FY 2008
BUDGET REQUEST
TO THE CONGRESS

Defense Nuclear Facilities Safety Board

February 5, 2007

GOVERNMENT PERFORMANCE & RESULTS ACT

GPRA Strategic Planning Reporting Requirements

The Government Performance and Results Act of 1993 (GPRA) requires each agency to prepare and submit a strategic plan establishing long-term programmatic, policy, and management goals. The Defense Nuclear Facilities Safety Board's Strategic Plan for FY 2003-2009 has been made available on the Internet at www.dnfsb.gov. In addition, agencies are also required to develop a performance budget with annual performance objectives that indicate the progress toward achievement of the strategic plan's goals and objectives. The Board's performance objectives for FY 2007 and FY 2008, as well as representative accomplishments for FY 2003 through FY 2006, are included in this budget request in accordance with the requirements of OMB Circular A-11.

For a comprehensive review of the Board's activities to improve the safety of the Department of Energy's defense nuclear facilities and identify remaining problems, please see the Board's Reports to Congress, which can be reviewed at the above Web address.

Defense Nuclear Facilities
Safety Board
FY 2008 Congressional Budget Request

TABLE OF CONTENTS

Defense Nuclear Facilities
Safety Board
FY 2008 Congressional Budget Request
APPROPRIATION & EXPENSE SUMMARY

(Tabular dollars in thousands.)

OPERATING EXPENSES

	ACTUAL FOR FY 2006	PRESIDENT'S BUDGET REQUEST FOR FY 2007	FINANCIAL PLAN FOR FY 2007	BUDGET REQUEST FOR FY 2008
New Budget Authority	21,812*	22,260	19,758 **	22,499
Obligations	20,445	22,731	22,404	23,285
Outlays	19,684	22,277	21,956	22,819

* $22,032,000 Appropriation: $220,320 (1%) rescission included in FY 2006 Defense Appropriations Bill.

** A regular 2007 appropriation for this account had not been enacted at the time the budget was prepared; therefore, the account is operating under a continuing resolution (P.L. 109-289, Division B, as amended). The amounts included for 2007 in this budget reflect the levels provided by the continuing resolution.

Enabling Statute:

National Defense Authorization Act, Fiscal Year 1989 (Pub. L. 100-456, September 29, 1988), amended the Atomic Energy Act of 1954 (42 U.S.C. 2286 et seq.) by adding new Chapter 21– Defense Nuclear Facilities Safety Board,

As Amended by:

National Defense Authorization Act for Fiscal Year 1991(Pub. L. 101-510, November 5, 1990),

National Defense Authorization Act for Fiscal Years 1992 and 1993 (Pub. L. 102-190, December 5, 1991),

Energy Policy Act of 1992 (P.L. 102-486-Oct. 24, 1992), and National Defense Authorization Act for Fiscal Year 1994 (Pub. L. 103-160, November 30, 1993),

Federal Reports Elimination Act of 1998 (P.L. 105-362, November 10, 1998) and National Defense Authorization Act Fiscal Year 2001 (Pub. L. 106-398, October 30, 2000).

Defense Nuclear Facilities
Safety Board
FY 2008 Congressional Budget Request

PERSONNEL SUMMARY

	FY 2006 ACTUAL	PRESIDENT'S BUDGET REQUEST FY 2007	FY 2007 FINANCIAL PLAN	FY 2008 BUDGET REQUEST
Statutory Personnel Ceiling: (FTE's) [1/]	150	150	150	150
FTE Usage [2/]	86	100	95	98
Board Members and Permanent Employees at End of Fiscal Year	86	100	98	98

1/ National Defense Authorization Act for FY 1992 and FY 1993, Pub. L. 102-190, raised the Board's statutory employee ceiling from 100 to 150 full-time staff to accommodate mandated additional nuclear weapons oversight responsibilities. This statutory employment ceiling does not include Board Members, who by virtue of the Board's enabling legislation may hire up to the equivalent of 150 full-time employees. See 42 U.S.C. § 2286b(b)(1)(A).

2/ FY 2008 FTE usage includes the five full-time Board Members appointed by the President, by and with the advice and consent of the Senate.

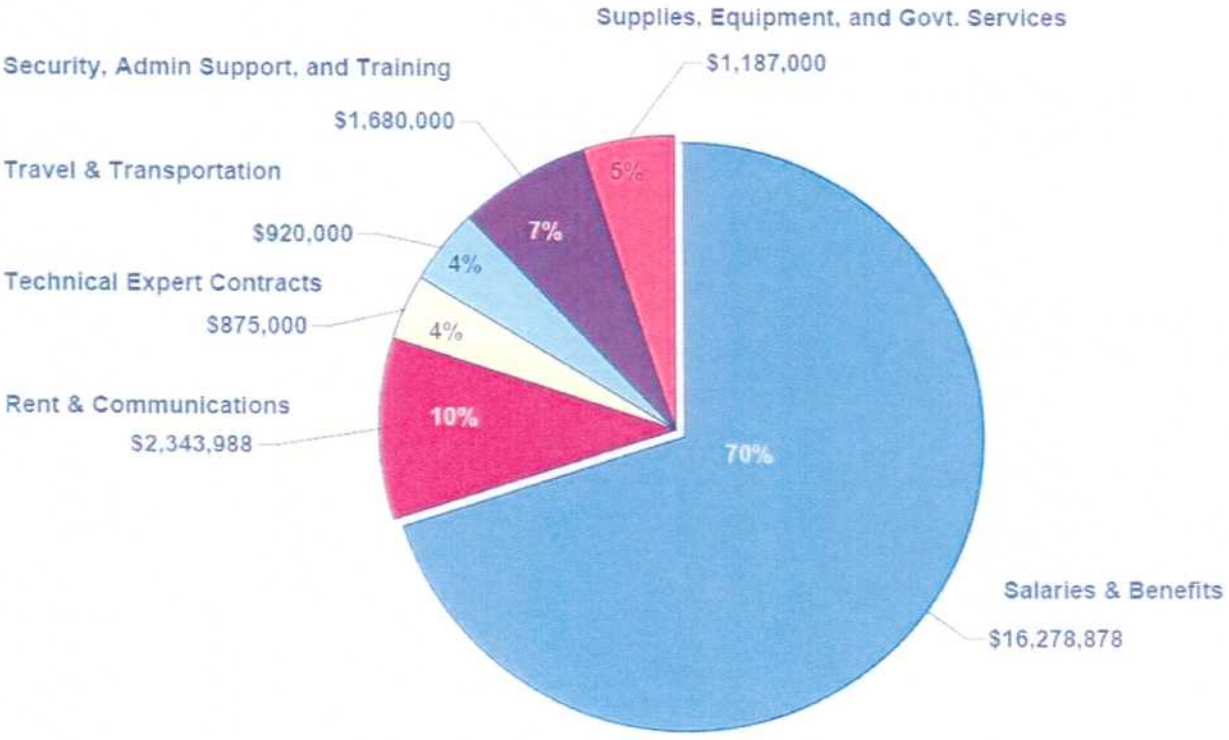
Defense Nuclear Facilities
Safety Board
FY 2008 Congressional Budget Request

PROPOSED APPROPRIATION LANGUAGE

SALARIES AND EXPENSES

For necessary expenses of the Defense Nuclear Facilities Safety Board in carrying out activities authorized by the Atomic Energy Act of 1954, as amended by Public Law 100-456, section 1441, [$22,260,000] $22,499,000 to remain available until expended. [*Energy and Water Development Appropriations Act, 2007*]

FY 2008 Total Projected Obligations = $23,284,866



Budget Request Summary

The Board's FY 2008 budget request for $22,499,000 and 98 FTEs includes funding for statutory increases in civilian salaries and associated employee benefits (e.g., employer contributions to employee health benefit and retirement accounts, matching Thrift Savings Plan contributions, etc.), as well as additional funding for recurring cost increases the Board experienced in FY 2006. A brief description of each requirement and associated funding request follows (a full explanation is included on the referenced page number):

	New Budget Authority	FTEs	Page Ref.
Baseline - FY 2007 Congressional Budget Request	$22,260,000	100	
Funding for full impact of FY 2007 civilian pay raise in FY 2008. [Note: this amount is the difference between the 2.3% pay increase included in the President's FY 2007 Budget and the approved 2.64% pay increase (including Washington, D.C. locality)—includes impact on employee benefits.]	$48,000		10
Funding for the proposed 3.1% civilian pay raise effective in January 2008. [Note: budget projection based on paying increased salaries and benefits for nine months in FY 2008—includes impact on employee benefits.]	$345,000		10
Funding for increased personnel benefits costs. [Note: budget projection based on increased benefits (e.g., health insurance premiums, retirement contributions, etc.) as a percentage of salaries.]	$215,000		11
Funding for increased travel costs. [Note: budget projection based on higher FY06 actual costs.]	$140,000		11
Funding for increased other services costs. [Note: budget projections for other services (administrative support contracts, training, etc.) based on increases relating to inflation, recruitment costs, and systems support.]	$175,000		11

