfy Commitment 8.6.3 in the 2004-2 implementation plan, *Active Confinement Systems.*

- On **December 17, 2007**, the Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board regarding NNSA's utilization of the Materials Accountability and Safeguards System at the Los Alamos National Laboratory.

- On **December 20, 2007**, the Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board regarding the project underway at the Nevada Test Site. Ongoing project work has afforded NNSA an opportunity to use some of the concrete cores drilled for the CEF project to verify the DAF structure compressive strength.

- On **December 21, 2007**, the Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board requesting an additional 60-day extension to submit report in order to provide a more comprehensive and informative description of the status of safety improvements at LANL, and of actions NNSA is taking throughout the chain of command to improve Federal oversight.

- On **December 21, 2007**, the Administrator for the National Nuclear Security Administration (NNSA) sent a letter to the Board requesting an additional 90-day extension to provide report regarding safety rationale for continuing the operation of the Chemistry and Metallurgy Research (CMR) Building at LANL, as well as a detailed schedule of NNSA actions to assure safe operation of this facility.

- On **December 21, 2007**, the Associate Administrator for Emergency Operations sent a letter to the Board regarding NNSA's plans for preparing the G-Tunnel for the limited possibility that it will be used for disposition of an Improvised Nuclear Device (IND).

- On **December 28, 2007**, Chief Operations Officer for Environmental Management (EM) sent a letter to the Board regarding the report on the implementation of DOE Operating Experience Program (OEP) in EM as specified in Commitment 19.2 of the Implementation Plan, Revision 2, October 2006, for Recommendation 2004- 1, *Oversight of Complex, High-Hazard Nuclear Operations.*

APPENDIX D

Safety Accomplishments and Activities at Major Defense Nuclear Sites

This discussion of safety accomplishments and activities at the defense nuclear sites in this appendix is organized by mission sponsor—Energy and Science or the National Nuclear Security Administration (NNSA)—and then by the responsible Department of Energy (DOE) field element as follows. Within the Energy and Science category, the Office of Environmental Management (EM) has responsibility for most of the relevant field elements, sites, and activities. However, the Office of Nuclear Energy is the lead program secretarial officer for Idaho Operations Office activities, and the Office of Science is the lead program secretarial officer for Oak Ridge Office activities.

Environmental Management Field Elements

i. Carlsbad Field Office
ii. Idaho Operations Office
iii. Oak Ridge Office
iv. Office of River Protection
v. Richland Operations Office
vi. Savannah River Operations Office

NNSA Field Elements

vii. Livermore Site Office
viii. Los Alamos Site Office
ix. Nevada Site Office
x. Pantex Site Office
xi. Sandia Site Office
xii. Savannah River Site Office
xiii. Y-12 Site Office

For the Savannah River Site, NNSA and EM have primary management responsibilities for certain aspects of operations. Most site operations at the Savannah River Site, including cleanup efforts, are overseen by the Savannah River Operations Office under the auspices of EM. Tritium facility operations are overseen by the Savannah River Site Office under the auspices of NNSA.

Environmental Management Sites

i. Carlsbad Field Office

The Carlsbad Field Office (CBFO) manages the DOE National Transuranic (TRU) Waste Program Office, the Waste Isolation Pilot Plant (WIPP) facility operations, and serves as an international center for the study of waste management. The CBFO coordinates the program for the permanent disposal of TRU radioactive waste at Department sites, national laboratories, and other participants.

WIPP, located in the desert of southeastern New Mexico, is a non-reactor nuclear facility providing safe and permanent disposal of defense TRU and TRU-mixed waste in subterranean salt beds 2,150 feet underground. Since its first opening in 1999 for TRU waste disposal, WIPP has played a crucial Departmental role by helping to meet its commitments to environmental cleanup around the nation. The demonstrated success of WIPP has resulted from the integration of safety into the entire programmatic mission: safe characterization, transportation, and permanent disposal of TRU waste.

First Receipt of RH TRU Waste at WIPP

Operational and Safety Accomplishments at the Waste Isolation Pilot Plant

WIPP continues to be a significant contributor to the Department's progress toward completing cleanup throughout the EM complex. WIPP has received more than 6,200 shipments and disposed of over 52,000 cubic meters of TRU waste since opening. Significant efforts were made by management and line workers at all levels, which resulted in the following operational and safety accomplishments during 2007:

- WIPP received and disposed of over 8,500 cubic meters (approximately 1,020 shipments) of TRU waste. As of mid-December 2007, the total volume of TRU waste disposed of in the WIPP underground disposal rooms was over 52,000 cubic meters.
- WIPP achieved a low Total Recordable Case rate of 0.5, which included all participant organizations. WIPP also achieved a 0.36 case rate for Days Away, Restricted, and Transferred (683,731 exposure hours since the last injury causing days away from work.).
- WIPP received its 6,000th shipment of TRU waste on August 29, 2007 from INL, accounting for over 2.6 million miles traveled by TRU waste transporters without a WIPP-accountable accident.
- Completed the DOE operational readiness review for receiving remote-handled TRU waste and received the first such waste shipment on January 23, 2007.
- WIPP safely disposed of over 90 canisters of remote-handled TRU waste. This effort involved close coordination of characterization, transportation, safety, quality assurance, security, waste handling, and engineering operations.
- TRU waste characterization, transportation and disposal success is evident from the increase in productivity seen in 2007. By certifying over 10,000 TRU waste drums, WIPP has certified more drums in 2007 than in any other previous year. In addition, a total of four contact-handled waste lines have been successfully deployed, allowing for further TRU waste cleanup progress at Los Alamos National Laboratory (LANL), Savannah River Site (SRS), Oak Ridge National Laboratory (ORNL) and Idaho National Laboratory (INL). In addition, WIPP successfully deployed five remote handled lines, adding Argonne National Laboratory-East among LANL, SRS, ORNL, and INL.
- TRU waste cleanup was completed at Brookhaven National Laboratory, the 13th site to be cleaned up.
- WIPP safely and successfully placed clean room modules of the Enriched Xenon Observatory (EXO) Project in the WIPP underground. EXO is part of a consortium of scientists, led by Stanford University, to detect neutrinoless double beta decay. The modules, weighing between 13,000 and 15,000 pounds each, were lowered into the underground by hoist and then transported by a 41-ton forklift nearly a kilometer to the experimental area.
- WIPP has maintained the Mine Operator of the Year Award for over two decades. In September 2007, at the New Mexico Mining Association conference, WIPP was again named Mine Operator of the Year by the New Mexico Mining Association in conjunction with the New Mexico State Mine Inspector's Office.

Activities Related to Implementation of Board Recommendations

The WIPP is committed to implementing Defense Nuclear Facilities Safety Board (Board) recommendations. As of December 2007, the WIPP has no overdue Board-related commitments or actions.

ii. Idaho Operations Office

The DOE Idaho Operations Office (ID) oversees the activities at the Idaho site, including operations of the Idaho National Laboratory (INL) and the Idaho Cleanup Project (ICP). The ID/INL mission is to develop and deliver cost-effective solutions to both fundamental and advanced challenges in nuclear energy and other energy resources, national security, and environmental management. The INL is operated for the DOE by Battelle Energy Alliance. Under a separate contract, CH2M-WG Idaho is the Idaho Cleanup Project contractor for the DOE at the Idaho site. In addition, Bechtel

BWXT Idaho, LLC (BBWI) manages the Advanced Mixed Waste Treatment Project (AMWTP). Safety accomplishments and activities during 2007 for activities overseen by DOE-ID are summarized in the following sections.

Idaho National Laboratory/Battelle Energy Alliance Safety Initiatives

INL successfully completed its DOE Phase II Integrated Safety Management System (ISMS) Verification Review in October 2007. Based on a review that included observing over 150 work activities, interviewing over 300 contractor personnel, reviewing over 700 laboratory documents, and participating in 19 ISMS related presentations, the Review Team concluded that INL had implemented all aspects of its ISMS. As suggested by the Review Team, the INL is considering findings and observations identified during the review as part of its effort to continuously improve the INL safety management system.

INL's worker safety and health program, as required by 10 CFR 851, *Worker Safety and Health Program*, was approved by the Department before the required date of May 25, 2007. Several actions to achieve full compliance with the new program have been reported in the Price-Anderson Amendments Act non-compliance tracking system.

Advanced Mixed Waste Treatment Project Safety Initiatives

The AMWTP includes a modern waste treatment facility and is the cornerstone of DOE's commitment to prepare and ship waste out of Idaho. Managed by BBWI, safety and compliance are paramount to operations at the AMWTP.

Risk Reduction Through Stabilization of Excess Nuclear Materials and Waste

A primary mission of DOE is safe risk reduction and cleanup of the environmental legacy of the nation's nuclear weapons program and government-sponsored nuclear energy research. AMWTP's 2007 accomplishments in the risk reduction arena are related to TRU and mixed low-level waste (MLLW) programs as follows.

- Shipment of over 5,700m3 TRU waste to Waste Isolation Pilot Plant; this equates to over 570 shipments

Engineering Test Reactor Removal

- Shipment of over 700m3 MLLW to the Nevada Test Site and Energy Solutions of Utah (previously Envirocare)
- Over six million man-hours (four years) without a lost time accident; no milestone or schedule is worth an employee safety incident - BBWI is striving for zero accidents.

In addition, AMWTP has continued to reduce radiation exposures even though production/maintenance levels and significant waste handling in retrieval have increased. In 2007, AMWTP achieved a 20 percent reduction in total dose (when compared to the 2006 values, which were 50 percent lower than those from 2005).

Worker Protection Initiatives and Improvements

AMWTP continued demonstrating its commitment to ensuring that workers are provided with a safe work environment.

Most noteworthy was the submittal, DOE approval, and implementation of the 10 CFR 851 Worker Safety and Health Program at AMWTP. The 10 CFR 851 Rule requires that DOE contractor workers be provided with a workplace that is free from

recognized hazards that can cause death or serious physical harm. The implementation was accomplished on May 3, 2007, ahead of the May 25, 2007, goal.

The AMWTP Beryllium Program under 10 CFR 850 was approved and implemented on April 26, 2007. Enhancements expected during 2008 include two revisions to the beryllium training modules, assessment and revisions as necessary to beryllium mitigation measures in AMWTP processes, and improved sampling processes.

A major focus area at the AMWTP has been on the mitigative controls for a hydrogen deflagration/ explosion event. As part of the AMWTP's commitment to the Board and the DOE, and integral to ISMS and the 10 CFR 851 Rule, DOE approved WT-ESH-049, *Hydrogen Deflagration Mitigation Process*, on August 29, 2007. Implementation of this process (e.g., hazard identification and mitigation) at AMWTP includes drum handling controls to protect workers in the event of a drum deflagration. Controls that have been implemented to protect the involved workers include:

- Mock-up tested/refined engineered physical barriers to be used during initial drum handling and the use of lid restraints for bulged/suspect drums
- Training and development of detailed pre-incident plans
- Infrared screening of retrieval areas and enhanced fire response with the strategic staging of magnesium oxide
- Administrative controls for handling drums requiring standoff distances during initial drum handling and body position restrictions during all drum handling.

The AMWTP's Human Performance Improvement program provides a coherent, strategic approach to improving human performance in project operations. Actions related to Human Performance Improvement include:

- Most of the workforce, sixty percent, has received training to recognize the manageable elements of human performance (over 450 employees of 775).
- Promotion of organizational improvement by eliminating conditions that encourage human error (e.g., latent organization weaknesses, flawed defenses) and by reinforcing these defenses/values/processes via Fact Finding Event Analysis, Six Sigma improvements, incentivized employee KEYS (Keep Everyone and Yourself Safe)observations, company feedback sessions, etc.
- Promoting the "what if" attitude to encourage workers to consider problems that might be encountered before performing a work activity.

Engineering Test Reactor Removal

Safety Directives

AMWTP personnel were integral in the development and approval of DOE-STD-5506, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*. This standard was in direct response to a Board suggestion to standardize and provide consistency in methods for performing safety analysis throughout the DOE Complex for TRU processes. This standard is currently being incorporated into the AMWTP Documented Safety Analysis revision to be submitted to ID the first quarter of 2008.

Miscellaneous Related Safety Initiatives and Actions

The System Engineer program was enhanced during 2007 and now includes four qualified Cognizant System Engineers directly responsible for vital safety systems, 15 qualified System Engineers working under the four Cognizant System Engineers, and four System Engineers in training.

The revised AMWTP safety performance objectives, measures, and commitment indicators were DOE approved and implemented. Leading indicator metrics included ConOps, human performance indicators, safety compliance, and employee involvement measures.

Idaho Cleanup Project Safety Initiatives

The ICP, managed by CH2M-WG, LLC, Idaho (CWI) at INL, has made improvements in worker safety, environmental cleanup and protection, and reduction of future risks to employees, the public, and the environment. In 2007, ICP achieved STAR status under DOE's Voluntary Protection Program and continued to meet ISMS objectives. In addition, in accordance with 10 CFR 851, *Worker Safety and Health Program*, ICP submitted its worker safety and health program plan, which was approved by ID on May 25, 2007. Further, the Office of Health, Safety and Security, Office of Independent Oversight, conducted an assessment of ICP environment, safety, and health programs and verified that work is being performed safely. Other achievements is areas of interest to the Board are summarized below.

Risk Reduction

- ICP reduced the number of ICP nuclear facilities from 21 to 16 between October 1, 2006, and December 31, 2007, by: 1) removing legacy radioactive material and downgrading facilities to non-nuclear and by 2) merging similar facilities and activities to enhance efficiency and reduce costs.

- Idaho Nuclear Technology and Engineering Center (INTEC) CPP-603 Underwater Fuel Storage Basins Facility, was downgraded to non-nuclear because ICP successfully cleaned up and removed radioactive material.

- ICP completely removed all radioactive material from the INTEC Unirradiated Fuel Storage Facility (CPP-651), which is being maintained as a Hazard Category 2 nuclear facility while it awaits a new mission.

- ICP completed INTEC FAST Fluorinel Dissolution Process Area missions and is removing residual radioactive material to downgrade the facility to non-nuclear. ICP completed disposition of all 149 Fluorinel Dissolution Process filters.