	New Budget Authority	FTEs	Page Ref.
Funding for two (2) additional FTEs. [Note - reflects effects of FY 2007 Continuing Resolution and FTE level requested for FY 2008.] Salaries = 2 x $120,000 Benefits = 2 x $30,000 Relocation Costs = 2 x $25,000 Travel Costs = 2 x $10,000	($370,000)	(2)	12
Decreased Prior-Year Carryover. [Note: as a result of a full year Continuing Resolution in FY 2007, the estimated amount of the previous year's unobligated balance available at the start of FY 2008 is $323,000 less than the estimated amount in the President's FY 2007 Budget, i.e., $323,000 less is estimated as an available FY 2008 budgetary resource and must be offset by additional new budget authority.]	$323,000		12
Decreased Estimated End of Year Unobligated Balance [Note: the projected estimated unobligated balance at the end of FY 2008 is $637,000 less than the estimated amount in the President's FY 2007 Budget.	($637,000)		12
Total Cost of Additional Funding Requirements in FY 2008 Budget Request.	**$ 239,000**	**(2)**	
FY2008 New Budget Authority.	**$ 22,499,000**	**98**	

2. EXECUTIVE SUMMARY

The Defense Nuclear Facilities Safety Board's (Board) Fiscal Year 2008 Budget Request is for $22.499 million in new budget authority and 98 full-time equivalent staff years. The requested sum is necessary if the Board is to continue its vital health and safety oversight role with its unique scientific and technical expertise.

The Board plays a key role in maintaining the viability of this Nation's nuclear deterrent capability by:

- ensuring that the health and safety of the public and workers at the Department of Energy's (DOE) defense nuclear facilities located throughout the United States are adequately protected, as DOE attempts to maintain readiness of the nuclear arsenal, dismantle surplus weapons, dispose of excess radioactive materials, clean up surplus defense facilities, and construct new defense nuclear facilities;

- enhancing the safety and security at our Country's most sensitive defense nuclear facilities when hazardous nuclear materials and components are placed in more secure and stable storage configurations in response to the Board's oversight operations and recommendations; and,

- providing for the early identification of health and safety vulnerabilities, allowing the Secretary of Energy to address problems before they become national catastrophes.

The increase in new defense nuclear facilities in the design and construction phase will continue to have a significant impact on the Board's workload, as noted in this report's Major Health and Safety Oversight Changes section. DOE has more than 20 design and construction projects currently underway or planned for the near future to support the ongoing mission of the defense nuclear complex and cleanup of certain sites (see Exhibit A, page 14). The design and construction reviews have made substantial demands on the Board's technical oversight resources in specialty skill areas such as seismic engineering of structures, geotechnical reviews, concrete chemistry, systems engineering, and hazard analysis. The Board expects these demands to increase in response to recent Congressional direction for the Board and DOE to consider a more structured process for issue resolution. The Secretary of Energy has recognized the health and safety importance of the Board's past work in identifying safety issues, and relies on the Board's oversight to ensure that safety features are incorporated in the design of these new projects, as required by DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*. The slow resolution by DOE of some safety issues identified by the Board has recently resulted in significant impacts on cost and schedule of certain projects. The Board has conducted hearings on the early integration of safety into the design of new nuclear facilities. Detailed design and construction reviews are

resource intensive and time consuming, but are key to preventing safety flaws in design and construction.

DOE plans to modernize the weapons complex and develop a new nuclear weapon will also cause the Board to continue to reorient and adjust its oversight resources in 2008.

Maintaining a viable oversight program covering geographically dispersed defense nuclear programs is technically challenging, and maintaining a highly competent and experienced engineering staff is key to fulfilling this oversight mission. Seventy (70) percent of the Board's budget request for FY 2008 is dedicated to paying the salaries and benefits for 93 staff personnel and five full-time Board Members.

Since our technical oversight operations are directly dependent on the expertise of the staff, the Board is particularly concerned with the actual and projected loss of technical engineering competence due to retirements and movement to other organizations, both public and private. The competition within the public and private sectors for the engineering skills set the Board requires is intense due to growing demand for and decreasing numbers of qualified engineers. The growing demand is exacerbated by the recent resurgence of the commercial nuclear industry. The Board intends to continue to aggressively promote its intern program to increase the number of entry-level engineers as a long-term solution to its workforce needs.

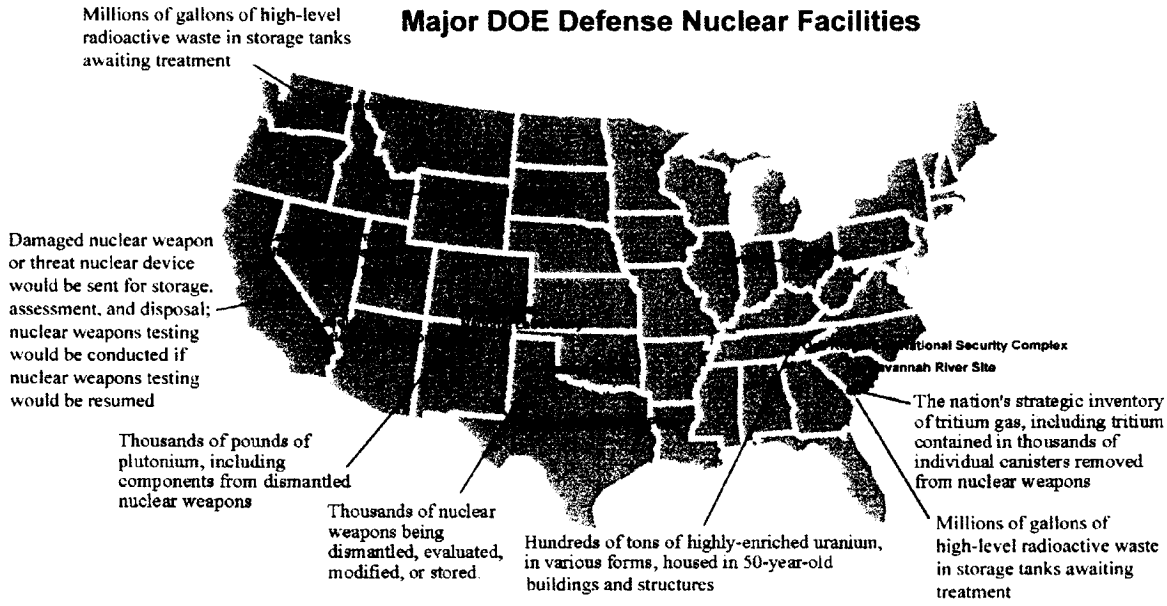
The Board began FY 2006 with eight engineer vacancies within its technical staff organization. During FY 2006, the Board lost three additional engineers. In the second half of FY 2006, the Board implemented a very aggressive recruiting campaign to replace key engineering talent losses at the mid-career level. As a result, the Board hired two engineers who reported for duty during FY 2006 and five engineers who have joined the Board's staff in FY 2007, and is continuing its aggressive hiring program to bring the technical staff up to full-strength in FY 2007.

In regard to non-engineering staff, the Board plans to continue its program to hire quality managerial and support personnel to maintain its small support staff. The Board has been successful in replacing such personnel and believes it can find the necessary personnel using the hiring flexibilities currently available. The Board intends to continue its policy of keeping the non-engineering staff as small as possible, consistent with inherently governmental function needs and the availability of external service providers.

As a result of its aggressive recruiting campaign and the filling of vacant Board Member positions, the Board has 94 encumbered positions at the time of this budget submission, and expects to fill the four remaining positions in 2007.

The Risks

The DOE nuclear weapons program remains a technically challenging and hazardous operation as the very nature of DOE's defense nuclear mission presents unique hazards. The Board conducts its oversight of DOE in order to ensure that public health and safety are adequately protected against the risks that exist in the defense nuclear complex. The following map of major DOE defense nuclear facilities and sites includes a few examples of the types of hazardous materials and operations of concern to the Board:



Unlike commercial nuclear facilities, DOE's nuclear weapons stockpile stewardship and management operations conducted at facilities such as the Pantex Plant in Texas and the Los Alamos National Laboratory in New Mexico are unique in that they include nuclear explosive activities and experiments involving collocated high explosives and nuclear material. The risks at these defense nuclear facilities are not solely a function of the quantities of nuclear material present and associated criticality safety concerns, but also the processes involved, which include the potential for explosive dispersal of radioactive materials or inadvertent nuclear detonation.