- ICP transferred 615 fuel handling units from wet to dry storage.

- ICP prepared a new Documented Safety Analysis specifically to facilitate the deactivation and decommissioning of ICP nuclear facilities. ID approved the new safety analysis report (SAR-217, "ICP D&D Activities") on December 6, 2007.

- ICP has received DOE approval of Critical Decision 3 (CD-3) for the Integrated Waste Treatment Unit (IWTU) design for treatment of sodium-bearing waste. The IWTU Project, recognized as a model for integrating safety into the design of a nuclear facility, is currently under construction at INTEC.

Safety Performance

- ICP reduced the number of injuries during FY 2007 from a recordable case rate of 1.67 in 2006 to a recordable case rate of 1.3 in 2007 (a 22 percent reduction). The Day Away and Restricted or Transferred case rate was 0.73 in 2006, and in 2007 it was 0.20 (a reduction of 72.5 percent).

- ICP completed safety basis document upgrades over the last two years based on technical direction provided by DOE. Major areas for upgrade identified by DOE-ID included risk criteria and evaluation guidelines, use of MELCOR Accident Consequence Code System (MACCS) as the tool for consequence assessment to the colocated worker and the public, and TSR format and content upgrades to comply with 10 CFR 830, Subpart B, *Safety Basis Requirements, and DOE-STD-3009-94, Preparation Guide for DOE Nonreactor Nuclear Facility Safety Analysis*.

- ICP successfully passed two International Standards Organization 14001 surveillance audits, providing consistency in standardized and proven environmental controls and resulting in safer, more effective operations for both personnel and the environment.

Sodium-Bearing Waste Treatment Project

- The State of Idaho, Department of Environmental Quality, granted temporary authorization to commence construction of the IWTU for treatment of sodium-bearing

waste in accordance with the Resource Conservation and Recovery Act (RCRA). The State then issued the RCRA operating permit for the IWTU with an effective date of April 26, 2007, and issued the final IWTU Permit to Construct, which became effective immediately.

- DOE approved Critical Decision 3 (CD-3) for the IWTU Sodium-Bearing Waste Treatment Project authorizing construction and procurement of the IWTU to proceed in accordance with 413.3A requirements. The Preliminary Documented Safety Analysis was revised to reflect IWTU final design.

- ICP started construction at the IWTU site, which included completing all site preparation activities, installing the mud mat for the Process and Packaging Cells, installing the majority of the basemat reinforcing steel and embedded items in preparation for initial concrete pours, and procuring and erecting an inflatable enclosure over the site to create a safe work environment to continue construction throughout the harsh Idaho winter.

Deactivation and Decommissioning

- ICP completed decontamination, decommissioning and demolition of over 24 buildings and structures, including: one nuclear facility building, four radiological buildings, and six industrial buildings.

- ICP completed exterior demolition of Test Reactor Area (TRA)-642, Engineering Test Reactor (ETR).

- ICP completed TRA-642 ETR reactor vessel removal and on-site disposal.

- ICP completed decontamination, decommissioning, and demolition of the TRA-648 ETR electrical building and the TRA-644 ETR heat exchanger building.

- ICP completed demolition of Test Area North (TAN)-607 High Bay Assembly Shop.

- ICP completed TAN-607 stack removal.

- ICP completed TAN-607 Hot Shop demolition using directional explosives to keep any contamination from spreading.

- ICP developed an action memorandum to allow disposal of the ETR reactor vessel in the Idaho Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility (ICDF)—a major success that avoids the much higher cost and associated transportation risks of off-site disposal.

Remote Handled TRU Waste

Environmental Cleanup Activities

- ICP completed startup of Accelerated Retrieval Project (ARP) Phase II and began waste retrieval at the Radioactive Waste Management Complex (RWMC) Subsurface Disposal Area (SDA). ICP exhumed 5821 cubic yards of waste and soil in FY 2007.

- ICP started construction on ARP Phase III to expand waste retrieval capabilities at the RWMC SDA.

- ICP closed 15 Voluntary Consent Order (VCO) enforceable milestones during FY 07. The VCO was established to cover items out of compliance with RCRA. ICP also closed 23 release sites under CERCLA.

- ICP disposed of 6,598 cubic meters of low-level waste (LLW) in the SDA and 27,526 cubic meters of LLW/MLLW in the ICDF. In addition, ICP shipped 1,428 cubic meters of LLW/MLLW off-site for treatment and/or disposal.

- ICP completed the first ever remote-handled TRU waste shipment to WIPP.

- The ICP remote-handled TRU project retrieved, characterized, and shipped remote-handled TRU waste to WIPP without significant safety or environmental issues. Over 450 drums of waste have been retrieved, of which over half have been characterized. The remote-handled TRU project loaded 99 shipments of characterized waste drums into 72B casks and shipped them to WIPP for permanent disposal. The characterization and shipment processes have met all WIPP schedules and deadlines safely and ahead of schedule.

- ICP completed grouting seven large tank farm waste tanks, leaving four large tanks to be grouted after steam reforming treatment of the remaining sodium bearing waste at the IWTU.

- ICP completed on-site treatment of V-9 tank waste.

- ICP completed VES-SFE-106 sludge removal.

- ICP shipped the first contact-handled TRU waste exhumed from the SDA to WIPP.

- ICP completed de-watering and grouting the underwater fuel storage basins in the Fuel Receiving and Storage Facility, CPP-603A.

iii. Oak Ridge Office (OR)

The U.S. Department of Energy's Oak Ridge Office (OR) is responsible for major DOE science, technology, and environmental management programs. OR is responsible for activities at ORNL, the East Tennessee Technology Park (ETTP), and various projects. Safety accomplishments and activities at Oak Ridge projects and facilities are provided in the following sections.

Uranium-233 Downblending Project at ORNL

In February of FY 2007, the Uranium-233 Downblending Project completed an environmental assessment and subsequently issued a Finding of No Significant Impact to complete National Environmental Policy Act requirements. Isotek Systems LLC (Isotek) assumed operational responsibility for Building 3019, where the U-233 is being stored, in February 2007. In May 2007, the project received approval of CD-2/3A, which established the performance baseline and authorized long-lead procurements and dismantlement of Building 3019 legacy equipment to make room for the new uranium processing systems. In 2007, the project continued design work, initiated long-lead procurements, and conducted isolation/characterization activities in preparation for dismantlement activities. The project also completed an evaluation of alternatives to address nuclear safety concerns associated with the potential failure of Stack 3020 in a natural phenomena event, which supported the DOE decision to remove the stack as part of the project's scope. After completing readiness activities, the project received four uranium hexafluoride traps from the Molten Salt Reactor Experiment Fuel Salt Disposition Project in November. Trap receipt activities are planned to resume in early 2008.

The Office of EM conducted an evaluation of Isotek's Quality Assurance Program in October and a subsequent Quality Assurance Audit of Isotek's design agent, Burns and Roe. The DOE Integrated Project Team also completed a comprehensive design review during the week of December 6, 2007.

Transuranic Waste Preparation and Reduction at ORNL

Approximately 3900 drums of legacy TRU waste were in storage at ORNL at the start of the project. Before the drums are moved to the Transuranic Waste Processing Center (TWPC), vents and sample ports must be installed and headspace gas sampling conducted. As of the latest report, 1872 drums have been safely processed, and 751 drums have been shipped to the TWPC for characterization and disposition. Of these 1872 drums, 249 drums with indications of elevated hydrogen levels have been identified and vented to safe levels. In addition, 47 boxes of legacy waste, approximately one-third of the box inventory, have been shipped to the TWPC, thereby further reducing the legacy waste inventory.

ORNL Melton Valley Closure Project

The Melton Valley Closure Project, a cleanup project at ORNL, was completed in 2006. As a result of the capping, releases to the environment have been significantly reduced. In 2007, the discharge fluxes of three key contaminants at ORNL (tritium, strontium-90, and cesium-137) were the lowest on record.

East Tennessee Technology Park (ETTP)

ETTP is a major environmental cleanup project managed by the Bechtel Jacobs Company, LLC (BJC). Accomplishments in 2007 at ETTP are discussed in the following paragraphs.

BJC Nuclear Criticality Safety (NCS) Program

The BJC NCS Program prepared a criticality incredibility analysis, approved by DOE, that establishes the criteria to be met prior to demolition of the first section of the K-25 Building. BJC NCS personnel are intimately involved with the project characterization efforts that are necessary to implement the approved analysis. In addition to this significant effort, the BJC NCS Program supported D&D (including building demolition) of Building K1420. That building has been safely demolished, and the resulting debris pile is now being containerized and shipped off site. In other areas, the NCS Program has focused on analysis for disposal of the K25 Building process gas equipment and piping at the Environmental Management Waste Management Facility (EMWMF) disposal cell, safe resumption of Molten Salt Reactor Experiment fuel salt removal activities, and successful resolution of legacy discoveries such as the unidentified casks found in the K-770 Scrap Yard.

Building K-1401 at ETTP

Building K-1401 at ETTP was formerly the site's Maintenance Building. The building was approximately 100 feet by 400 feet and was composed of a main floor totaling approximately 400,000 square feet and a basement on one end of the building with approximately 85,000 square feet for a total of approximately 485,000 square feet. The preparatory work prior to demolition included waste characterization, evaluation of disposal options, and management of various types of waste material in compliance with regulatory, security, and contractual requirements. In addition, work activities in the basement area of Building K-1401 included removal of process piping and equipment prior to demolition. The building was demolished in a phased approach, following completion of various contamination and waste cleanup/removal activities and a structural evaluation for safety purposes. The demolition of Building K-1401 was completed on September 21, 2007. The waste disposal in the EMWMF landfill was completed on September 26, 2007, with a total of 1993 loads transported to the landfill totaling approximately 20,531 cubic of waste.

Scrap Metal Project at ETTP

The project was completed on April 13, 2007. The project totals included 4327 shipments and 96,206,990 pounds (48,103 tons) of scrap metal removed and shipped for disposal. The majority of material was shipped to the EMWMF, with a small amount being disposed offsite at Energy Solutions (formerly Envirocare). Three casks containing cesium have been placed in appropriate storage at ORNL and are part of the waste inventory for future disposition.

K-25/K-27 D&D Project

The K-25 and K-27 Buildings were two of the original gaseous diffusion facilities for isotopic enrichment of uranium from the late 1940s to the early 1960s. The scope of the project is to remove all process and non-process equipment, demolish both buildings, and disposition the equipment, material, and debris. During FY 2006, a new plan for demolishing the K-25 and K-27 Buildings was developed that better protects workers from the deteriorated conditions in the buildings by reducing the number of workers and hours spent in the buildings. This new plan involves removing high-risk components, unbolting and removing motors and compressors, and then demolishing the buildings from the outside, utilizing heavy equipment. Currently, the project is executing numerous activities leading to the start of the demolition of the K-25 Building West Wing in FY 2009. Activities and accomplishments during 2007 included:

- Design, procurement, and construction of the new Nondestructive Assay Shop (construction completed and operational testing initiated) and Segmentation Shop (construction is 95% complete) outside of the K-25 Building.
- Revision 4 of the documented safety analysis (DSA) and Revision 4C of the technical safety requirements (TSR) were approved on October 22, 2007. Revision 5 has been developed and is currently being reviewed by DOE.
- Characterization sampling.
- Cell housing and pipe ductwork removal and disposal.
- Vent, purge, drain, and visual inspection of process piping and equipment.

- Process equipment and piping stabilization (foaming).
- Asbestos abatement.
- Transite removal.
- Design, procurement, and construction of new criticality detection system (system went operational for entire K-25 Building on November 14, 2007).

Over 2,000,000 Safe Work Hours

The BJC K-25/K-27 D&D Project worked from January 4, 2006, to September 30, 2007, without a lost workday away case. This 21-month period corresponds to over 2 million hours without a lost workday away case (i.e., an injury severe enough to prevent someone from coming to work).

BJC/OR-1745, Worker Safety and Health Program

In accordance with the requirements of 10 CFR 851, BJC developed and submitted a unified Worker Safety and Health Program that applies to all self-performed and subcontracted work. Based on the recommendation of the OR Assistant Manager for Environmental Management, BJC received DOE approval of its program on May 16, 2007. In addition to the program documentation, BJC developed, submitted, and received approval of its List of Closure Facility Hazards and Controls.

Transuranic Waste Processing Center

The Transuranic Waste Processing Center (TWPC) is managed by EnergX on behalf of Foster Wheeler. The TWPC mission is to receive legacy TRU wastes and future wastes to be generated from decontamination and decommissioning, remediation, and ongoing mission operations at the ORNL complex. The facility processes, treats, repackages and ships the waste for final disposal at the Waste Isolation Pilot Plant, Nevada Test Site, or any other designated disposal facility. Accomplishments in 2007 at TWPC include:

TWPC Metrics and Safety Performance Highlights

There have been no lost time or restricted workday injuries or illnesses at the TWPC since 2002. One minor recordable injury occurred in October 2007 on a construction site; the accident investigation prompted the upgrade of several TWPC processes.

TWPC Safety Program Improvements

Work is under way to upgrade several Worker Health and Safety Program processes at the TWPC, including industrial hygiene, occupational medicine services, and incident reporting. In addition, a worker-sponsored Peer Safety Observation Program is being piloted in the Maintenance Department.

TWPC VPP Status

OR completed its review of the TWPC application for VPP Star status in 2007. Over 50 TWPC managers and workers were recognized during the TWPC monthly safety luncheon for their participation in reviewing the VPP application as authors, reviewers, and subject matter experts. The DOE VPP onsite inspection is scheduled for April 7-18, 2008.

TWPC NCS Program

The NCS Program, along with Revision 14 of the DSA/TSR, was successfully implemented in early October 2007. DOE completed a comprehensive review of the NCS Program, with no findings and one program proficiency identified. The program consists of three new NCS evaluations, a program implementing procedure, and numerous operational implementing procedures.

TWPC Remote-Handled Waste DSA Revision

DOE approved the DSA/TSR (Revision 15) authorizing (a) processing of remote-handled debris waste, (b) contact-handled enhancements for treatment of liquids, (c) use of overpack containers, (d) treatment of mercury, (e) marshalling contact-handled waste, (f) handling aerosol cans and soils, and (g) overpacks of contact-handled waste. This DSA/TSR revision will be implemented in 2008.