Tons of radioactive and toxic materials exist throughout the defense nuclear complex, and there are many pathways by which these hazards might be released, creating risks to the workers and the public. Consequently, the operation of many of DOE's defense nuclear facilities can pose significant hazards to the environment, the public, and the workers. Most of the facilities in the

complex were constructed many years ago and are deteriorating as they age. Earthquakes, extreme winds, floods, lightning, and other such natural phenomena can threaten the integrity of facilities or structures that confine hazardous materials.

Other potential release mechanisms include inadequate safety controls in new and old facility designs, human errors, equipment malfunctions, chemical reactions, fire, detonation of explosives, and inadvertent nuclear criticality events. Nuclear-related accidents in other countries underscore the significance of the risks in the DOE nuclear weapons operations. For example, on September 30, 1999, a nuclear criticality accident occurred at a nuclear fuel processing plant at Tokaimura, Japan. The accident occurred due to human error, serious breaches of nuclear material safety principles, and a mind-set that a criticality accident was incredible. The accident resulted in severe overdoses to three workers, of whom two died within a year of the accident. There have been no criticality accidents in the United States since 1978. However, many DOE facilities contain sufficient amounts of fissionable material such that the risk of an accidental criticality exists and must be controlled.

Also, unpredictable chemical reactions in materials used extensively in defense nuclear work have resulted in several accidents. In 1957, a liquid radioactive waste storage tank exploded at the Mayak, Russia, nuclear complex, contaminating an area equal to the size of New Jersey. It is estimated that this nuclear accident released twice the amount of curies of the Chernobyl reactor accident and forced the evacuation of 11,000 people. The DOE defense nuclear complex includes millions of gallons of radioactive liquid waste, which represents a source of hazard that must be addressed.

Management & Policy Overview

Identifying potential accident conditions and mitigating their consequences is very important for risk management. Safety is assured by working to understand and reduce the likelihood of events that are adverse to safety and by limiting the consequence of events if they do occur. In addition, safety is assured through robust systems that use multiple layers of protection such that no single layer is depended upon to ensure safety. This concept is called "defense in depth."

Considering the scope of the Board's oversight responsibilities and the risks involved, the Board must function as an oversight organization comprised of technical experts who can quickly recognize problems in the hundreds of hazardous operations conducted daily throughout the DOE defense nuclear complex. Safety oversight activities are prioritized predominantly on the basis of risks to the public and the workers; the types and quantities of nuclear and hazardous material at risk; and the process and setting of the operations involved. Assigning review priorities based on perceived risk levels is a continual process influenced by the technical expertise of the Board Members, as well as by reports from the Board's site representatives, staff issue papers, site visits, implementation plans for the Board's recommendations, responses to reporting requirements, correspondence from workers at DOE sites, testimony from public hearings and meetings, and Congressional inquiries. The Board's outcome measure of successful oversight operations is the

early identification of health and safety issues, long before these issues become significant problems and potentially, accidents that could threaten public health and safety and the continued viability of DOE's nuclear weapons and cleanup missions.

To conduct its oversight responsibilities, the Board has subject matter experts and field site representatives on staff, and also contracts for unique specialized technical expertise. To better oversee DOE's (especially the nuclear weapon-related) activities, the Board has established site offices at the Hanford Site (Washington), Lawrence Livermore National Laboratory, the Pantex Plant (Texas), the Y-12 National Security Complex (Tennessee), the Savannah River Site (South Carolina), and the Los Alamos National Laboratory (New Mexico). As site representative vacancies occur, the Board reassigns experienced headquarters staff to fill these demanding positions in the field and then backfills the technical vacancies at headquarters to ensure that it has the expertise to conduct oversight operations and to prepare suitable candidates for future field assignments.

An effective Board oversight program requires a determined, focused, and well-executed human capital plan and program. This program uses all available tools to attract and retain the technical talent necessary to accomplish the job that Congress has asked of the Board. After years of experience, the Board has determined that its technical staff requires scientists and engineers with extensive backgrounds in technical disciplines such as nuclear-chemical processing; conduct of operations; general nuclear safety analysis; conventional and nuclear explosive technology and safety; nuclear weapons safety; storage of nuclear materials; and nuclear criticality safety, and waste management. Essentially all of the technical staff have technical master's degrees, and approximately 20 percent have doctoral degrees. Because the Board's health and safety Recommendations and other advisories to the Secretary of Energy are based on in-depth technical information and detailed safety analyses, the recruitment and retention of scientific and technical staff members with outstanding qualifications continues to be critical to the successful accomplishment of the Board's mission.

The Board started FY 2006 with 58 technical staff on board out of 66 positions (88%). While the Board has attempted to plan for the loss of technical competence due to retirements and other attrition, the inability to replace all the technical staff lost over the past few years has challenged the Board's ability to provide adequate health and safety oversight of DOE's defense nuclear activities. During FY 2006, the Board lost three engineers due to retirement and attrition. The Board was able to offset two of the three losses with new hires in FY 2006 and has hired an additional five engineers to date in FY 2007 (while also losing an additional engineer to attrition). Thus, the Board has 61 of 66 planned technical staff (92%) positions filled. The competition for scientists and engineers with the Board's required expertise continues to be very stiff due to the expected growth of nuclear power generating capacity in the near future, the consequent need for increased commercial oversight by the Nuclear Regulatory Commission, Department of Defense's emphasis on combating weapons of mass destruction, and DOE's nuclear weapons complex activities. The Board must also plan for additional staff retirements that will further reduce our technical capabilities if action is not taken soon. Twenty (20) percent of the Board's technical staff are eligible for regular retirement today. In FY 2008, the number of technical staff eligible for retirement increases slightly to twenty-one (21) percent of our technical workforce. Clearly, the combination of an aging workforce and high

demand for experienced scientists and engineers by other organizations will impact Board operations if not dealt with in an aggressive manner.

To meet this current and future shortage of personnel, in the second half of FY 2006, the Board instituted a very aggressive approach to reach out to mid-career and senior-level scientists and engineers. This approach included a wide-ranging and multi-faceted advertising campaign to reach potential employees. This resulted in a sharp increase in resumes received and the hiring of six engineers as noted above, with several additional offers currently pending. The Board will continue this aggressive approach until a full complement of technical personnel are on board.

In addition to continuing our recruitment of experienced scientific and engineering talent to fill immediate staff needs, the Board also needs to focus its recruiting effort on attracting the next generation of scientists and engineers. The Board developed and previously implemented a three-year Professional Development Program (PDP). This recruitment and development program brings entry-level technical talent into professional positions within the Board. Through a technical mentor, individuals are provided a series of individually tailored developmental assignments, formal academic schooling, and a one-year, hands-on field assignment. This is a highly competitive program designed to attract the next generation of scientific and technical talent to Federal service through an extensive college recruiting program. The Board plans to continue this program at a level averaging two new PDP candidates per year using its FTE authority.

The Board currently has two vacancies (out of 29 positions) in the Offices of the General Counsel (OGC) and the General Manager (OGM). A candidate has accepted an offer for one of the positions and is expected to be onboard at the time of this budget submission. Finally, with the addition of two new Board Members in October, the Board is operating with its full complement of five Board Members for the first time in almost two years. The net impact of aggressive hiring and filling of vacant Board positions means the Board expects to have 94 encumbered positions at the time of this budget submission and outstanding offers for the remaining 4 positions it projects to have the resources to fill.

Major Health and Safety Oversight Changes

The DOE weapons complex and DOE's management thereof is in the midst of major changes. As a result, the Board needs to adapt to meet this challenge and its budget request is structured to respond to these changes.

Increased Oversight of New DOE Design and Construction Projects

The Board is required by law to review the design of each new Department of Energy defense nuclear facility before construction of such a facility begins and to recommend to the Secretary such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety. In FY 2008, the Board will continue to review the ongoing design effort, as well as the construction activities of at least 20 DOE defense nuclear facilities currently underway or

planned for the near future. Exhibit A provides a summary of the status' of the various DOE projects that the Board is monitoring. (See page 52 *Nuclear Facilities Design & Infrastructure* for a full discussion of these projects.)

The Board plans to concentrate its oversight attention on the projects with the highest risk, significance, and complexity. One prominent example of a high risk, new facility undergoing both design and construction is the Waste Treatment Plant (WTP) in Richland, Washington. The WTP project consists of three major nuclear facilities to pretreat and vitrify high-level waste stored in underground tanks at Hanford and an analytical laboratory. This project, now estimated to cost in excess of $11.0 billion, has evolved from a facility designed to treat only 10 percent of the tank waste at Hanford to one that is proposed to be used to process all of the high-level waste inventory from the underground tanks by 2028. WTP is a complex, high risk program that has constantly changing design and construction parameters and will require more than 15 years to complete. The design and construction activities for the WTP plant slowed in 2005 and 2006 due to seismic concerns and budget questions but are expected to ramp up significantly by 2008.

The design and construction reviews conducted by the Board on WTP and other new DOE facilities will help to identify and preventing safety flaws in design and construction that could render a newly constructed facility unusable. These reviews are necessarily resource intensive and time consuming in order to respond to DOE activities.

The Board has identified the following areas of expertise it will require either in-house or through contract support to conduct the technical reviews:

- Highly specialized skills in areas such as seismic engineering of structures and geotechnical reviews that are necessary for the technical oversight reviews of new DOE projects. The Board plans to use technical contract funds in FY 2008 to fill this need.

- Additional structural and mechanical engineering expertise to evaluate the design, selection, and installation of safety-related mechanical systems such as ventilation systems, process piping, pumps and valves, and to evaluate technical issues that continue to evolve, such as core drilling to support the final seismic design.

- Expertise in safety analysis is a broad area of continuing need for the Board to support the development of adequate safety controls for new defense nuclear facilities, as well as the upgrading of the safety bases for existing facilities.

- Additional chemical process and nuclear waste vitrification expertise to provide technical oversight of the complex WTP processes, as well as numerous other nuclear facilities, such as the Salt Waste Processing Facility and the Plutonium Disassembly and Conversion Facility at the Savannah River Site, the Plutonium Vitrification Project being planned for the K-Reactor at the Savannah River Site, the

Demonstration Bulk Vitrification Facility at the Hanford Site, and the Integrated Waste Treatment Unit at the Idaho National Laboratory.

- Expertise in fire protection detection and suppression systems to ensure these key safety controls are designed, installed, and maintained correctly.

On September 29, 2006, *House Conference Report 109-702 on the National Defense Act for Fiscal Year 2007* (H.R. 5122) was released and approved by both houses of Congress. The Conference Report, Section 3201, noted the conferees' concern regarding the untimely resolution of technical issues raised by the Board and that the Board and DOE would benefit from a more structured process for issue resolution that would allow issues to be raised, evaluated, and adjudicated at logical points in the design and construction process. The report directed the Board and DOE to continue discussions on a process for more timely identification and resolution of technical differences concerning design standards, and to report jointly to the Congressional defense committees on these efforts, including recommendations, if any, for legislation that would strengthen and improve the Board's technical safety oversight of DOE. Implementing a more structured process has the potential to significantly increase the Board's oversight workload. The Board will be assessing the effects of any such changes, make appropriate adjustments within its FY 2007 and 2008 budget authorities, and factor additional resource needs into the Board's 2009 Budget Request.

The above changes and challenges of DOE's design and construction program will require the Board to shift resources in 2008 to meet changing priorities as DOE projects approach Critical Decision points.

Safety of Nuclear Weapon Activities

To maintain this Nation's nuclear deterrent, DOE is accelerating its programs to extend the life of weapons in the enduring stockpile, requiring more and increasingly complex operations to disassemble, refurbish, reassemble, and re-certify nuclear weapons and components. DOE's nuclear weapons stockpile stewardship and management operations require particular Board oversight attention due to the hazards associated with the nuclear explosive activities and experiments involving collocated high explosives and nuclear material.

The focus of overseeing nuclear weapon activities involves preventing potential devastating accidents in the nuclear weapons complex. The Board must provide comprehensive and effective oversight to ensure that an accident with the absolutely unacceptable consequence of a nuclear detonation never occurs. Key to this prevention is for the Board to have competent safety expertise in the area of high explosives, which could trigger an accidental nuclear detonation. Inadvertent nuclear detonation could occur at:

- the Pantex Plant during nuclear explosive operations, or

- at the Nevada Test Site (NTS) while working on a damaged nuclear weapon or an improvised nuclear device.

In response to Congressional oversight and criticism, based on the findings of the Defense Science Board, DOE has begun implementing plans to increase throughput in the weapons complex. The Board anticipates that DOE will increase the operational tempo of nuclear explosive operations at the Pantex Plant due to increased requirements to maintain surveillance of our aging stockpile, particularly in the absence of underground testing, and pressure from various sources to dismantle our retired nuclear weapons as we draw down our nuclear weapons stockpile. Production operations at the Y-12 National Security Complex in Tennessee will increase in order to continue to provide essential support to the enduring stockpile. The vintage defense nuclear facilities at Y-12 are particularly in need of replacement, and the Board will oversee DOE's efforts to ensure the safety of the challenging task of operating aging facilities at a high tempo while designing, constructing, and making the transition to modern replacement facilities.

The National Nuclear Security Administration (NNSA) has recently begun work on the Reliable Replacement Warhead (RRW) at its nuclear laboratories. One of the goals of RRW is improved safety in its manufacture and maintenance. The Board will provide nuclear safety oversight of this activity to ensure that the promised safety improvements are achieved.

The Board anticipates the need to shift the equivalent to two FTEs in FY 2008 from other work to oversee high explosive operations (particularly with respect to high explosives reaction in abnormal environments such as fires or drops/impacts) and nuclear weapon design, production, and testing.

Nuclear Materials Processing and Stabilization

In the arena of nuclear materials processing and stabilization, the Board oversees the high-level waste (HLW) stored in underground tanks at the Savannah River Site (SRS). DOE stores more than 34 million gallons of HLW in 49 HLW tanks at SRS, and the aging systems within the tank farms and the shrinking volume of free space in the tanks pose significant health and safety risks for DOE and its contractor. DOE plans to separate HLW liquids, salts, and sludges, treat each waste stream, and stabilize the waste for packaging and final disposal. This is a complex and hazardous process and requires DOE to work closely with many local and national regulators and stakeholders.

The Board has issued several letters and Recommendations regarding the HLW system at SRS, including Recommendation 2001-1, *High-Level Waste Management at the Savannah River Site*, which is still very much applicable. On this topic, the Board has interacted closely with DOE, the SRS contractor, the State of South Carolina, and the appropriate committees of the U.S. Senate and House of Representatives.

The Board's oversight at SRS encompasses a wide variety of technical safety issues related to the chemical treatment of wastes and to the design, construction, and operation of waste treatment facilities. Examples of these technical safety issues at SRS include:

- targeted retrieval of low-curie salt waste from HLW tanks without adding excess dissolution water to the HLW system,

- design and construction of an Actinide Removal Process for pretreatment of salt wastes,
- design and construction of a modular cesium removal unit for the pretreatment of salt wastes,
- modifications to and subsequent operation of the Saltstone Disposal Facility for disposal of low-curie salt wastes,
- treatment of unique organic compounds and HLW in Tank 48,
- design, construction and operation of the Salt Waste Processing Facility, which would serve to treat the bulk of the HLW in the SRS Tank Farms,
- coordinated operation of HLW evaporators to avoid introduction of incompatible waste forms to an evaporator,
- coordinated sludge washing and retrieval to maintain a feed stream to the Defense Waste Processing Facility (DWPF),
- assuring adequate tank space to accommodate recycle water from the DWPF, and
- final cleanout and closure of the HLW tanks.

Additional Funding Needs

The Board's budget request includes funding to pay for the nondiscretionary cost increases resulting from Federal pay raises that exceeded the amount in the President's budget request for FY 2007 and to compensate for the projected January 2008 pay raise, as well as for projected cost increases in personnel benefits, travel, and other services based on actual FY 2006 expenses. An explanation of each requirement and associated funding impact and object class (OC) is discussed as follows:

Fully Fund the Salaries and Benefits Account for FY 2008 (OC 10)

During the past several fiscal years, the enacted civilian pay raises have exceeded the pay raise factors that were included in the President's budget requests. Since an agency's budget request for salary and benefit funds includes an allowance for the President's proposed pay increase, any increase in this pay raise above the President's request must be absorbed by each agency as the funding authorized and appropriated for each agency is not otherwise adjusted to reflect the actual pay raise. With 70 percent of the Board's budget dedicated to paying for staff salaries and benefits, the Board is unable to absorb pay increases without a corresponding staff reduction. The financial impact of these unfunded cost-of-living pay increases is especially severe since the Board does not have the financial flexibility to recover from shortfalls in our salary and benefits account.