TWPC Transuranic Waste Operations

The TWPC continued operations to process contact-handled TRU waste for ultimate disposal at either WIPP for TRU waste or the Nevada Test Site for LLW and MLLW. Over 180 cubic meters of TRU waste has been repackaged and characterized for disposal.

TWPC Macroencapsulation System

A low-temperature Macroencapsulation System was installed at the TWPC for meeting RCRA treatment requirements for MLLW. The system has

been placed into operation, and over 170 cubic meters of macroencapsulated MLLW has been shipped to the Nevada Test Site for disposal.

TWPC Storage Facility

A new storage facility for contact-handled TRU waste was constructed at the TWPC in 2007 to increase processing and disposal efficiencies. The facility, called the Contact-Handled Marshalling Building, will be used for staging processed contact-handled TRU waste for shipment to WIPP, as well as staging waste received from BJC storage facilities for processing in the TWPC.

TWPC Remote-Handled Debris and Sludge Processing Capability

Modifications to the processing facility for remote-handled debris were completed in 2007, allowing for development of a revised processing strategy for sludge.

WTP construction progress, October 2006 for comparison to photograph from October 2007 below

TWPC Hot Cell

The final build-out of the TWPC remote-handled hot cell is nearing completion to make the facility ready for processing remote-handled TRU debris waste. Lessons learned have been incorporated by visiting other remote-handled TRU processing sites in the DOE complex and by working with CBFO on processing strategies.

TWPC Fire Protection System – An upgrade to the Fire Protection System has been installed in the contact-handled TRU glovebox, as well as the remote-handled TRU hot cell, replacing the Water Mist System that had been in use at the TWPC with a new sprinklered system.

iv. Office of River Protection (ORP)

The mission of the DOE Office of River Protection (ORP) is to retrieve and treat Hanford's tank waste and close the tank farms to protect the Columbia River. Major activities include a construction project – the Waste Treatment and Immobilization Plant (WTP) Project – and operation of the tank farms, which hold large quantities of radioactive waste pending treatment.

Waste Treatment and Immobilization Plant Project

The cornerstone of the tank waste cleanup project at Hanford is the WTP Project. The WTP will use a proven technology, called vitrification, to immobilize chemical and radioactive waste in an exceptionally sturdy form of glass to isolate it from the environment. Activities and accomplishments at WTP are discussed below.

WTP Project Occupational Safety Record

Through November 2007, the WTP achieved 11 consecutive months without a day-away-from-work injury, for a cumulative rate for CY 2007 of 0.00. The first week of December, the Project reached two significant milestones for hours without a lost workday case: (1) 2 million hours for the Construction Site and Marshalling Yard workforce (non-manuals, manuals, and subcontractors) and (2) 5 million hours for the overall Project, including satellite offices in Oakland and Frederick. The CY 2007 cumulative total recordable injury case rate through November is 1.52, compared to a rate of 1.72 for the same period in 2006.

On May 15, 2007, ORP approved the Bechtel National, Inc. (BNI) WTP Worker Safety and Health Program and the associated requirements implementation matrix. This constituted approval of the Program for WTP in accordance with 10 CFR 851.

WTP Project Voluntary Protection Program Site Assessment

A VPP team from Washington Savannah River Company, supplemented with local participants, completed their assessment of BNI's safety system in 2007 to help determine the project's readiness to submit an application for VPP Star Status; WTP is making process improvements as a result of this review. In January 2007, the DOE Office of Health, Safety and Security awarded Intermech, Inc., a

subcontractor to BNI, recognition in the DOE VPP at the Merit level for their onsite construction operations.

2007 saw significant construction progress in the facilities not affected by the seismic design criteria

WTP Construction Project Status

Primarily due to concerns about seismic design criteria for the facility (resulting from identification of sedimentary interbeds within the basalt framework), construction of the High Level Waste and Pretreatment facilities was curtailed in FY 2005. Following certification of revised ground motions to Congress and completion of a readiness review, construction of the High Level Waste Facility resumed on September 23, 2007. Work at the Pretreatment Facility focused on testing and development to address process flowsheet and concerns raised by an external expert team in 2006, and performing the readiness review activities necessary to resume construction following the Secretarial certification of the revised seismic ground motion. Construction activities resumed in December 2007.

For most of 2007, project construction continued to focus on the facilities unaffected by revisions to the seismic design basis for the Pretreatment and High Level Waste Vitrification facility. These include the Seismic Category III facilities: Low Activity Waste Facility, the Analytical Laboratory, and the Balance of Facilities. Through September 2007, engineering design of WTP is approximately 77% complete, and construction is approximately 32% complete (based on person hours).

WTP Project Implementation of Revised Ground Motion Criteria

In 2005, the structural design criteria were revised to incorporate revised ground motion spectra. In 2006, the project began implementing the revised criteria for the detailed design of the facility concrete and steel structures, equipment, components, and piping. The revised seismic ground motion was certified to Congress by the Secretary of Energy on August 10, 2007.

DOE and the U.S. Army Corps of Engineers performed independent reviews of the implementation of the revised criteria for the buildings, piping, equipment, and other commodities throughout 2006 and 2007. Issues raised by the Corps on the detailed designs have also been resolved. Issues raised by DOE on the building, piping, and other commodities have been resolved. However, the resolution of comments on the equipment design has not yet been verified because many of these are vendor designs, which have not yet been updated.

WTP Project Seismic Borehole Project

In June 2006, work began on the Borehole Project to develop final site response design spectra with updated site-specific data to confirm shear wave velocity and other seismic effects on the facility. The project drilled one corehole and three deep boreholes to measure the seismic characteristics. The boreholes were drilled to a depth of approximately 1,400 feet. The project was completed in June 2007. Review of the extensive (and previously unavailable) data confirmed that the revised ground motion analyses utilized in plant design are sufficiently conservative and confirm the availability of design margin.

WTP Technical Issues

The status and progress for various technical issues at WTP are as follows:

External Flowsheet Review Team Issue Resolution Activities. In 2006, an independent critical review of the process flowsheet for the WTP was conducted. The review (performed by the External Flowsheet Review Team) identified 17 issues that, if not corrected, could have prevented the facility from reaching its design production rates and 11 other potential issues that could also reduce production. Examples of the major identified issues include inadequate ultrafiltration area and flux, undemonstrated ultrafiltration system and leaching processes, plugging of process piping, erosion of mixing vessels, inadequate mixing systems, instability of baseline ion exchange resin, Pretreatment Facility availability, lack of comprehensive feed testing in commissioning, and

limited remotability demonstration. BNI developed detailed plans for resolving all 28 issues, which included corrective actions, schedules, integration with other issues, and integration with the overall project schedule. ORP's review and approval of all the plans was completed in January 2007. In 2007, actions were completed to resolve eight of the issues and five of the potential issues. A Pretreatment Engineering Platform is being built to test solutions for the issues with the leaching and filtration system in the Pretreatment Facility. Laboratory and pilot scale testing to resolve the remaining issues related to sampling, line plugging, erosion, and vessel mixing is in progress by BNI and DOE. The Pretreatment Engineering Platform will demonstrate the ultrafiltration system, leaching process design, system scale-up, and improve projections of system capacity. Testing will be performed by Pacific Northwest National Laboratory in the Process Demonstration Laboratory – West facility in Richland, Washington. Integrated testing with simulant is targeted for Summer/Fall of 2008.

Effects of Anti-Foam Agent on Gas Retention. An antifoam agent is required to prevent foaming in five non-Newtonian feed tanks in the Pretreatment Facility that use mixing spargers during normal operations. Preliminary small-scale tests completed in December 2006 showed that the anti-foam agent was causing increased gas retention. If this phenomenon occurred at full scale, it would require additional mixing and venting capability beyond the current design. In 2007, additional testing at one-quarter scale showed that the addition of antifoam agent did not increase gas retention, contrary to the indications of the smaller-scale experiment.

Hydrogen in Piping and Ancillary Vessels. In 2007, the project continued its review of the design in order to identify locations in which combustible mixtures of flammable gas (principally hydrogen) and oxygen could accumulate and potentially explode. Several thousand pipe segments and small vessels were identified as being potentially vulnerable. The project identified a variety of active controls and design features to prevent or mitigate any explosions, where vulnerability exists. DOE has approved acceptance criteria for these controls and design features, and requested additional testing in 2007 to provide information that can be used to bound the pipe support loads that could result from such explosions.

Summary Structural Reports for Pretreatment and High Level Waste Facilities

Summary Structural Reports were developed for the Pretreatment and High Level Waste Facilities. These reports provide a concise summary of the facility structural design. The primary lateral load resisting system consists of concrete shear walls and floor diaphragms with openings and discontinuities, making it difficult to visualize the transfer of seismic loads from the roof to the foundation from numerous detailed calculations. The Summary Structural Report describes the methods used to analyze and design the building and presents key results from selected portions of the structures. It also provides a description of the fundamental static and dynamic responses of the buildings, the resulting demand on the structure, and the capacity of the structural members. It includes graphics and narration providing an understanding of the structural response and load paths demonstrating that the facilities perform their safety functions. The High Level Waste Facility Summary Structural Report was completed on November 30, 2007. The Pretreatment Facility Summary Structural Report was completed in December 2007. Both documents have been provided to Board staff for review.

Workers retrieve cameras used in tank C-108 retrieval. Tank C-108 is the ninth Hanford single shell tank to be in retrieval or completed

Authorization Basis Changes (Design and Standards Change Approvals)

Six significant changes to the Safety Requirements Document were approved in 2007. These included extensive changes to address the hazard of slow accumulation of explosive gases (mainly hydrogen) in piping and ancillary vessels, and revision of the criteria for procurement of commercial items for use in important to safety systems.

DOE approved 22 changes to the Preliminary Safety Analysis Report in 2007. These included improved safety controls for internal flooding due to hypothetical piping failure in the Low Activity Waste, High Level Waste, and Pretreatment Facilities; fire protection improvements for the High Level Waste canister export truck bay; and addition of two emergency diesel generators to the existing design that has two emergency diesel generators.

Assessments of WTP Contractor Activities

In 2007, ORP initiated several quality assurance assessments that dealt with procurement of nuclear related items and activities, including items that are not safety-related equipment but fall under the umbrella of nuclear items and activities. As a result, BNI is strengthening its overall application of graded approach and NQA-1 to the complete suite of nuclear related procurements. :For example, an ORP assessment of WTP fire protection program identified continuing deficiencies and is resulting in increased BNI management attention.

Tank Farms Project

The chemical and radioactive waste is currently stored in 177 large underground tanks. ORP and its tank farm contractor, CH2M HILL Hanford Group, Inc., are removing and transferring this waste from the older 149 single-shell tanks to the newer 28 double-shell tanks to reduce the environmental risk posed by the older tanks.

Single Shell Tank Waste Retrieval and Technology Development Activities

ORP completed waste retrieval from tank S-112 and performed bulk waste retrievals on three larger single-shell tanks (C-108, C-109 and S-102) during CY 2007. About 1.13 million gallons of tank waste has been transferred from these tanks to the newer robust double-shell tanks. At the end of CY 2007, tank C-108 is 88 percent complete, C-109 is 85 percent complete, and S-102 is 92 percent complete. Tanks C-108 and C-109 completed retrieval system construction and startup during 2007.

Removal to less than one inch of waste in the tank bottom, the regulatory goal, has been technically challenging. As a result, new single-shell tank retrieval equipment has been developed and tested using a full scale tank located at the Hanford cold test facility. A remotely operated in-tank retrieval tool (salt mantis) was deployed at tank S-112 which allowed complete removal of the tank hard heel. High-pressure, low-volume mixers (rotary vipers) were deployed at tank S-102 and resulted in increased waste retrieval rates. In CY 2008, a second type of in-tank vehicle (FoldTrack) will be deployed in tanks C-109 and C-108 to complete removal of the tank hard heels.

ORP completed waste retrievals from the four C-200 series tanks. About 6,000 gallons of tank waste was transferred to the newer, more robust double-shell tanks. Waste retrieval was completed from tank C-204 during 2007. These tanks are an older style single-shell tank with a 55,000 gallon capacity. A new Vacuum Retrieval technology was used for the first time on these tanks. This retrieval method limits the amount of water introduced inside the tank during retrieval work. This technology will be deployed on the larger single-shell tanks that may have leaked in the past.

Occupational Safety

The Tank Farms Project injury/illness performance continues to be excellent. The tank farm contractor had only one recordable case and one lost workday case in the fourth quarter of FY 2007. The last four quarters (12 months) of injury/illness reporting for the tank farm contractor shows continued improvement and a reduction of injuries. From the first to the fourth quarter of FY 2007, the FY 2007 Tank Farms Project Total Recordable Case rate decreased from 1.33 to 0.32, and the Days Away, Restricted or Transferred case rate decreased from 0.66 to 0.32.

Demonstration Bulk Vitrification System

The Demonstration Bulk Vitrification System is a research and development project designed to demonstrate the suitability of the Bulk Vitrification technology for treating low activity waste for onsite disposal. Several project reviews were performed by ORP, the contractor CH2M HILL Hanford Group, Inc, and external groups. These included an independent technical review of the Demonstration Bulk Vitrification System.

As a result of the reviews, several actions have been taken, including additional full-scale testing. Additional engineering-scale and full-scale tests were performed to demonstrate integrated operations, and resolution of technical issues related to molten ionic salt. Validation of the project baseline was completed in September 2007. The remaining key technical issues are related to the confinement strategy and the containment of

technetium-99 in the glass matrix. The confinement strategy was an issue raised by the Board and redesign efforts have been undertaken to resolve the issue. The revised strategy has been presented to the Board and staff. General agreement has been obtained regarding the methodology for confinement.

Three full scale tests were performed using actual in-container vitrification (ICVtm) boxes to gather data (heat loads to various system components, nitrogen oxide generation, off-gas particulate composition, etc.) for the Demonstration Bulk Vitrification System design using a six-tank composite low activity waste simulant.

Evaporator Activities

During FY 07, the 242-A Evaporator performed two campaigns that together resulted in approximately 1.3 million gallons of additional space to support future (single-shell tank) retrievals and operational double-shell tank space needs. Evaporator upgrades are in progress for the heating, ventilation and air conditioning systems and the evaporator's Monitoring and Control System to ensure continued functionality of the 242-A evaporator facility to manage the volume of wastes in the double-shell tank system. The Monitoring and Control System upgrades led to the failure of a recirculation pump inside the facility; corrective actions and repairs of the pump are ongoing.

Integrated Safety Management System

ORP completed integrated safety management (ISM) oversight activities of the tank farm contractor throughout the year to support the annual ISMS declaration. However, on July 27, 2007, an 85 gallon spill of tank waste occurred at single-shell tank S-102 during efforts to unplug the waste retrieval pump. A subsequent Type A Accident Investigation Report identified deficiencies in contractor engineering programs, conduct of operations, and emergency response. As a result of the deficiencies identified during this investigation, ORP reviews, and other contractor-initiated investigations, ORP delayed the annual ISMS declaration to provide sufficient time to analyze the Type A Accident Investigation report, develop corrective action plans, and complete an independent assessment of ORP oversight of the tank farm contractor. On December 4, 2007, the independent assessment of ORP oversight was published, and it identified weaknesses in ORP management systems and engineering oversight programs. ORP is preparing a corrective action plan for this assessment. On December 5, 2007, EM approved the Type A Accident Investigation Report corrective action plan.

Based on the completion of the various investigations and reviews, and the development of corrective action plans, ORP is preparing to establish the ISMS declaration for 2008 for both ORP and the tank farm contractor. This declaration is scheduled to be completed in January 2008.

In addition, ORP conducted extensive oversight of the work planning, work execution, and radiological controls associated with the S-102 spill recovery field and ensured that all issues were resolved. ORP also conducted a project management and technical review of the technical documentation that describes the processes, strategies, activities, and documentation to ensure that WTP's encapsulation of canistered Immobilized High-Level Waste complies with Office of Civilian Radioactive Waste Management requirements. The most significant issue identified was that the Project Compliance Plan did not include sufficient information for the Review Team to perform a technical evaluation to determine whether the strategies complied with Office of Civiliam Radioactive Waste Management Immobilized High Level Waste requirements identified in the DOE Recovery Work Plan review and Judgments of Need (from both the DOE Type A Investigation report and the CH2M HILL Root Cause Analysis Report) prior to commencing S-102 spill recovery work activities. To date, the spill recovery field work has been safely and effectively performed.

Tank Farm RCRA Corrective Action Project

ORP has completed the initial vadose zone characterization for major past releases in the tank farms to estimate future environmental and human impacts and mitigate past releases as required by the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement, or TPA). Interim corrective measures to eliminate water run-on and water line leaks have also been completed on all the single-shell tanks, mitigating future impacts. The RCRA Facility Investigation Report for Hanford Single-Shell Tank Waste Management Areas, which summarizes the first ten years of the Tank Farm RCRA Corrective Action Project, will be sent to the Washington State Department of Ecology and released to the public in January 2008 in accordance with TPA Milestone M-45-55.

Planning for phase two of the RCRA Corrective Action Project with Richland Operations Office (RL) is under way to link upcoming groundwater cleanup decisions and future tank closure efforts, and will be embodied in joint RL-ORP milestone negotiations. Subsurface resistivity measurements were performed and analyzed for the B, BX, and BY Tank Farms, with similar measurements in progress at TX and TY Tank Farms. Sediment sampling using an innovative direct push technique has begun in the C Tank Farm. An interim surface barrier to prevent precipitation from further driving the vadose zone plume from a previous Tank T-106 release is under construction.

Double-Shell Tank Integrity

The Hanford Tank Integrity Program focuses on controls and inspections for the 28 Hanford double-shell tanks that were constructed from 1967 to 1986. These tanks have a nominal capacity of approximately one million gallons each. Because some of these tanks are beyond their original design life, and will be needed to support tank waste through the life of the WTP, additional testing, inspection, and monitoring is performed to assess and monitor the condition of these tanks as required by DOE orders. In 2006, an Independent Registered Qualified Professional Engineer provided the first certification that the double-shell tanks are fit for use, as required by Washington State Regulations for storage of dangerous waste. This certification also contained recommendations for continuous monitoring and inspection.

In 2007, the Hanford Double Shell Tank Integrity program completed a second round of ultrasonic testing on six Hanford double-shell tanks that had previously been tested with the same technology, meeting a major TPA Milestone (M-48-00). The data from 2007 was compared with data gathered seven to ten years ago for these same tanks and showed no discernable change in wall thickness, thus indicating that corrosion rates are extremely low. Calculations based on electrochemical laboratory testing results also show extremely low corrosion rates.

A panel of experts on tank corrosion continues to regularly review tank chemistry and corrosion control activities. This panel has recommended the testing and monitoring conducted in the double-shell tank. Based on data from past tank waste probes and testing, the expert panel recommended a new probe design based on measurement of the electrochemical potential in the waste. In 2007, further investigation into the tank chemistry indicated that carbonate-based waste within the tanks is acting as a corrosion inhibitor, allowing for reducing caustic additions to these tanks.

To gain additional double-shell tank space, the allowable fill height of Tank 241-AP-108 was raised. The technical basis for raising the fill height in the remainder of the tanks in the 241-AP tank farm was reviewed by Board structural integrity consultants, and seismic modeling was refined. The 2006 Independent Registered Qualified Professional Engineer certification has been updated to reflect all of the changes to the program. A revised structural analysis modeling update is planned for 2008.

Environmental Impact Statement

A draft of the Tank Closure Environmental Impact Statement (EIS) was completed on August 13, 2004, for internal DOE review. Subsequently, issues with another Hanford EIS, the Hanford Solid Waste EIS, resulted in a decision to combine the Hanford Solid Waste EIS with the Tank Closure EIS. This new EIS will examine new approaches to completing the groundwater analysis and enhancing the scope of the document to include a more quantitative cumulative impact analysis. The groundwater analysis is now being performed with a commercially available model that will use Hanford field data for application in the EIS. The data used in the model has been independently verified as required through the Settlement Agreement. A model technical review group of independent experts was hired to review the groundwater model conversion. This group held six public meetings with the tribes and stakeholders to address the conversion process. The additional waste management scope, as a result of the settlement agreement requirements, has to be redone, and the Fast Flux Test Facility has been added to the EIS, as well as a more in-depth cumulative impact analysis. A court settlement indicated that groundwater, human health analysis, and transportation analysis performed in a previous site disposal analysis would be redone. The analysis of the required resource areas is ongoing. The next draft is scheduled to be completed in Summer of 2008. This EIS is required to support future tank waste treatment, storage, and disposal; disposition of waste generated at Hanford; waste to be potentially shipped to Hanford from other DOE sites; and the final disposition of the Fast Flux Test Facility.

Assessments of Tank Farm Contractor Activities

ORP conducted an assessment of the CH2M HILL Contamination Control Program in February 2007. ORP determined that the contractor program met the requirements of 10 CFR 835. ORP also conducted an assessment of the tank farm contractor Software Quality Assurance Program, with support from the DOE Headquarters Office of the Chief of Nuclear Safety, focusing on the implementation of the new DOE O 414.1C safety software requirements. The assessment identified weaknesses in implementing the new requirements, processes for achieving legacy waste compliance with the new requirements, and the application of the graded approach to Software Quality Assurance activities. In addition, ORP performed an assessment of the tank farm contractor's Injury/Illness Recordkeeping Program that identified one finding for corrective action.

v. Richland Operations Office

RL made significant cleanup progress in 2007 at its major facilities and projects. RL's commitment to safely cleaning up the legacy of the Hanford site and reducing risks associated with legacy materials and facilities are demonstrated by the achievements in the following subsections.

Plutonium Finishing Plant (PFP)

- Demolished the liquid waste storage building (241-Z) in the PFP to slab-on-grade.
- Decided to consolidate surplus plutonium at the Savannah River Site. This decision represents a significant safety and security cost savings/avoidance for Hanford that will eliminate the need for continued safe, secure, and long-term storage of surplus special nuclear materials at PFP and will facilitate ongoing deactivation, decommissioning, decontamination, and dismantlement activities.

K Basin Closure Sludge Retrieval and Disposition

- Completed the removal of containerized sludge from the K-East Basin, which once held 2,300 tons of spent nuclear fuel and radioactive sludge, and transferred it to engineered containers within the K-West Basin.
- Placed a one-foot layer (between 400 and 500 cubic yards) of cement-like material called grout over the floor of the million-gallon, water-filled K-East Basin.
- Completed containerization of over 90% of sludge from the K-West Basin into engineered containers within the K-West Basin.

K Basin final pass vacuuming

Waste Treatment and Disposal

- Treated 805 cubic meters of MLLW and disposed of the resulting waste at onsite and offsite facilities.
- Completed thermal treatment of 600 cubic meters of MLLW.
- Shipped over 650 cubic meters of transuranic waste to WIPP for disposal.
- Initiated a pump and treatment system to address emerging technetium-99 groundwater plume in the T Farm Area.
- Continued to operate groundwater remedial systems in the 100-H, 100-K, 100-D, 100-NR-2, 200-UP-1, and 200-ZP-1 areas.
- Deployed field treatability tests for chromium-, strontium-, and uranium-

contaminated groundwater plumes that are adjacent to the Columbia River.

- Decommissioned 90 excess groundwater wells.

Central Plateau Remediation

- Retrieved 2,400 cubic meters of suspect TRU waste from Hanford's burial grounds located in the Central Plateau. Retrieved more than 7,200 cubic meters (34,600 drum equivalents) of radioactive waste from burial trenches in the 200 West and East Areas, meeting a TPA Milestone ahead of the scheduled December 31, 2007, due date.

- Remediated four waste sites at Hanford's Central Plateau 200 North Area. The four sites represent the first Central Plateau waste sites remediated under an approved regulatory decision document.

River Corridor Remediation

- Culminated six months of ISMS planning and implementation with the completion of a rigorous DOE Phase II verification that determined that the River Corridor Remediation project had documented and implemented an adequate ISMS.

- Completed deactivation, decontamination, decommissioning, and demolition of 20 industrial buildings and 6 radiological buildings (including 2 former high risk radiochemistry laboratories) located near the Columbia River.

- Completed remediation of 18 liquid waste sites and burial grounds along the Columbia River Corridor.

Waste Operations

- Disposed of over 400,000 tons of remediation waste at the Environmental Restoration Disposal Facility (ERDF).

- Initiated construction of new disposal Cells 7 and 8 to provide needed capacity at ERDF.

- Completed independent review of technical issues involving use of ERDF for onsite waste disposal, which concluded facility provided adequate protection of environment and health.

Demolition of 241Z

Contractor Oversight

RL conducted over 500 planned reviews of contractor activities in FY 2007 consistent with DOE Order 226.1A, *Implementation of DOE Oversight Policy*. In addition to the planned reviews, RL uses an Operational Awareness database in which RL staff records daily contractor oversight observations. This system allows for the collection of a wide range of information at an informal level, thereby giving RL an additional tool to evaluate contractors' ISM performance. This system was optimized in 2007 through implementation of a web-based database that allows for pictures and documents to be uploaded and linked to the entries as well as other enhancements. Operation Awareness data is analyzed (monthly and quarterly) for trends and new areas are identified for further oversight attention. For FY 2007, RL generated 4,302 Operational Awareness entries related to the contractors' performance of work. From these entries, 1,131 issues (4 Concerns, 353 Findings, 774 Observations) and 23 Good Practices were identified and communicated to the contractors.

Extensive contractor and RL oversight of Washington Closure Hanford (WCH) ISMS implementation was performed to support the Phase II verification. WCH successfully completed the ISMS verification in November 2007 and has demonstrated marked improvement in performance throughout the second half of FY 2007. Notable improvements include implementation of the WCH Integrated Work Control Process, use of Management Walkthroughs

to ensure consistent understanding of WCH management expectations, and a systematic, project management approach to ISMS implementation following the poor performance identified in Spring 2007. The DOE ISMS Phase II review team determined that the WCH ISMS was effectively documented and implemented, with a number of opportunities for improvement.

RL has concluded that the RL contractors have a robust ISMS description. Both RL prime contractors have good Occupational Safety and Health Administration injury rates. For FY 2007, Fluor Hanford, Inc. had a Total Recordable Case rate of 0.95 and a Days Away, Restricted, or on Job Transfer rate of 0.41. WCH ended FY 2007 with a Total Recordable Case rate of 0.85 and a Days Away, Restricted, or Job Transfer rate of 0.11.

Other RL achievements in 2007 included:

- Contractors took the necessary actions to implement the Operating Experience/Lessons Learned requirements of DOE Order 210.2, *DOE Corporate Operating Experience Program*. RL implemented the requirements in February 2007, and the contractors completed implementation in December 2007.

- RL applied the Technical Readiness Assessment process that is used by the National Aeronautics and Space Administration and the Department of Defense to determine whether the technical maturity of the critical technologies proposed for the K-Basins Sludge Treatment Project are advanced enough to justify project construction and procurement. The result indicated an insufficient level of technology readiness and DOE returned the project to the conceptual design phase.

- RL led a complex-wide team of electrical subject matter experts to produce an Electrical Systems and Safety Oversight Functional Area Qualification Standard, DOE-STD-1170-2007, which has formally been issued to all elements of DOE.

- The Safety System Oversight procedures and processes were reviewed both externally and internally, resulting in a corrective action plan that made major improvements in RL's program.

- RL performed three major assessments of Fluor Hanford, Inc. nuclear facilities' Vital Safety Systems, verifying that these systems can and will continue to be able to perform their safety function.

- RL completed recommended actions in response to Board Recommendation 2002-3 to incorporate Specific Administrative Controls into facility safety bases to implement DOE-STD-1186, *Specific Administrative Controls*. RL verification of these implementation actions is scheduled for early CY 2008.

- RL transferred management, safety, and operations of the Radiological Processing Laboratory (Building 325, 300 Area) facility from the EM to the Office of Science.

Waste characterization using misters

- Following removal of bulk sludge from the KE-Basin, RL initiated a process for integrating safety into design for the Sludge Treatment Project. This Project is a pilot project for EM and DOE in the implementation of draft DOE-STD-1189, *Integration of Safety into the Design Process*.