The Board needs additional funding to help pay for the out-year impacts of the 2.64 percent (including Washington, D.C. locality) and 3.1 percent increases in January 2007 and January 2008 respectively. An additional $48,000 is needed to fund the full impact of the FY 2007 civilian pay raise at the 2.64 percent level for FY 2008, as well as an additional $345,000 to fund the President's proposed FY 2008 civilian pay raise of 3.1 percent effective in January 2008. Without additional new budget authority to absorb these additional personnel costs the Board would be forced to operate

without the equivalent of 2-4 employees, which would jeopardize its ability to carry out its responsibilities.

Funding for Increased Employee Benefits Costs (OC 12)

For the FY 2007 budget request, the Board estimated its recurring, non-discretionary employee benefit costs (e.g., contributions to health insurance, FICA, retirement funds, Thrift Savings Plan (both automatic and matching contributions for FERS employees), etc.) at approximately 23.9% of salaries. In FY 2006 those costs were almost 26% of salaries and an analysis of FY 2004 and FY 2005 actuals indicate a definite upward trend in these costs. Employee benefits in the FY 2008 budget request are estimated at 25.7% of personnel salaries. This results in an additional $215,000 in employee benefits costs over and above the amount included in the FY 2007 President's Budget after taking into account the aforementioned pay raises. Without additional new budget authority to absorb these additional personnel costs the Board would be forced to operate without the equivalent of 1-2 employees, which would jeopardize its ability to carry out its responsibilities.

Funding for Increased Travel Costs (OC 21)

Board members and the technical staff travel extensively to the various DOE defense nuclear facilities located throughout the United States in order to conduct first-hand assessments of operations and associated health and safety issues. The levels of DOE activity and increased Congressional interest in facilities such as the Hanford Site's WTP have caused the Board to travel more. FY 2006 travel costs ran significantly above the amount included in the President's FY 2007 Budget when factoring in that Board operated most of the year at less than 90% of its budgeted FTEs. Moreover, significant increases in fuel costs portend additional increases in airfare costs in the coming years. Travel costs in the FY 2008 Budget Request are estimated based on FY 2006 actuals adjusted for a full workforce. This results in an additional $140,000 in travel costs over and above the amount included in the President's FY 2007 Budget.

Funding for Increased Other Services Costs (OC 25.2)

Other Services includes a wide range of the Board's recurring administrative support needs such as the independent audit of the Board's financial statements, physical and cyber security, employee training, information technology support, and recruitment advertising. This funding includes $100,000 budgeted for the independent audit of the Board's financial statements. In addition, staff of the Board's Office of the General Manager (OGM) devote approximately 2 FTE (10% of the entire OGM staff) to provide the information to the auditors and meet other requirements while they are on-site.

For FY 2008 the Board is requesting an additional $175,000 in new budget authority for increased contract costs due to inflation ($50,000), increased recruitment advertising ($50,000), and Certification and Accreditation (C&A) support of Information Technology (IT) systems ($75,000). The Board's primary administrative support contracts were negotiated with increases of 3.6%, which equates to an approximate $50,000 increase from FY 2007 to FY 2008. In addition, the Board

experienced significantly higher recruitment costs in FY 2006 ($105,000) than the approximately $50,000 it has historically incurred (and what was estimated for the FY 2007 Budget Request) due to the need to fill technical staff vacancies. The types of experienced scientists and engineers required by the Board are in high demand and an ongoing, extensive recruiting effort is necessary to replace technical employees lost through attrition. Recruitment costs include print and radio advertisements, trade show materials, and conference registration fees. With greater than twenty percent of its current technical employees eligible for retirement in FY 2008, the Board anticipates having to continue this level of recruiting and requires new budget authority in that amount. Finally, the Board anticipates having to contract for C&A support on its software systems in order to meet its Federal Information Security Management Act (FISMA) obligations. The Board has not previously contracted for that work and thus the costs (estimated at $75,000) were not factored into the FY 2007 Budget Request, requiring new budget authority in that amount.

Impact of a Full Year FY 2007 Continuing Resolution

Based on a full year Continuing Resolution under current scoring guidelines, the Board will receive new budget authority of $19.8M in FY 2007, which is $2.5M less than the $22.3M included in the President's FY 2007 Budget. The net effect of that reduction, even after paring FY 2007 obligations to the minimum required to maintain operations, is to reduce the originally projected carryover to FY 2008 to $797,495 based on ending FY 2007 with a staff of 98. Additionally, the Board will defer its planned information technology equipment life-cycle replacement program and its security upgrade program until FY 2009 and maintain 98 FTEs in FY 2008. The Board has consistently budgeted for a minimum of $500,000 in unobligated carryover at the start of the fiscal year since the start of operations in FY 1990 in the event that the Board must respond to a serious nuclear emergency at a DOE defense nuclear facility. Emergency situations may include assisting DOE in assessing the disposition of damaged nuclear weapon or improvised nuclear devices such as a terrorist dirty bomb, or a significant safety issue encountered in the routine dismantlement of a nuclear weapon requiring immediate attention. Emergency expenses would include the cost of mobilizing a response team of Board employees and outside technical experts, traveling to the location of the emergency, and remaining in the field as long as necessary until the situation is safely resolved. This funding is especially important when the Board has been required to operate under a continuing resolution or an appropriations hiatus. Examples of when the Board has had to draw upon its reserve include the tritium leak into the Savannah River during the attempted restart of the K Reactor at SRS during the Christmas/ New Year week in the early 1990's, and the appropriations hiatus in early FY 1995 when the Board continued to operate while other agencies had to shut down all non-essential services . The impact of the full year Continuing Resolution in FY 2007 does not allow such a reserve to be maintained in FY 2008 without reducing necessary technical staff.

Conclusion

The Defense Nuclear Facilities Safety Board requests additional funding of $239,000 in FY 2008 over its FY 2007 Congressional Budget Request to fulfill the Board's statutory health and safety responsibilities. The Board's role in providing independent oversight of health and safety issues throughout the DOE defense nuclear complex for the Secretary of Energy, the Administration, and the Congress places intense pressure on our ability to provide timely and accurate assessments. The Board is the last line of defense in preventing costly mistakes and tragic accidents from occurring in very complex, dangerous programs.

Planned or Underway DOE Construction Projects (Exhibit A)

SITE	FACILITY	TOTAL PROJECT COST ($M)	STATUS - January 2007		
			Critical Decision Approved	Design Completion	Construction Completion
Hanford Site	**Waste Treatment Plant**	$12,200			***(Operational 2018)***
	a. Pretreatment Facility		CD-3	65%	25%
	b. High Level Waste Treatment Facility		CD-3	75%	20%
	c. Low Activity Waste Facility		CD-3	90%	45%
	d. Analytical Laboratory Facility		CD-3	80%	25%
	Demonstration Bulk Vitrification System Project	$190	CD-1	90%	Not Started. Some site and foundation work. ***(Operational 2011)***
	K-Basin Closure Project Sludge Treatment	$100	Not formally implementing critical decision process	90%	Starting ***(Operational 2007)***
	Tank Retrieval and Waste Feed Delivery System	$250	One sub-project is not using the formal critical decision process.	Various degrees of completion.	Various degrees of completion. ***(Operational to be determined)***
	Immobilized High-Level Waste Interim Storage Facility	$100	CD-3	90%	Deferred ***(Operational to be determined)***
Idaho National Laboratory	**Integrated Waste Treatment Unit project**	$425	CD-2/3B	70%	Not Started ***(Operational 2009)***

SITE	FACILITY	TOTAL PROJECT COST ($M)	STATUS - January 2007		
			Critical Decision Approved	Design Completion	Construction Completion
Los Alamos National Laboratory	**Chemistry and Metallurgy Research Replacement Project**	$975	CD-1	60%	Some ground work (*Operational 2014*)
	Technical Area 55 Reinvestment Project	$72	Phase A: CD-2 Phase B: CD-0	60%	(*Complete 2010*) (*Complete 2014*)
	Upgrades to Pit Manufacturing Capability at Tech Area 55	Annual funding	Not formally implementing critical decision process		work ongoing
	Radioactive Liquid Waste Treatment Facility Upgrade Project	$96	CD-1		(*Operational 2011*)
	New Solid Transuranic Waste Facility Project	$40	CD-0	60%	(*Operational 2011*)
	Nuclear Material Safeguards and Security Upgrades Project Phase 2	$240	CD-1	30%	(*Operational 2013*)
	Tech Area 55 Radiography Project	$38	CD-0	90% on hold	(*Operational 2010*)
Nevada Test Site	**Device Assembly Facility -- Criticality Experiments Facility**	$150	CD-2	90%	Not Started (*Operational 2009*)
Pantex Plant	**Component Evaluation Facility**	$112	CD-0		**(Operational on hold)**