- RL completed the bulk of the corrective actions developed in response to the findings of the DOE Headquarters Independent Oversight inspection of Environment, Safety and Health Programs at the Waste Stabilization and Disposition Project. These corrective actions have resulted in improved integration of engineering and nuclear safety during document reviews and oversight of

facility operations. Related changes to the safety bases resulted in improved controls and supporting documentation.

- RL issued a major revision to its Technical Qualification Program Plan in March 2007 and is pursuing Headquarters accreditation of the program.

- The RL Facility Representative program in 2007 was maintained at full staffing through the successful qualification of two additional Facility Representatives.

- RL has continued to support its contractor in achieving VPP Star status. In 2007, Fluor Hanford added an additional star to its credentials, for a total of 13 stars.

vi. Savannah River Operations Office

The Savannah River Site (SRS) performs activities for both EM and NNSA; activities specific to NNSA are discussed in section xii. Activities performed by the site contractor – Washington Savannah River Company (WSRC) – in support of EM are overseen by the DOE Savannah River Operations Office (SR) and include nuclear materials stewardship and environmental stewardship. Major activities and accomplishments in 2007 for the site and specific facilities/projects at SRS are summarized below.

Sitewide

As of mid-December 2007, SRS Operations and Construction employees achieved several significant safe work milestones. Operations exceeded 7.3 million hours since their last injury requiring days away from work. Construction exceeded 20.8 million hours since their last injury requiring days away from work. The most recent lost time injury was over eight years ago (June 1998). In addition, WSRC achieved their fifth Star of Excellence Award under the DOE VPP. In addition, all existing SRS contractors have implemented 10 CFR 851. and new contractors are required to obtain approval of their Worker Safety and Health Program before they are allowed to commence work on site. In July 2007, the SRS Workplace Safety, Health and Security Policy and the Environmental Management System Policy were issued.

Exterior view of the Defense Waste Processing Facility

Area Completion Project

The Area Completion Project includes work scope for soils and groundwater remediation and facilities D&D in support of the site's area completion strategy. This work scope is conducted by contractor employees in the Soils and Groundwater Closure Projects and the Site Deactivation and Decommissioning (D&D) Project, respectively. Currently, 338 of 515 waste units have been completed or are in remediation.

Decommissioning was completed for eight Performance Measure facilities during FY 2007, representing a reduction of the site's facility footprint by 166,000 square feet. Altogether, 246 Performance Measure facilities have been decommissioned since FY 2003. Most of the facilities completed in FY 2007 were in P Area in support of the SRS Area Completion Strategy. During FY 2007, efforts in the D&D program shifted from facility completions to P and R Reactor deactivation activities. These activities will support the eventual decommissioning of the reactor facilities.

Solid Waste

In FY 2007, SRS maintained its accelerated TRU waste shipment program, dispositioning 1,675 cubic meters of legacy TRU waste and successfully completing 122 shipments to WIPP. SRS worked closely with DOE Headquarters and WIPP to complete the installation and initial testing of the large container nondestructive examination and nondestructive assay equipment. All legacy hazardous waste and all legacy MLLW, with the exception of PUREX solvent, has been disposition. Shipments of legacy PUREX solvent for treatment and disposal are ongoing and are scheduled to be completed by December 31, 2008.

F Area Closure Project (FACP)

FACP completed the repackaging of greater than 1000 TRU drums in 221-F Canyon and shipment of legacy material from 211-F Recycle Sump and 800 Underground. FACP also received approval for a Justification for Continued Operations to allow the repackaging of higher Plutonium Equivalent Curie waste drums in F Canyon. DSA updates were initiated for the installation of passive vents and concrete cap over the 800 underground portion of 211-F in accordance with EE/CA closure. In addition, FACP completed the initial list of F/H Area Laboratories infrastructure upgrade needs including the installation of dehumidifiers in building 772-1F and the installation of a Thermal Ionization Mass Spectrometer (TIMS).

H Area Completion Projects

H Canyon blended down highly-enriched uranium and shipped about 30,000 kilograms of low-enriched uranium solution. The low-enriched uranium is sent to Tennessee to be converted into materials suitable for use in the Tennessee Valley Authority's commercial power reactors. Discussions are ongoing to expand this program to other legacy DOE materials. The current program is expected to be completed in the third quarter of FY 2008. Other risk reduction accomplishments at H Area in 2007 included:

- Completed the repackaging (HB Line) and processing of (H Canyon) the remaining 82 of 283 non-MOXable uranium (with plutonium) scrap containers that originated from the Rocky Flats. The uranium was recovered to support the Highly Enriched Uranium Blenddown Program.

- H Canyon and HB-Line facilities processed approximately 20 non-MOXable plutonium metals in 3013 containers and stored the resulting solution in H Canyon vessels pending their disposition to a Tank Farm Sludge Batch (second quarter of FY 2008).

- Shipped neptunium oxide (pre-existing solutions that were converted to oxide in HB Line's Phase II facility, September 2006) to Idaho for use in future putonium-238 production efforts.

- H Canyon completing repackaging of the contents of an additional 23 large (12' X 7' X 18') TRU solid waste boxes into smaller waste boxes that meet the certification requirements for shipment to WIPP; 25 were packaged previously.

- Identified several H-Area Waste Reduction Initiatives to reduce the amount of High Level Waste generated and transferred to the tank farm. High-activity waste ammonia kill and low-activity waste acid stripping were implemented. Remaining initiatives are planned to be implemented in FY 2008.

- Developed the H-Area Life Extension Program (including identification of infrastructure upgrades, cable aging, etc.) to support H Canyon and HB-Line continued operation through FY 2019 per the DOE Enriched Uranium Disposition Project.

- HB-Line completed the disposition of remaining SRS residues, bringing the total stabilized to 490 kg of fissile material.

- Performed approximately eight operating months of outages to transition both H Canyon and HB-Line facilities from a shutdown state to continued operations per the DOE Enriched Uranium Disposition Project.

- H Canyon implemented grouting of lead counterweights and began removing several burial boxes (5 of 40) of failed legacy equipment, components, and parts stored on top of and inside cell covers.

- Completed the initial list of H Canyon infrastructure upgrade needs through procurement of three evaporator pots, an 8 X 8 spare vessel, and decanter replacement, and rolled back contaminated areas to an RBA or clean area (Tank Gallery, Hot Sample Aisle)

- H-Area developed the Effectiveness Review Program to reinforce workplace "High Standards" in Safety and conduct of operations (ConOps). This was initiated by Facility Management as a result of increased Safety and ConOps "errors" in early FY 2007. Implementation of this program is yielding a decrease in identified "errors" as well as a reduction in Occurrence Reporting and Processing System reportable events.

- Performed Readiness Assessments and, as a prerequisite, Operability Reviews to authorize receipt and processing of plutonium-beryllium metals, Super Kukla metals, and RCRA Black Box Repackaging activity.

Operators at Saltstone

Nuclear Materials Management

The K Area Complex is SRS's only Category I facility. Key accomplishments for 2007 at the K Area Complex included:

- Installation and operation of a fire detection system for the K Area Material Storage portion of the facility. Providing fire detection capability in K Area Material Storage satisfied an open DOE commitment to the Board.

- Safe and successful start-up of the K Area Interim Surveillance activity. All targeted FY 2007 surveillances were completed as scheduled: 21 non-destructive and 7 destructive examinations. Results were satisfactory, and provided valuable supporting data on the long-term storage capabilities of 3013 containers.

- Initiation of the surplus, non-pit plutonium consolidation mission.

- Declaration of readiness to receive highly-enriched uranium materials. Lag storage of these materials began in December 2007.

- Completion of the balance of highly-enriched uranium ingot shipments to Nuclear Fuels Services (NFS) in Erwin, Tennessee. From 2003 through 2007, K Area Complex shipped a total of 5842 weapons-usable highly-enriched uranium ingots to NFS as part of the NNSA Nuclear Non-Proliferation "Weapons to Plowshares" blend-down campaign.

- Completion of Phase I of the neptunium oxide (NpO2) de-inventory campaign. K Area Complex shipped 33 NpO2 containers to INL, satisfying an open commitment to the Board.

- Continuation of plutonium and plutonium-enriched uranium de-inventory campaigns. Numerous shipments from K Area Complex to the H Area Complex were made throughout the year.

Spent Nuclear Fuel

Spent nuclear fuel is received and stored on site in the L Area Basin. The Spent Fuel Project Operations safely performed work with no lost work days in FY 2007, extending their record to over 15 years without a lost work day case and over 4 years since the last personal contamination. Other risk reduction activities have included:

- Successful receipt and processing of 18 casks from foreign research reactors, containing 702 spent fuel assemblies, into the L Area spent nuclear fuel inventory.

- Successful receipt and processing of 6 casks from domestic research reactors, containing 27 spent fuel assemblies, into the L Area spent nuclear fuel inventory.

- Successful receipt and placing of three drums of highly enriched uranium material from INL in the Dry Fuel Storage Area.

- Chartered a Heavy Water Users Group to facilitate information exchange among government, educational, and commercial entities involved in the heavy water industry. Hosted initial group meeting.

- Shipped heavy water to Spallation Neutron Source, Y-12 Facility, and North Carolina State University.

- Completed characterization and evaluation to successfully downgrade the Receiving Basin for Off Site Fuels facility from a hazard category 3 facility to a Radiological Facility.

- Disposed of 11 legacy contaminated casks from the Receiving Basin for Off Site Fuels cask pad.

- Completed 25 additional legacy waste shipments for a total volume reduction of approximately 24,000 cubic.

Savannah River National Laboratory (SRNL)

The SRNL Infrastructure Plan was updated in 2007 and highlights the Laboratory's infrastructure needs and goals through 2030. The updated Infrastructure Plan incorporates the 2008 Ten Year Project Plan necessary for the maintenance and sustainment of the facilities. In addition, the updated plan presents SRNL Engineering's evaluation of Building 773-A active ventilation confinement systems in relation to the Board's 2004-2 recommendations. Based on results of the evaluation, SRNL Engineering identified 24 gaps in the active confinement ventilation systems and has recommended projects to close these gaps. Other SRNL accomplishments in 2007 included:

- SRNL completed a series of studies that show that remediation of the chlorinated volatile organic compound groundwater plume in T-Area using edible oils for sequestration and bioremediation is appropriate and viable.

- SRNL performed two evaluations of pyrophoricity and hydrogen generation to support the acceptance of three Department of Transportation 6M 30-gallon drums, which are planned to be shipped from INTEC to L-Area at SRS. The contained materials are radioactive scraps of uranium-fission alloys that were recovered following a flash detonation event in 1991

- SRNL completed a sensitivity analysis of the structural response of the 9977 packaging to foam density. The results showed that the structural integrity of the containment vessel would not be compromised during hypothetical accident conditions even if no foam were present in the packaging. These results will be incorporated into the 9977 SARP.

- DOE-STD-3013-2004 requires that a comprehensive surveillance program be set up to ensure that the 3013 containers maintain appropriate integrity during the long term storage. Thermal analyses of the Rocky Flats and Hanford 3013 storage configurations were performed to predict the relevant maximum temperatures. Temperature profiles were computed and will be incorporated in the surveillance program.

- SRNL confirmed that flowsheets used for the dissolution of plutonium-beryllium metal composite materials are suitable for the dissolution of enriched uranium-plutonium materials in the H-Canyon dissolvers.

- In support of plutonium vitrification development, SRNL completed five more runs processing lanthanide borosilicate glass with hafnium oxide as a surrogate for plutonium oxide. Two runs were performed to test the melter operation without bubbling air through the melt. The glovebox melter system could be simplified significantly if the bubbler could be shown to be unnecessary.

- SRNL completed Defense Waste Processing Facility (DWPF) Sludge Receipt and Adjustment Tank cycle run, designed to track hydrogen production and performance for the Sludge Batch 3/4 (Tank 40/51) Blend.

- SRNL developed the heat balance model for Tank 13 to assess the impact of a Submersible Mixer Pump on waste temperature during the process of waste mixing and removal. Modeling analyses were performed to examine how sumps affect tank temperature during waste removal operation in Type-II tanks, such as Tank 13.

- SRNL developed a computational flow dynamics model to address Tank 49 mixing. The modeling analysis focused on estimating the number and types of pumps required to ensure particulate suspension in the tank.

- SRNL used computational flow dynamics methods to perform an analysis of the supernate transfer from Tank 4 to Tanks 8 and 33 to ensure that DSA discharge requirements for entrained sludge solids are met.

- SRNL demonstrated that the organic reagent involved in processing for K salt work will not result in the formation of a localized flammable concentration near the grout surface in the resultant saltstone material disposal vault.

- An analysis of the impact of internal structural steel used to support the permanent concrete roof on Saltstone Vault 4 was completed and concluded that corrosion of the structural steel will not affect the long-term performance of Vault 4.

- SRNL developed a flowsheet model for Tank 51 aluminum dissolution that describes the Tank 51 chemistry during its various operations. The model supports frit formulation by providing the projected composition of sludge batches transferred to DWPF as a function of varying degrees of aluminum partitioning between gibbsite and boehmite.

High-Level Waste

In 2007, SRS's liquid waste operations program safely accomplished numerous significant tasks to process high-level wastes and reduce risks. Examples include:

- Saltstone Facility processed more than 175,000 gallons in one week, compared to its historical average of 83,000 gallons.

- DWPF poured glass at a rate of 0.78 gallons per minute, compared to its historical average of 0.49 gallons per minute.

- MCU/ARP project in H-Tank Farm and DWPF completed its WSRC Management Readiness Assessment and prepared for its WSRC Operational Readiness Review, demonstrating successful cold runs and integrated runs.

- Successful initial testing was completed on the heel removal equipment for Tanks 18 and 19 on schedule to support Federal Facilities Agreement closure dates.

- A third Slurry Mixer Pump was installed in Tank 5, and DSA revision was submitted to support chemical cleaning of Tanks 5 and 6.

Salt Waste Processing Facility (SWPF)

The SWPF is managed by Parsons under a separate contract with DOE. The SWPF Project received Critical Decision 2/3A approval from the Deputy Secretary in September 2007, establishing a cost/schedule baseline for this critical SRS cleanup facility and authorizing initiation of limited site preparation/early construction activities. Final design activities continue for authorization of additional limited construction activities in March 2008 and authorization of full construction activities in September 2008.

In order to expedite completion of the geotechnical report and ensure the acceptability of the final report, DOE directed WSRC to perform liquefaction and dynamic settlement analyses for SWPF design using standard SRS methodologies. Parsons was directed to complete the remainder of the geotechnical investigation including field work, lab work, and static analysis. Static results were made available on April 4, 2007, and dynamic analyses were completed in June 2007. The final geotechnical report was issued in early August 2007. While this information was being developed, a set of conservative soil settlement profiles were developed and used in sensitivity studies to examine the structure's available design margin. The soil settlement profiles used in the sensitivity studies were subsequently confirmed to be conservative by comparison to the results of the final geotechnical report, verifying that the thickened basemat is a conservative design solution.

Parsons and DOE brought in expert consultants to review the structural analysis models and dynamic analysis approach, evaluate the load path, and provide recommendations for final design. The consultants concluded that the Finite Element Model is adequate, with some refinement to analyze localized discontinuities on a case-by-case basis. The consultants concluded that the Lumped Mass Model is not adequate for generating In-structure Response Spectra, and Parsons has committed to implement SASSI to develop the In-structure Response Spectra for final design. The load path evaluation identified discontinuities and recommended improvements, all of which have been accepted and addressed by Parsons. Meetings were held with the Board staff on April 30, 2007, and with the Board on May 9, 2007, to address the geotechnical/structural issues identified in the Board's January 10, 2007, letter. On June 1, 2007, the Board sent a letter to DOE noting that it is satisfied with the recent actions taken by DOE and its contractor to resolve the safety issues identified in a January 10, 2007, letter for the preliminary design of the SWPF. As such, the Board stated its belief that DOE's path forward for the SWPF design is acceptable. The final structural analysis plan was issued on June 19, 2007. Interactions continue with the Board as final design progresses.

Software quality assurance issues were identified related to the adequacy and effectiveness of Parsons' work processes and administrative controls. An independent review team was chartered to evaluate software control and usage at the SWPF, implementing procedures, and work practices. As a result of the review, a corrective action plan was developed to ensure that personnel have an adequate and consistent understanding of software quality assurance program requirements, that procedures provide sufficient and consistent criteria, and that oversight and checking are adequate. The implementation of the corrective action report is anticipated to address the software quality assurance issue and emphasize the need to recognize and report problems.

Reviews were conducted with the Board staff on fire protection, electrical, instrumentation and control, and control of flammable gases. The Board identified the contribution of thermolysis to flammable gas generation as a concern. Parsons is developing a test plan to obtain sufficient data to address the Board's concern.

NNSA Sites

vii. Livermore Site Office

The Livermore Site Office (LSO) oversees Lawrence Livermore National Laboratory (LLNL) in Livermore, California. On October 1, 2007, LLNL transitioned to a new contractor for the management and operation of the site. The new contractor is Lawrence Livermore National Security, LLC and is supported by its parent companies: Bechtel National, University of California, BWX Technologies, Washington Group International, and Battelle. Through the contractor transition, all of the LLNL facilities remained operational and there were no impacts on mission, safety, or security. Additional safety accomplishments and activities at LLNL in 2007 are summarized in the following sections.

Software Quality Assurance

LLNL completed a baseline inventory of all LLNL software identified as meeting the definition(s) of safety software, according to DOE Order 414.1C. Eleven of the 15 codes identified, approximately 73%, have been assessed for gaps. In addition, the National Ignition Facility identified its safety software inventory and is in the process of grading risk for the safety software, with completion expected in early 2008.

Specific Administrative Controls

DOE-STD-1186-2004, Specific Administrative Controls, has been incorporated into two of the site's seven DSAs and TSRs. An incentive fee target has been added to the contract Performance Evaluation Plan to incorporate STD-1186 into the remainder of the LLNL Site DSA/TSRs by the end of the FY 2008.

Active Confinement Ventilation Systems

B612 is one of the buildings covered in the Category 2 DSA for the LLNL Waste Storage Facilities. LSO directed TSR changes to limit B612 to a Category 3 building. Subsequently, a supplement to the listing of Hazard Category 3 Defense Nuclear Facilities with an Active Confinement Ventilation System was submitted to include B612 in accordance with Section 7.5 Implementation Plan (IP) for the Recommendation 2004-2. LSO and LLNL also made significant progress in 2007 towards completion of IP Deliverable 8.6.3 for evaluation of the B332 active confinement ventilation system due in early 2008.

Nuclear Material Packaging

LLNL has actively been engaged in development of DOE Manual 441.1-1, which implements Board Recommendation 2005-1. LLNL participated in the working groups and development of technical support documentation.

Configuration Management Program

LLNL continues to make progress in implementing a more rigorous configuration management program in the nuclear facilities. The Nuclear Materials Technology Program schedule was recently revised to more clearly state the activities and to reflect the completion of some of the milestones, including the approval of System Design Descriptions for vital safety systems.

Implementation of Actions Associated with Nuclear Criticality Safety

LLNL continued to conduct criticality safety classes in support of NCS qualification requirements for NCS professionals. LLNL still has an outstanding issue to address, dating from recommendations

made in a letter from the Board dated October 11, 2006. Specifically, LLNL is working to adequately address Board concerns about the software quality assurance issues related to LLNL's use of computer software used to assist operators in the movement of fissionable material.

Building 332 DSA

On October 1 2007, B332 transitioned to the safety programs, surveillances, procedures, and controls of the 10 CFR 830 Subpart B compliant DSA and TSRs. The DSA implementation and transition was a high management priority and was completed approximately 45 days ahead of schedule.

viii. Los Alamos Site Office

The Los Alamos Site Office (LASO) oversees the Los Alamos National Laboratory (LANL), a multi-discipline National Laboratory with 19 nuclear facilities (10 of which are Nuclear Environmental Sites). Los Alamos National Security (LANS) manages LANL under contract with DOE. Safety accomplishments and ongoing actions during 2007 are discussed below.

Operators sorting non conforming items at the Waste Characterization, Reduction and Repackaging Facility

Nuclear Material Stabilization

LANL has implemented a comprehensive program for the stabilization of nuclear materials in response to Board Recommendations 94-1 and 2000-1. Commitments 502 and 504 of the Implementation Plan for Board Recommendation 2000-1, *Stabilization and Storage of Nuclear Materials*, have been completed. Commitment 502 was to stabilize 50 percent of weapons grade plutonium, and Commitment 504 was to stabilize 50 percent of non-weapons grade plutonium by December 2006. LANL met these commitments ahead of schedule, and LASO verified milestone completion in January 2007. LANL also completed Commitment 509, which required stabilizing 50 percent of the 248 kg of the materials through the Recovery Evaluation Process.

Waste Characterization, Reduction and Repackaging Facility, Los Alamos National Laboratory

Oversight of Complex, High Hazard Nuclear Operations

LANL has supported LASO's effort in implementation of Board Recommendation 2004-1. LANL is working to implement a comprehensive, internal oversight and assurance system to improve performance and to complement LASO's oversight role. In addition, LASO ended its pilot oversight program and returned to a standard oversight approach that includes increasing formality of its oversight and placing greater emphasis on field oversight of contractor performance. However, recent reviews performed by the NNSA Chief, Defense Nuclear Safety and the Office of Health, Safety and Security, Office of Independent Oversight confirm that implementation inconsistencies exist and more work is necessary to achieve the needed improvements.

Active Confinement Systems

LANL has completed an analysis of the ventilation system at the PF-4 Plutonium Facility. This study supports the implementation of Board Recommendation 2004-2 and provides comprehensive input to the development of DOE ventilation system standards for existing and future facilities.

Use of Materials Accountability and Safeguards System (MASS)

In response to a September 2007 letter from the Board, NNSA confirmed that MASS was never intended to be used for criticality safety purposes. MASS is not relied upon to perform a criticality safety function and, therefore, requires no upgrades for criticality safety purposes. LANL is in the process of modifying safety procedures and retraining facility staff to ensure that MASS is used only for its intended purpose.

Formality of Operations

LANS is working to implement a philosophy of working in a formalized and disciplined manner in LANL facilities, with emphasis on nuclear facilities. LANL is establishing and implementing a Formality of Operations program that addresses Conduct of Operations, Conduct of Engineering, Conduct of Maintenance, and Conduct of Training. LANL has made progress in the development and implementation of Formality of Operations, including:

- Development of Institutional Procedures, completion of Gap Analyses, and development of implementation plans.
- Establishment of the Facility Operations Directors' Forum.
- Development of Institution Qualification programs.
- Closure of over 400 Formality of Operations Implementation Plan milestones.
- Reduction in the number of recordable events between FY 2007 and FY 2008 by 30 percent.

Transuranic Waste Operations.

NNSA continues to focus attention on removing the highest Material at Risk Transuranic Waste Material at LANL. NNSA instituted the Los Alamos TRU Throughput Improvement Project, brought focused attention to upgrade and startup the Waste Characterization, Reduction and Repackaging facility and has reduced the inventory of high Material at Risk TRU waste at LANL. The projected completion date for this effort is now June 2008.

ix. Nevada Site Office

The Nevada Site Office (NSO) maintains the capability at the Nevada Test Site (NTS) and other facilities and sites to implement DOE initiatives in stockpile stewardship, crisis management, waste management, environmental management, non-defense research and development, and work for others, as well as supporting other DOE programs. Major NTS facilities include the Device Assembly Facility (DAF), the U1A Complex, the Criticality Experiments Facility (CEF), and the Joint Actinide Shock Physics Experimental Research (JASPER) facility. Activities and accomplishments at NTS facilities and projects are discussed below.

Device Assembly Facility (DAF)

Criticality safety measurements were conducted at the DAF in 2007. This effort reestablished the nation's nuclear criticality safety research and development capabilities. Criticality safety experiments allow NNSA to continue to verify the safety of the nuclear weapons stockpile. NNSA also gains valuable insight about the characteristics of nuclear materials for emergency response teams and nonproliferation teams use the knowledge to better track and measure weapons material throughout the world.

A contractor management self-assessment and contractor and NNSA Operational Readiness Reviews were completed for initial startup and operation of the DAF Glovebox. Startup of Glovebox hot operations was approved by NNSA Headquarters Deputy Administrator for Defense Programs on November 30, 2007. The first JASPER targets will be assembled in the Glovebox in early 2008.

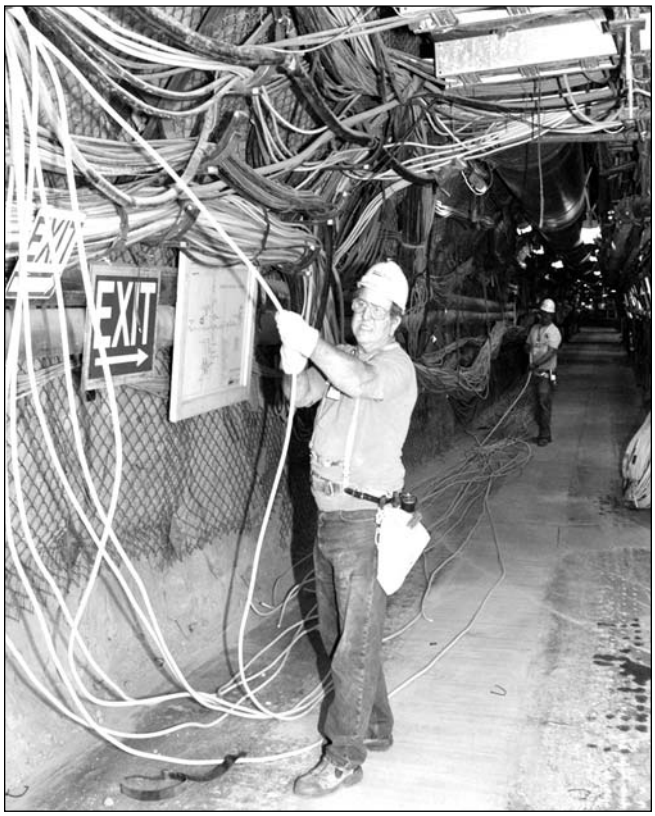
All structural expansion joints at the DAF were refurbished. The roof penetrations were refurbished and the site re-graded to improve water drainage. Roof re-grading included the emplacement of a drainage swale liner. Subsequent operational experience indicates a substantial improvement in preventing water infiltration. Cell drain repairs were also completed in 2007 on the CEF assigned spaces.

Design and procurement specifications were developed for the installation of a DAF roof geomembrane system. Preliminary engineering work was also completed on a replacement water tank to meet Performance Category 3 design requirements for natural phenomena hazards. A

request for proposal was developed for design, fabrication, and installation of a 250,000-gallon potable/fire water storage tank. The preliminary cost estimates for the geomembrane system and the storage tank indicate line item capital construction projects will be required.

U1a Complex

The U1a Complex is an underground laboratory consisting of horizontal tunnels, each about one-half mile in length, where experiments supporting the nation's nuclear stockpile are conducted. The underground U1a Complex is the location for subcritical experiments used to obtain technical information about the nuclear weapons stockpile.



Legacy cable removal in U1a Complex (in-progress)

A series of 12 small subcritical plutonium experiments, referred to as the Thermos experiments, were conducted at the U1a Complex in 2007. The objective of the experiments was to evaluate how plutonium performs after exposure to a high-energy shock. The experiments enabled scientists to capture high-power x-ray images of the shock wave as it travels through the plutonium. Data collected from the Thermos experiments enables scientists at the nuclear weapons laboratories to better understand changes in plutonium material properties at high temperatures and pressures and is used to validate three-dimensional models.

A number of safety improvements and physical upgrades were also made at the U1a Complex in 2007. These included: (a) removal of 118,600 feet of legacy cable from the underground U1a Complex to reduce combustible material loading; (b) removal of four legacy diagnostic trailers and 37,200 feet of surface laid diagnostic and power cables from the U1g Diagnostic Trailer Park in the U1a Complex to eliminate deferred maintenance and enhance safety; (c) replacement of the old underground telephone system by a modern fiber optic system to support security enhancements, voice-over-internet protocols, and improvements to the underground air quality monitoring system and fire alarm system; and (d) procurement of 150 self-contained self-rescue breathing units to replace existing units that had been recalled by the manufacturer as a result of recent mine fatalities.