SITE	FACILITY	TOTAL PROJECT COST ($M)	STATUS - January 2007		
			Critical Decision Approved	Design Completion	Construction Completion
Savannah River Site	**Pit Disassembly and Conversion Facility**	$1,700	CD-1	50%	Not Started (***Operational on hold***)
	Salt Waste Processing Facility	$660 being reevaluated	CD-1	30%	Not Started (***Operational 2011***)
	Container Surveillance and Storage Capability Project	$130	CD-1	30%	Building Preparations Started (***Operational 2010***)
	Plutonium Disposition Project	$500	CD-0	10%	Not Started (***Operational 2013***)
Y-12 National Security Complex	**Highly Enriched Uranium Materials Facility**	$500	CD-3	100%	40% (***Operational 2009***)
	Uranium Processing Facility	$1,500	CD-0	10%	Not Started (***Operational 2017***)
Oak Ridge National Laboratory	**Building 3019 -- Uranium-233 Downblending and Disposition Project**	$371	CD-1	90%	Not Started (***Operational 2012***)

Annual Performance Budgeting Objectives for Fiscal Year 2008

The Defense Nuclear Facilities Safety Board (Board) is an independent Executive Branch agency charged by statute with a broad mission of providing technical health and safety oversight of the Department of Energy's (DOE) defense nuclear facilities and activities.

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

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

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

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

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

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

To facilitate strategic management, the Board has organized its technical staff into four groups. The Technical Lead of each group is assigned responsibility for one of the four performance goals in the strategic plan, and for executing the performance objectives associated with that goal. As required by the Office of Management and Budget (OMB) guidance governing compliance with the Government Performance and Results Act of 1993, the Board has produced measurable performance goals for Fiscal Year (FY) 2007 and FY 2008 that, when executed, will demonstrate continued progress toward the Board's goals. These annual performance objectives and measures establish projected levels of performance and reflect the nature of the Board's independent oversight function.

The Board's objectives as outlined in its strategic plan address multi-year efforts and encompass a broad spectrum of technical areas relevant to the safety of DOE's defense nuclear mission. The Board's *Annual Performance Plan for FY 2008* identifies annual performance objectives that consist of technical issues to be evaluated in support of the Board's strategic plan, and the identification of specific candidate topics for these reviews. An outcome measure for each

objective is described as part of the discussion of each annual performance goal. Assessments of the outcome associated with each annual performance goal are provided in the Board's annual performance reports.

The Board measures progress toward achieving the positive outcomes embedded in each annual performance goal in three stages, by evaluating:

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

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

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

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

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

To facilitate an integrated review, the tables in the four major performance goals that follow are formatted to show the flow-through from the general objective set forth in the Board's Strategic Plan to the specific Annual Performance Objectives for FY 2007 and FY 2008. To place this planning information in context, the performance goals are followed by examples of the Board's accomplishments during the years FY 2003 through FY 2006, as required by OMB's instructions on preparing and submitting a performance budget.

The examples provided in the four major performance goals do not represent the entire scope of progress made on the FY 2006 Performance Goals pending September 2006 accomplishments. A comprehensive assessment of progress during Calendar Year (CY) 2005 appears in the Board's *Sixteenth Annual Report to Congress*. The Board's *Seventeenth Annual Report to Congress*, due for publication in early 2007, will cover accomplishments during CY 2006. The Board's annual performance reports are available for review on the Internet at www.dnfsb.gov under the *Public Documents/Reports to Congress* search headings.

3. PERFORMANCE GOAL 1: NUCLEAR WEAPON OPERATIONS

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

OUTCOME: DOE will have acknowledged, acted upon, and/or resolved the health and safety issues raised by the Board. Follow-up technical evaluation of DOE's nuclear stockpile activities will verify necessary improvements in safety.

SUMMARY:

Focused oversight of nuclear weapon activities at the Pantex Plant, in response to stockpile reduction initiatives, life extension programs, and efforts to increase throughput for stockpile surveillance operations, will continue to be a major priority for the Board in Fiscal Year 2008. Ongoing programmatic operation of aged facilities at the Y-12 National Security Complex (Y-12), in parallel with preparations to construct and transition into modern facilities, will likewise present the need for significant safety oversight activities by the Board. The relocation of hazardous missions to the Nevada Test Site (NTS) and operation of a major new tritium facility at the Savannah River Site will also be focus areas for the Board's safety oversight. Key areas of safety oversight for the Board in Fiscal Year 2008 will include:

- *Nuclear Explosive Operations*—DOE's efforts to increase the operational tempo at Pantex are expected to continue, due to increased requirements to evaluate our aging stockpile, as well as the need to dismantle retired weapons as we draw down our nuclear weapons stockpile.

- *Y-12 Modernization*—The Board will need to carefully evaluate continued programmatic operations at Y-12, particularly the need for upgrades to preserve safety in aging facilities that are overdue for replacement. Safety oversight is also needed for activities required to transition to new facilities (e.g., processing and packaging materials for transfer to the Highly Enriched Uranium Materials Facility, which is presently under construction).

- *Nevada Test Site Nuclear Activities*—There is significant work to be done for DOE to develop a capability at NTS to disposition a damaged nuclear weapon or improvised nuclear device. In addition, further subcritical experiments are expected to be conducted at NTS in support of nuclear weapon programs. Finally, the Nation's single capability to perform nuclear criticality experiments is being moved from Los Alamos National Laboratory (LANL) to NTS. The Board will be required to assess the safety of criticality operations at NTS in FY 2008.

- *Safety Upgrades at the National Laboratories*—Safety-related events in FY 2005 led to the shutdown of nonessential activities at LANL, and operations at the Lawrence Livermore National Laboratory (LLNL) plutonium facility later were curtailed based on assessments of its safety programs. Similarly, reviews by the Board at the Sandia National Laboratories (SNL) found extensive deficiencies in the authorization bases and safety programs for its nuclear facilities. Resolution of the underlying safety-related deficiencies will take DOE and the laboratories years. In addition, transition to a new operating contract at LLNL is expected to result in the need for additional safety oversight, as has been required during the contract transition at LANL.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2008 Performance Objectives

The Board and its staff will verify the safety of DOE's defense nuclear facilities and activities relating to the maintenance, storage, and dismantlement of the nuclear weapon stockpile, quality assurance of the stockpile, as well as its associated research and development, and the capability to test nuclear weapons and disposition damaged or improvised nuclear devices (such as a terrorist device).

The Board and its staff will conduct assessments of DOE's efforts to develop and implement safety management systems for stockpile management activities. The Board's evaluations will be split between DOE efforts to develop safety systems (e.g., system and process designs, safety bases, control schemes, and administrative programs) and DOE efforts to implement safety management systems. These reviews will focus on activities at the Pantex Plant, Y-12 National Security Complex (Y-12), Savannah River Site (SRS) tritium facilities, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), and the Nevada Test Site (NTS).

Representative areas for Board and staff review include:

- Development, implementation, and refinement of site-wide and facility-specific safety analyses and controls for nuclear facilities and activities (e.g., safety analysis reports and annual updates developed per 10 CFR 830).
- Weapon-specific safety analyses and controls identification and implementation for nuclear weapon activities (e.g., W76, B53, W80, W83, and W88).
- Nuclear explosive operations at Pantex (e.g., conduct of operations, process documentation, tooling).
- Laboratory support of nuclear explosive operations at Pantex (e.g., sensitivity testing of high explosives, electrostatic discharge studies, weapon response evaluation and documentation).
- Cross-cutting functional areas at Pantex, Y-12, LANL, LLNL, or SRS tritium facilities (e.g., legacy material disposition, nuclear criticality safety, fire protection, nuclear explosive safety, seismic design, conduct of operations, work planning, training, maintenance, configuration management).
- Special studies of unique or significant hazards at DOE nuclear facilities (e.g., classified projects, process technology alternatives, and disposition of special items and by-product materials).
- Plans for the management of special nuclear material at Y-12 during the transition period before the new Uranium Processing Facility is designed and constructed.
- Startup preparations for the Highly Enriched Uranium Materials Facility.
- Modernization plans for Y-12, including the Beryllium Capability Project, accelerated dismantlement of weapons components, and infrastructure upgrades.
- Corrective actions related to Uranium Holdup Survey Program at Y-12, and development of the next generation program.
- Plutonium pit manufacturing and certification at LANL.
- Corrective actions to strengthen institutional safety programs and infrastructure at LANL and LLNL.
- Readiness to dispose of damaged nuclear weapons or improvised nuclear devices at NTS.
- Subcritical experiments at NTS.
- Readiness to resume underground nuclear weapons testing at NTS, if testing were to resume.
- Readiness for nuclear explosive operations at the Device Assembly Facility at NTS.
- Preparations for criticality reactor (Criticality Experiments Facility) operations at the Device Assembly Facility at NTS.
- Age-related changes in nuclear weapons components for weapon systems in the enduring stockpile.
- Implementation of Recommendation 2005-1, *Nuclear Material Packaging*.