Criticality Experiments Facility

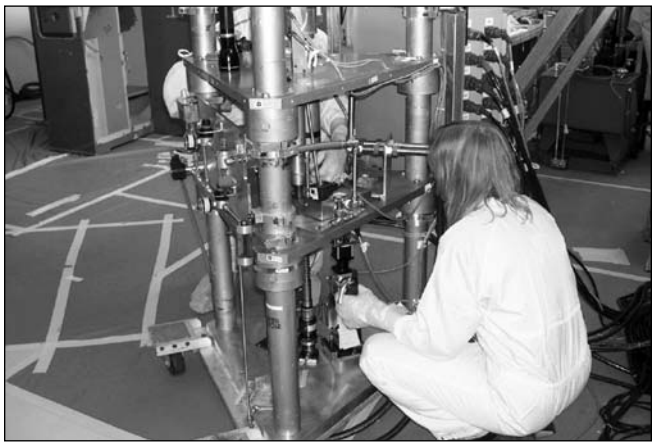
The CEF project is a $149,000,000 Line Item project that includes modification of a dedicated portion of the existing DAF at the NTS to accommodate the installation of four critical assembly machines and operations infrastructure such that the previous LANL Technical Area (TA)-18 mission can be relocated to the NTS. The scope of the project also includes modifications of the critical assembly machines and their associated control and safety systems. The critical assembly machines being relocated as part of the CEF project are Comet, Planet, Flattop, and Godiva IV. Completion of the project is currently scheduled for FY 2010.

The final design for the modifications to the DAF was completed in 2007. The preliminary DSA was completed in 2007, and several conditions of approval stemming from the NSO review were addressed and closed (e.g., fire suppression system design). The CEF project successfully relocated the control boundary for the material access area in May 2007 to enable craft workers to access the CEF construction portion of the DAF. Minor demolition associated with modifications to the DAF was completed and construction activities were initiated for the critical buildings, primarily focused on the control rooms and corresponding critical assembly machine locations. Significant progress was made in cutting duct penetrations and drilling cores through heavily reinforced blast walls where raceway and other utilities will be routed. Long-lead specialized materials have been ordered. Acceptance test plans were initiated to correspond

with completion of construction and building turnover. Decontamination and disassembly of the critical assembly machines at TA-18 were completed, and the machines were moved to a new location for re-assembly and testing. Design of the critical assembly machines and associated control and safety systems were also completed. Two of the critical assembly machines were fully re-assembled and testing initiated.

JASPER Facility

In April 2007, NNSA re-categorized the JASPER facility as a hazard category 3 nonreactor nuclear facility. LLNL developed a Justification for Continued Operations (JCO) to establish the operational parameters for the JASPER facility until safety basis documentation can be developed for compliance with nuclear safety rule requirements. The JCO was completed on June 19, 2007, and approved by NSO on June 28, 2007.

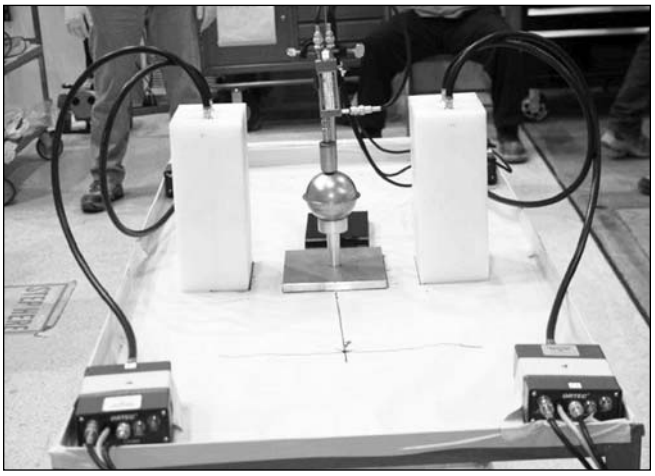


Godiva being assembled

Environmental Management

The LLW/MLLW Sub-Projects provide disposal services and facilities for DOE and U.S. Department of Defense generators at the NTS and across the United States. During FY 2007, the sub-projects safely accepted and disposed of 793,512 cubic feet of LLW and 150,481 cubic feet of MLLW at the NTS Area 5 disposal facility.

The Transuranic Waste Sub-Project is responsible for the disposition of legacy transuranic waste stored on the NTS in Area 5. During 2007, design engineering and safety basis documentation was completed for modifications to the Visual Examination and Repackaging Building (VERB) in Area 5. Upon completion of the physical modifications, the VERB will be used to segregate and repackage transuranic waste contained in 58 oversize boxes.



Beryllium Refected Plutonium (BRP) Ball with Detector Array

x. Pantex Site Office

NNSA's Pantex Site Office oversees the Pantex Plant, which is America's only nuclear weapons assembly and disassembly facility. Pantex has five primary operational missions: (1) weapons assembly, (2) weapons disassembly, (3) evaluation of the weapons, (4) high explosive production and research and development support, and (5) interim plutonium pit storage. The plant is managed and operated for the DOE by Babcock & Wilcox Technical Services Pantex, LLC (B&W Pantex), (previously called BWX Technologies, Inc. Pantex). Safety accomplishments and activities at Pantex during 2007 are described below.

Active Confinement Systems, Ventilation System Evaluation

B&W Pantex performed an evaluation of the ventilation systems (as part of an implementation plan commitment for Board Recommendation 2004-2) for the facilities where nuclear operations are performed. The following facilities were evaluated: 12-86, submitted 7/27/07; 12-64, submitted 9/27/07; 12-44, submitted 11/26/07; and 12-116, submitted 12/3/07. For all four facilities, the evaluation concluded that no upgrades were recommended because the benefit does not warrant the cost.

Lightning Protection

Pantex has worked on resolving issues related to bond wires and indirect effects of lightning. The major accomplishments for 2007 include:

- A Nuclear Weapons Complex Lightning Committee was formed with representation from the design laboratories and Pantex. This standing committee will identify issues related to lightning and ensure a thorough evaluation of those issues.

- Pantex evaluated the induced current in a circuit formed with floor mounted equipment connected to the Nuclear Explosive. The evaluation demonstrated that there was a very low probability of a completed circuit during a lightning strike. However, Pantex incorporated additional measures of disconnecting the equipment and establishing standoff during lightning warnings. These measures will remain in place until final analysis can demonstrate that the induced current would not result in an unacceptable weapon response.

- Pantex developed a testing plan to determine whether the penetrations form an electrical path to the rebar in the facility. In cases where the penetrations form an electrical path, the engineered bonds can be removed. This approach will reduce the manpower required to perform periodic testing of the engineered bonds.

Electrostatic Discharge

B&W Pantex has published a report which provides a revised definition of the Pantex electrostatic discharge (ESD) environment. The purpose of the report is to define how possible sources of ESD should be characterized for determining component responses. The new definition uses a probabilistic distribution curve to predict the likelihood that a source (such as a person or a piece of tooling) will be at a certain static potential. The distribution was developed based on voltage data collected in various Pantex operating environments. The distribution is used along with an enhanced method for characterizing the capacitance of metallic tools proposed by LLNL to predict the severity of an ESD event in a probabilistic manner. Use of this new distribution will provide a more realistic evaluation of the threat of ESD during weapon operations.

During the studies conducted to support the development of the Refined Pantex Voltage Distribution, one activity stood out as creating the highest body voltage on technicians. That activity was interaction with the fabric-lined foam-cushioned chairs. Based on this data, B&W Pantex has purchased approximately 450 static-dissipative chairs for use in operating environments where static-sensitive components are handled. Testing conducted using both types of chairs has indicated that use of the static-dissipative chairs results in lower body voltages for the technicians.

xi. Sandia Site Office

The NNSA Sandia Site Office oversees Sandia National Laboratories (SNL). Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, manages and operates SNL for DOE/NNSA. Sandia designs all non-nuclear components for the nation's nuclear weapons, performs a wide variety of energy research and development projects, and works on assignments that respond to national security threats. The following sections summarize safety accomplishments during 2007.

Worker prepares cask for loading

Safety Basis Improvements

NNSA/Sandia Site Office and SNL completed improvements in Safety Basis Analysis and documentation that were originally identified in a September 27, 2004, Board letter. SNL completed implementation of a corporate improvement plan called the Safety Basis Improvement Project for its

Safety Basis Program and has transitioned to a process to sustain the improvements that have been completed. The performance of this process is monitored by the Sandia Site Office, and feedback is provided to SNL at least quarterly.

The Annular Core Research Reactor supported a moderate testing schedule of customers in 2007. The DSA revision was submitted to DOE/NNSA/Sandia Site Office in September 2006 and the Safety Evaluation Report (SER) was issued May 2007. The new DSA was implemented in December 2007.

A worker checks the radiological condition of the cask

The Gamma Irradiation Facility maintained a modest testing schedule for 2007. The DSA was submitted to DOE/NNSA/Sandia Site Office in August 2006 and a SER was issued in June 2007. The new safety basis is planned to be implemented in February 2008.

The Auxiliary Hot Cell Facility initiated operations as a radiological facility in September 2007. The planning is under way to ultimately authorize it to operate as a limited-life Hazard Category III nuclear facility. The planned work is in support of de-inventory objectives at SNL.

The Manzano Nuclear Facility provides secure storage for legacy material at SNL. The facility DSA was approved in March 2007 and was fully implemented in August 2007.

At the Sandia Pulsed Reactor facility, the reactor core was fully dismantled, packaged, and shipped to the DAF at the NTS, where it will be stored until it is determined whether it is required to verify the reliability of the stockpile. The Safety Analysis Report was updated in June 2007, and Sandia Site Office issued the SER in September 2007. The updated safety basis also governs the operation of a zero power critical assembly that is now planned for use in 2009.

Removal of Material from Sandia National Laboratories

Sandia, in close coordination with NNSA and the Sandia Site Office and with significant support from other DOE sites (Savannah River, Y-12, Nevada Test Site, Argonne, Idaho, and Los Alamos), succeeded in removing all accessible Security Category I and II materials in FY 2007. In addition, SNL shipped the first shipment of Sodium Debris Bed Material to Idaho. The remainder is planned to be removed by the end of FY 2008. The remaining Security Category I/II items are being accessed to be sent to the NTS and Y-12. Completion of this removal will make SNL a "non-possessing" site, at which time security can be reduced to Security Category III levels.

Shipping container leaves the Sandia Loading Facility for its destination

xii. Savannah River Site Office

The Savannah River Site Office (SRSO), in coordination with SR, oversees NNSA activities at SRS. These activities include nuclear weapons stockpile stewardship, including operation of the tritium facility. NNSA activities at SRS are performed by the site contractor (WSRC), which also support activities that are overseen by SR. In addition to the site-wide accomplishments

(discussed under Section vi), the activities and safety-related accomplishments in 2007 associated with the NNSA tritium operations included:

- SRS Defense Programs has exceeded a safety milestone of over 8 million hours without a days-away case.
- Subsequent to the successful Operational Readiness Reviews and startup testing of the Tritium Extraction Facility in 2006, the facility became fully operational. The initial extraction of tritium gas from Tritium Producing Burnable Absorber Rods was competed in January 2007. The extraction of an additional batch of rods was successfully completed in December 2007.
- An increased trend in Conduct of Operations events was noted during 2007; in response, SRS Defense Programs initiated a Senior Supervisory Watch Program. The Board site representatives performed observations of the implementation of this program during August and September 2007.

xii. Y-12 Site Office

NNSA's Y-12 Site Office (YSO) oversees the Y-12 National Security Complex. Located in Oak Ridge, Tennessee, Y-12 is a key facility in the U.S. nuclear weapons complex and supports the NNSA nuclear weapons stewardship efforts. Y-12 serves as the nation's only source of enriched uranium weapons components and nuclear fuel for the U.S. Navy, is the main U.S. storage facility for enriched uranium, and is a leader in materials science and precision manufacturing. BWXT Y-12, LLC is the Y-12 management and operations contractor. The following sections summarize safety accomplishments during 2007.

Project Management Initiatives

The Uranium Processing Facility (UPF) project, a facility under design to support NNSA Transformation Strategies, received Critical Decision (CD)-1 approval, which is a key to Y-12 continuing as the Uranium Center of Excellence. Activities completed on the UPF Project included releasing the UPF Integrated Management Plan, the Preliminary Hazard Analysis, and the Safety Design Strategy. An information exchange was held with the design laboratories on the results of the UPF FY 2006 technology development initiatives. Additionally, several process simulations were performed in response to questions regarding throughput and system transition. While DOE-STD-1189, *Integration of Safety into the Design Process*, has not yet been issued, Y12 is applying draft Standard 1189 to this project in a pilot effort to further integrate safety and design.

Construction of the Highly Enriched Uranium Materials Facility (HEUMF) continued in 2007. The HEUMF is a storage facility that is a key step toward material consolidation, which will result in security improvements while reducing costs. At the end of September 2007, construction execution is within the Performance Baseline and the facility is now approximately 70% complete. An External Independent Project Review for the HEUMF Project was completed in October 2006, resulting in the Deputy Secretary's January 2007 approval of the baseline change proposal to update the project's performance baseline.

The newly constructed Jack Case Center at Y-12 houses approximately 1200 employees some of whom were previously stationed in Manhattan Project era facilities

Operational readiness was completed for Phase I of the Quality Evaluation Relocation Project, and it was turned over to Operations for use. As a result, Y-12 was able to decertify the material access area in Building 9204-4 and thereby reduce security costs and the footprint. Phase II of the Quality Evaluation Relocation Project is ahead of schedule and within budget.

Infrastructure Improvement Projects

A number of infrastructure improvement were completed or made significant progress in 2007. The Compressed Air Upgrades Project was completed on schedule and $1.7 million under

budget to provide the site with reliable compressed air. The Steam Plant Life Extension Project, which will significantly improve the site's environmental posture and deliver a reliable steam supply for the next 50 years, received CD-2/3 approval. The Potable Water Systems Upgrades Project, improving fire protection systems and potable water, received CD-3 approval. The Complex Command Center, which will replace the fire station, Plant Shift Superintendent offices, and technical support center to improve the Design Basis Threat posture, received CD-0 approval. Additionally, 16 capital projects were completed with a total value of $15.9M.

Y-12 continues to work toward the demolition of unneeded buildings and reroofing in important facility areas. In 2007, seven additional facilities, totaling more than 103,000 square feet were demolished, resulting in significant operational and utility usage reductions for the site, bringing the seven-year total to more than 260 buildings demolished at well over one million square feet. The 9996 Roofing Replacement Project was completed. This mission-critical activity replaced more than 17,000 square feet of roofing and directly supported the Depleted Uranium/Binary Consolidation efforts.

The collaborative ability of the workforce was enhanced through relocation of employees into newly constructed, alternately financed buildings (the first alternately financed buildings for NNSA). Specifically, about 1500 employees were relocated to the Jack Case Center and the New Hope Center from approximately 20 older, inefficient buildings. These obsolete buildings will be demolished to further reduce the site footprint.

Ongoing Production Activities to Support the Mission

FY 2007 dismantlement and disposition scope was completed on schedule and within budget targets. The last dismantled unit for the W55, W56 and the B61 Mods 2 and 5 systems was achieved, eliminating all War Reserve canned subassemblies of these types from the stockpile. All FY 2007 B61 Life Extension Program deliverables were completed. Y-12 executed activities to resolve technical issues in support of delivering the W76 First Production Unit.

NNSA decided to locate the Large Chamber Scanning Electron Microscope in Oak Ridge permanently. The microscope will be operated as a user-facility, generating sufficient user-fee revenue to cover its operating and maintenance costs while remaining available to Defense Programs as needed.

Y-12 dismantled the first unit from the enduring stockpile using an experimental infrared debonding technique. The Y-12 Throughput Improvement Plan is being executed, and has resulted in measurable enriched uranium machining capacity and special materials production. All commitments for delivery of highly enriched uranium to Naval Reactors and to NNSA down-blending processors were met. Requirements for the delivery of enriched uranium to foreign research reactors and removal of highly-enriched uranium from foreign locations were met.

Environment, Safety, and Health

A number of improvement initiatives were implemented in the Chronic Beryllium Disease Prevention Program. These initiatives included risk communication training for the Industrial Hygiene staff, a program to trend Beryllium Lymphocyte Proliferation test results, an expanded sampling program in areas where workers with chronic beryllium disease or beryllium sensitivity are housed, an enhanced beryllium boundary sampling and mapping program, and the use of the unique tacky cloth developed at Y-12, which has proven effective in removing very low levels of beryllium surface contamination without leaving a residue. There were eight samples that exceeded the DOE Action Level, each of which was associated with a specific activity in which airborne levels of beryllium were anticipated. In each instance, the appropriate engineering and administrative controls were implemented and personnel were equipped with powered air purifying respirators. This performance validates the effectiveness of hazard analysis processes and documents that occupational exposures to beryllium are being properly anticipated, evaluated, and controlled.

The Radiation Exposure Monitoring System report was completed and submitted, documenting an internal dose reduction of 13.6% and an external dose increase of 59.3% for a collective dose increase of 1.5%. Internal exposure is the major dose contributor at Y-12, and although the overall dose increased slightly, the internal dose reduction is significant.

The site achieved 1.7 million hours without a lost-time injury for Construction direct-hire craft, staff, and escorts. The most recent lost workday occurred in April 2004. Construction subcontractors worked 1.0 million hours without a lost-time injury.

Y-12 continued to provide information and support for the Integrated Facility Disposition Project that will secure funding for key Y-12 decontamination and dismantlement activities.

A recent review of the Y-12 Emergency Management Program Organization by the Office of Independent Oversight determined that YSO and B&W Y-12 have maintained a strong program. Strengths noted during the review include the institutionalization of expectations that support key emergency management program elements; a strong site response capability that is well-supported by an integrated set of facilities, procedures, and other tools; and strong feedback and improvement processes. Findings coming out of the review focused primarily on improvements needed to promote proficiency of emergency response personnel, including backup personnel for primary responders.

Y-12 implemented more than 45 pollution prevention activities with an anticipated reduction of more than 25.7 million pounds of waste and a projected cost savings/avoidance of approximately $600,000. Y-12 was notified of several awards for pollution prevention activities. Three award nominations won an NNSA Pollution Prevention Environmental Stewardship Award Certificate for Best in Class and will be submitted for the White House Closing the Circle Award. Y-12 is the only NNSA site to receive a Best in Class Award for 4 consecutive years.

Waste management activities were transferred from an OR contractor, BJC, to the Y-12 management and operations contractor in recent years. However, in the interim, BJC continued to support Y-12 activities. A new subcontract for solid waste work was awarded to Navarro-GEM, J.V., and successful completion of the transition of solid waste management work from BJC to Navarro-GEM, J.V was achieved. This transition involved mobilization of Navarro-GEM, standing up an operations management system for the Y-12 Waste Management Department, transfer of several employees from BJC and its solid waste subcontractor to Y-12, and moving the BJC waste tracking system to Y-12. The near-term results of the change to retrieval of solid wastes from Y-12 generators and disposition of solid wastes were apparent and positive.

A significant nuclear safety milestone was achieved with the implementation of the NNSA-approved Building 9212 Safety Analysis Report and TSRs. This accomplishment culminated years of cooperative effort by B&W Y-12 and NNSA to bring all Y-12 nuclear facilities into compliance with the DOE Nuclear Safety Rule, 10 CFR 830 Part B.

Risk Reduction

The facility risk reviews for Buildings 9212, 9204-2E, and 9215 were completed. The results of these reviews were summarized and actions were prioritized in the *Project Plan for the 9212, 9204-2E and 9215 Complex Facility Risk Review*. A summary of the detailed estimates was provided to Headquarters for inclusion in the FY 2009 budgeting process. Y-12 developed a Continued Safe Operating Oversight Team for the 9212 Complex to evaluate performance indicators for long term assurance of the safe operation of this facility while the UPF project is designed and built and report annually on performance indicator trends.

Y-12 completed 50 shipments of low-level radioactive wastes and other materials for disposal at the NTS. These shipments contained approximately 62,280 cubic feet, representing more than 50% of the Y-12–allotted disposal volume.

Y-12 completed the disposition of "no defined use" lithium that is excess to Defense Programs needs. Ten shipments (more than 500 drums) of the material were sent to the NTS for disposal. The space created by this effort will allow for storage of other needed lithium materials.

Readiness activities for the ES-3100 shipping containers were completed. This Y-12-developed Type B fissile material container allows safer and more efficient transport of uranium for DOE, commercial, and international customers.

APPENDIX E

Abbreviations and Acronyms

2000-1 . . . . . .Board Recommendation 2000-1, *Stabilization and Storage of Nuclear Material*

2000-2 . . . . . .Board Recommendation 2000-2, *Configuration Management, Vital Safety Systems*

2001-1 . . . . . .Board Recommendation 2001-1, *High-Level Waste Management at the Savannah River Site*

2002-1 . . . . . .Board Recommendation 2002-1, *Quality Assurance for Safety-Related Software*

2002-2 . . . . . .Board Recommendation 2002-2, *Weapons Laboratory Support of the Defense Nuclear Complex*

2002-3 . . . . . .Board Recommendation 2002-3, *Design, Implementation, and Maintenance of Administrative Controls*

2004-1 . . . . . .Board Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*

2004-2 . . . . . .Board Recommendation 2004-2, *Active Confinement System*

2005-1 . . . . . .Board Recommendation 2005-1, *Nuclear Material Packaging*

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

92-4 . . . . . .Board Recommendation 92-4, *Multi-Function Waste Tank Facility at Hanford Tank Farms*

94-1 . . . . . .Board Recommendation 94-1, *Improved Schedule for Remediation*

95-2 . . . . . .Board Recommendation 95-2, *Safety Management*

97-1 . . . . . .Board Recommendation 97-1, *Safe Storage of Uranium-233*

98-1 . . . . . .Board Recommendation 98-1, *Resolution of Safety Issues Identified by Internal Independent Oversight*

98-2 . . . . . .Board Recommendation 98-2, *Safety Management at Pantex*

99-1 . . . . . .Board Recommendation 99-1, *Safe Storage of Pits at Pantex*

AMWTP . . . . . .Advanced Mixed Waste Treatment Facility

ARP . . . . . .Accelerated Retrieval Project

BBWI . . . . . .Bechtel BWXT Idaho, LLC

BJC . . . . . .Bechtel Jacobs Company, LLC

BNI . . . . . .Bechtel National, Inc.

Board . . . . . .Defense Nuclear Facilities Safety Board

CAMP . . . . . .Corrective Action Management Program

CBFO . . . . . .Carlsbad Field Office

CD . . . . . .Critical Decision

CDNS . . . . . .Chief of Defense Nuclear Safety

CEF . . . . . .Critical Experiments Facility

CERCLA . . . . . .Comprehensive Environmental Response, Compensation, and Liability Act

CFR . . . . . .Code of Federal Regulations

ConOps . . . . . .Conduct of Operations

CNS . . . . . .Chief of Nuclear Safety

CRAD . . . . . .Criteria Review and Approach Document

CTA . . . . . .Central Technical Authority

CWI . . . . . .CH2M-WG, LLC, Idaho

CY . . . . . .Calendar Year

D&D . . . . . .Decontamination and Decommissioning

DART . . . . . .Days Away from Work, Restricted or Job Transfer

DAF . . . . . .Device Assembly Facility

Department . . . . . .Department of Energy

Departmental . . . . . .Departmental Representative to the Defense Nuclear Facilities Safety Board Representative

DOE . . . . . .Department of Energy

DOE G . . . . . .DOE Guide

DOE M . . . . . .DOE Manual

DOE O . . . . . .DOE Order

DOE P . . . . . .DOE Policy

DWPF . . . . . .Defense Waste Processing Facility

DSA . . . . . .Documented Safety Analysis

EIS . . . . . .Environmental Impact Statement

EM . . . . . .Office of Environmental Management

EMWMF . . . . . .Environmental Management Waste Management Facility

ERDF . . . . . .Environmental Restoration Disposal Facility

ES&H . . . . . .Environment, Safety and Health

ETR . . . . . .Engineering Test Reactor

ETTP . . . . . .East Tennessee Technology Park

FACP . . . . . .F Area Closure Project

FAQ . . . . . .Functional Area Qualification Standard

FRA . . . . . .Functions, Responsibilities, and Authorities

FTCP . . . . . .Federal Technical Capability Program

FY . . . . . .Fiscal Year

HEPA . . . . . .High Efficiency Particulate Air

HEUMF . . . . . .Highly Enriched Uranium Materials Facility

HSS . . . . . .Office of Health, Safety and Security

ICDF . . . . . .Idaho Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility

ICP . . . . . .Idaho Cleanup Project

ID . . . . . .Idaho Operations Office

INL . . . . . .Idaho National Laboratory

INTEC . . . . . .Idaho Nuclear Technology and Engineering Center

ISM . . . . . .Integrated Safety Management

ISMS . . . . . .Integrated Safety Management System

IWTU . . . . . .Integrated Waste Treatment Unit

JASPER . . . . . .Joint Actinide Shock Physics Experimental Research

JCO . . . . . .Justification for Continued Operations

LANL . . . . . .Los Alamos National Laboratory

LANS . . . . . .Los Alamos National Security, LLC

LASO . . . . . .Los Alamos Site Office

LLNL . . . . . .Lawrence Livermore National Laboratory

LLW . . . . . .Low Level Waste

LSO . . . . . .Livermore Site Office

MASS . . . . . .Material Accountability and Safeguards System

MLLW . . . . . .Mixed Low Level Waste

NCS . . . . . .Nuclear Criticality Safety

NEPA . . . . . .National Environmental Policy Act

NNSA . . . . . .National Nuclear Security Administration

NQA . . . . . .Nuclear Quality Assurance Standard

NRC . . . . . .Nuclear Regulatory Commission

NSO . . . . . .Nevada Site Office

NTS . . . . . .Nevada Test Site

OR . . . . . .Oak Ridge Office

ORNL . . . . . .Oak Ridge National Laboratory

ORP . . . . . .Office of River Protection

PFP . . . . . .Plutonium Finishing Plant

QA . . . . . .Quality Assurance

RCRA . . . . . .Resource Conservation and Recovery Act

RL . . . . . .Richland Operations Office

RWMC . . . . . .Radioactive Waste Management Complex

Sandia . . . . . .Sandia National Laboratories

SDA . . . . . .Subsurface Disposal Area
SER . . . . . .Safety Evaluation Report
Secretary . . . . . .Secretary of Energy
SIMS . . . . . .Safety Issues Management System
SNL . . . . . .Sandia National Laboratories
SNM . . . . . .Special Nuclear Material
SQA . . . . . .Software Quality Assurance
SR . . . . . .Savannah River Operations Office
SRNL . . . . . .Savannah River National Laboratory
SRS . . . . . .Savannah River Site
SRSO . . . . . .Savannah River Site Office
SS-21 . . . . . .Seamless Safety for the 21st Century
SSO . . . . . .Safety System Oversight
STD . . . . . .Standard
SWPF . . . . . .Salt Waste Processing Facility
TA . . . . . .Los Alamos National Laboratory Technical Area
TAN . . . . . .Test Area North
TPA . . . . . .Tri-Party Agreement
TQP . . . . . .Technical Qualification Program
TRA . . . . . .Test Reactor Area
TRC . . . . . .Total Recordable Case
TRU . . . . . .Transuranic
TSR . . . . . .Technical Safety Requirement
TWPC . . . . . .Transuranic Waste Processing Center
UPF . . . . . .Uranium Processing Facility
U.S.C. . . . . .United States Code
VCO . . . . . .Voluntary Consent Order
VPP . . . . . .Voluntary Protection Program
WCH . . . . . .Washington Closure Hanford
WIPP . . . . . .Waste Isolation Pilot Plant
WSRC . . . . . .Washington Savannah River Company
WTP . . . . . .Waste Treatment and Immobilization Plant
YSO . . . . . .Y-12 Site Office

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