While performing its reviews, the staff will assess the effectiveness of ISM implementation and the safety controls identified for ongoing operations as well as any new weapon system dismantlement projects at Pantex, Y-12, or NTS that start in FY 2008.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2007 Performance Objectives

The Board and its staff will verify the safety of DOE's defense nuclear facilities and activities relating to the maintenance, storage, and dismantlement of the nuclear weapon stockpile, quality assurance of the stockpile, as well as its associated research and development, and the capability to test nuclear weapons and disposition damaged or improvised nuclear devices (such as a terrorist device).

The Board and its staff will conduct assessments of DOE's efforts to develop and implement safety management systems for stockpile management activities. The Board's evaluations will be split between DOE efforts to develop safety systems (e.g., system and process designs, safety bases, control schemes, and administrative programs) and DOE efforts to implement safety management systems. These reviews will focus on activities at the Pantex Plant, Y-12 National Security Complex (Y-12), Savannah River Site (SRS) tritium facilities, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), and the Nevada Test Site (NTS).

Representative areas for Board and staff review include:

- Development, implementation, and refinement of site-wide and facility-specific safety analyses and controls for nuclear facilities and activities (e.g., safety analysis reports and annual updates per 10 CFR 830).
- Weapon-specific safety analyses and controls identification and implementation for nuclear weapon activities (e.g., W76, B53, B83, W80, W88).
- Nuclear explosive operations at Pantex (e.g., conduct of operations, process documentation, tooling).
- Laboratory support of nuclear explosive operations at Pantex (e.g., sensitivity testing of high explosives, electrostatic discharge studies, weapon response evaluation and documentation).
- Cross-cutting functional areas at Pantex, Y-12, LANL, LLNL, or SRS tritium facilities (e.g., legacy material disposition, nuclear criticality safety, fire protection, nuclear explosive safety, seismic design, conduct of operations, work planning, configuration management).
- Special studies of unique or significant hazards at DOE nuclear facilities (e.g., classified projects, process technology alternatives, and disposition of special items and by-product materials).
- Relocation of Quality Evaluation activities at Y-12.
- Plans for the management of special nuclear material at Y-12 during the transition period before the new enriched uranium facilities are designed and constructed.
- Modernization plans for Y-12, including the Beryllium Capability Project, accelerated dismantlement, and infrastructure upgrades.
- Implementation of the Documented Safety Analysis for the Building 9212 Complex at Y-12.
- Corrective actions related to Uranium Holdup Survey Program at Y-12, and development of the next generation program.
- Startup testing with tritium gas in the Tritium Extraction Facility at SRS
- Plutonium pit manufacturing and certification at LANL.
- Corrective actions to strengthen institutional safety programs and infrastructure at LANL and LLNL.
- Preparations to dispose of damaged nuclear weapons or improvised nuclear devices at NTS.
- Readiness to resume underground nuclear weapons testing at NTS, if testing were to resume.
- Readiness of the Device Assembly Facility for nuclear facility operations.
- Preparations for criticality reactor (Criticality Experiments Facility) operations at the Device Assembly Facility at NTS.
- Age-related changes in nuclear weapons components for weapon systems in the enduring stockpile.
- Implementation of Recommendation 2005-1, *Nuclear Material Packaging*.

While performing its reviews, the staff will assess the effectiveness of ISM implementation and the safety controls identified for ongoing operations as well as any new weapon system dismantlement projects as Pantex, Y-12, or NTS that start in FY 2007.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2006 Performance Accomplishments

Nuclear Explosive Safety Top Down Review. DOE has made significant improvements to the Nuclear Explosive Safety process in the past several years; however, because of continuing problems, the Board and DOE agreed in May 2004 that a Top-Down Review of the process was needed to harmonize the directives, eliminate conflicts and redundancy, determine whether the requirements were adequate, and elevate key requirements to a level in the directives system commensurate with their safety significance. The Board participated in this effort, and DOE briefed the Board on the results in January 2006. Forty-three issues had been developed and considered, and action was recommended on almost half of these. Implementation of some of the recommended corrective actions was initiated promptly; however, others have been on hold pending the completion of a DOE review of production throughput at Pantex.

Revised Nuclear Explosive Safety Directives. In response to the Board's observations, DOE has revised and updated key nuclear explosive safety directives, including DOE Order 452.1C, *Nuclear Explosive and Weapon Surety Program*; DOE Order 452.2C, *Safety of Nuclear Explosive Operations*; and DOE-STD-NA-3016-2006, *Hazard Analysis Reports for Nuclear Explosive Operations*. While the new version of DOE-STD-NA-3016 improves over the previous revision in certain areas, key details regarding weapon response development have been left for the design laboratories to define. This issue will be the subject of Board reviews in FY 2007.

Pantex Cell Gap Analysis. The Board evaluated calculations of leakage through cell gaps performed to better understand the consequences of potential accidents at the Pantex Plant. Based on these calculations, leakage through cell gaps does not appear to be an issue for single-unit operations. However, there is still a concern that accident consequences for multi-unit operations involving certain systems in certain facilities could challenge the evaluation guidelines. Additional calculations and testing may be needed to provide assurance that the evaluation guidelines will not be challenged for multi-unit operations.

Electrostatic Discharge (ESD). The Board evaluated efforts by the Pantex Plant contractor and the weapon design agencies to characterize ESD insult environments and the responses of sensitive components to them. Progress has been made in defining the environments and the hazards posed by them; however, the Board has identified the need for additional clarification with respect to furniture (e.g., tooling and equipment) ESD, capacitive coupling between the insulting objects and other nearby charged objects, the assumption of electrical isolation of tools within the established standoff boundary, and resonance conditions and effects.

Special Tooling Program at Pantex. In a letter dated December 15, 2004, the Board expressed concern that continuing weaknesses in the Special Tooling Program could have an adverse impact on the safety of nuclear explosive operations. In response, DOE conducted a comprehensive, independent review of tooling program deficiencies and committed to implement corrective actions to improve the tooling program. The Board reviewed the program in March 2006 and determined that it had significantly improved, thereby improving the safety and efficiency of nuclear explosive operations that rely on specially designed tools to eliminate or minimize hazards.

W56 Dismantlement at Pantex. The Board evaluated process development and execution of the W56 dismantlement campaign at Pantex. The Board urged DOE to ensure that laboratory expertise, both active and retired, was applied to resolve technical challenges that arose to help ensure the safe and successful completion of the dismantlement campaign. Dismantlement of all W56 war reserve units was safely completed in June 2006.

B61 and W87 Operations at Pantex. Recommendation 98-2, *Safety Management at the Pantex Plant*, recommended that DOE expedite development and implementation of re-engineered processes for nuclear explosive operations at Pantex so that the attendant safety improvements could be achieved sooner. In FY 2006, the Board evaluated the start-up of the Seamless Safety for the 21st Century (SS-21) processes for the B61 and W87 Disassembly & Inspection and Rebuild Programs. The enhanced processes utilize upgraded procedures, redesigned tooling, and fewer handling and lifting steps. These improvements make the operations significantly safer and more efficient than their predecessors.

Safety of Dismantlement Operations. The Board continued to evaluate DOE's plans to dismantle an older weapon system that does not incorporate some of the modern safety concepts. The Board expressed concern to DOE regarding proposed disassembly activities at non-DOE facilities that did not have adequate safety programs and systems. DOE no longer plans to use such facilities; dismantlement operations are now planned for Pantex facilities.

Conduct of Operations at Pantex. In response to a Board letter issued in May 2005 identifying deficiencies in the conduct of nuclear explosive operations at Pantex, DOE initiated efforts to address the cause of the deficiencies and to develop both near- and long-term plans to improve the conduct of operations. After a followup review in FY06, the Board issued a letter to DOE in March 2006 re-emphasizing the importance of a consistently high degree of formality in the conduct of nuclear explosive operations, and favorably noting the extensive involvement of senior contractor management in developing and implementing improvements in conduct of operations at Pantex. As proposed improvements are implemented and the process matures, the Board expects to see continued improvements in the formality of nuclear explosive operations. The Board is continuing to evaluate improvements in the formality of work through daily operational oversight provided by its site representatives.

Pantex Multi-Unit Operations. The Board is evaluating the safety implications of the implementation of multi-unit nuclear explosive operations at Pantex, which are being pursued in support of an increasing operational tempo. In response to the Board's observations, Pantex is taking a more comprehensive approach to evaluating the implementation of multi-unit operations, including analyzing human factors considerations. In addition, the Board has urged Pantex to become more closely involved with studies being performed by the design agencies that will aid in evaluating the increase in risk associated with performing multi-unit operations.

Laboratory Support of Pantex Nuclear Explosive Operations. As a result of concerns over the continued erosion of technical competence and a need to re-emphasize the priority of work that directly supports nuclear safety, the Board issued Recommendation 2002-2, *Weapons Laboratory Support of the Defense Nuclear Complex*. In response, DOE established a single point of contact for each weapon system at each national laboratory, and a requirement at each site office to track and ensure closure of nuclear safety support requirements for weapon laboratories. These changes have enhanced the timely resolution of safety concerns in the nuclear weapon complex. The Board has now closed this recommendation.

Readiness to Dispose of a Damaged Nuclear Weapon. The Board has consistently highlighted to DOE, the need to develop the programs and infrastructure at NTS necessary to safely dispose of a damaged nuclear weapon or improvised nuclear device. In FY 2006, the Board determined that DOE no longer had a clear plan for meeting this need. The Board requested that DOE explain the required state of facility readiness and its plans for safety improvements, because it did not appear the mission and hazards had changed. As a result of the Board's interactions, DOE has continued to make physical and procedural improvements at the NTS G-tunnel, provided training, and has articulated its basic plans for dispositioning a damaged nuclear weapon if needed.

Subcritical Experiments. The Board reviewed preparations for subcritical experiments at NTS, identifying inadequate nuclear safety management programs, inadequate mechanisms for verification of readiness that would also be needed should nuclear weapons testing be resumed, and safety basis inadequacies for subcritical experiments that also would be relevant to nuclear weapons testing. In FY 2006, DOE made improvements that addressed these issues, including improvements in safety basis reviews, implementation of controls, and readiness reviews. As a result, subcritical experiments have a more complete documented safety analysis and thorough verification of readiness.

FY 2006 Performance Accomplishments

Lightning Protection at NTS. In 2003 and 2005, the Board noted deficiencies in lightning protection at NTS related to the protection of nuclear operations and personnel. In response, NTS implemented compensatory measures and began a study of the lightning protection needs at NTS. In FY 2006, a site-wide directive for the lightning protection program and lightning protection studies were completed. As a result, NTS now has a technical basis to identify appropriate controls for lightning protection for hazardous operations and has implemented a site-wide lightning protection program and controls.

Device Assembly Facility at NTS. In FY 2006, the Board evaluated the implementation of the safety basis for the Device Assembly Facility and the conduct of readiness reviews. As a result, DOE developed and implemented plans to assess safety management programs and vital safety systems in DAF, has improved work planning and procedures, and has improved the implementation of controls (such as the fire protection system).

LANL Institutional Corrective Actions. The Board spent considerable effort, including a public meeting on March 22, 2006, reviewing LANL's institutional corrective action programs and ensure their continuity through the contract transition. Corrective actions focus on key areas including safety, quality assurance, software quality management, conduct of engineering, safety basis, conduct of operations, environmental risk management, and training. The Board has also sought to encourage DOE to ensure that adequate resources are provided for implementation of these corrective action plans in a timely manner.

Federal Oversight at LANL. In November 2005, the Board learned of DOE's plan to execute a 3-month "strategic pause" in oversight at LANL to re-engineer oversight policies and procedures in preparation for the transition to a new prime contractor. Approximately two-thirds of the site office's workforce were planned to be devoted to the re-engineering effort during the pause, leaving the remaining third to oversee laboratory operations. The Board objected to the concept of the pause and requested information on how DOE would maintain effective safety oversight for the significant defense nuclear activities pursued during that time period. DOE provided the requested information and proceeded with the pause, which evolved into a pilot project for a new concept in oversight that is heavily reliant upon self-oversight by the contractor. The Board is closely evaluating the development of the pilot project.

Confinement Ventilation at the LANL Plutonium Facility. The current safety basis for the LANL Plutonium Facility credits a passive confinement strategy (i.e., no active confinement ventilation) as a safety-class control to protect the public from postulated accidents. In response to issues raised by the Board, LANL analysts performed a comprehensive set of air-flow calculations to estimate potential releases under accident conditions and concluded that this strategy was inadequate. Compensatory measures were developed and implemented while further study on the confinement strategy was performed. Under the Implementation Plan for the Board's Recommendation 2004-2, *Active Confinement Systems*, this facility is now being assessed as a high priority facility with an accelerated schedule. The Board has continued to review and provide feedback on the draft methodology for leak path factor analysis.

Nuclear Criticality Safety Program at LANL. In October 2005, the Board observed DOE's review of the nuclear criticality safety program at LANL. The DOE review revealed several non-compliances with applicable ANSI/ANS standards and DOE Orders. Among the most serious deficiencies were that some operations had changed without revision to the criticality safety analysis, roles and responsibilities were ill-defined and implemented, and some fissile operations did not have documented criticality safety analyses. In response, LANL developed a criticality safety improvement plan, which included a thorough assessment of all ongoing fissile material operations. The Board evaluated the execution of this improvement plan in late FY06 and found that adequate progress was not being made. The Board issued a reporting requirement in September 2006, requesting that DOE identify interim compensatory measures and articulate its plan for ensuring timely correction of the deficiencies.

FY 2006 Performance Accomplishments

Fire Protection at LANL. On May 15, 2006, the Board received DOE's response to issues previously identified by the Board regarding the need to define a multi-year strategy for timely resolution of all fire protection deficiencies and achievement of site-wide improvements at LANL. Issues that needed to be addressed included incomplete documentation and delays in the completion of inspections, tests, and maintenance; fire hazard analyses recommendations not implemented on a timely basis; no formal plan to address the Baseline Needs Assessment for fire and emergency services; no long-term contract for fire and emergency services with Los Alamos County; and fire alarm systems in several defense nuclear facilities still requiring upgrades. The Board reviewed this plan and determined the contractor's proposed activities adequately addressed the Board's concerns; however, questions remain unresolved regarding the ability of DOE's Los Alamos Site Office to fulfill its role in this area.

Incorporation of Safety into the Design of Research and Development at LANL. In November 2005, the Board reviewed LANL's requirements for designing research and development processes and apparatus. The Board reviewed procedures for performing hazard analyses, developing controls, identifying applicable engineering standards and practices, and applying safety-related project management practices, such as having distinct design phases and independent design reviews. Following the transfer of responsibility for management and operation of LANL to a new prime contractor, the approach of the new LANL management was reviewed. LANL stated that its intention that all significant programmatic and facility work at LANL undergo engineering and safety reviews during design and that each major project will have a designated chief engineer who will act as design authority. These initiatives represent a significant improvement compared to past practices at LANL.

Safety Basis at Sandia National Laboratories, New Mexico. In late FY 2005, the Board identified fundamental weaknesses in the implementation of nuclear safety requirements and controls at a defense nuclear facility located at SNL. At present, SNL is pursuing a Safety Basis Improvement Project to resolve the underlying safety-related deficiencies. Most tasks will be complete by the end of 2006, but some actions stretch out to the end of 2008. The SNL corporate-level safety basis group has hired several additional experienced safety basis staff members and augmented this staff with senior contractors who possess complex-wide experience. This has resulted in significant progress, with upgrades in facilities noted during recent reviews by the Board's staff.

Integrated Safety Management at Sandia National Laboratories, New Mexico. In an October 8, 2004 letter, the Board identified multiple failures of the hazard analysis and work control process at SNL. In response, DOE developed a corrective action plan to ensure the associated weaknesses are corrected and that integrated safety management is fully implemented. Near-term corrective actions for defense nuclear facilities are nearing completion, and longer term actions are in progress.

Safety Basis at Y-12. The Board reviewed a draft version of the Documented Safety Analysis for the Building 9212 Complex and identified weaknesses that resulted in improper downgrading of safety systems, including certain fire protection systems. In response to the Board's observations, key fire protection systems were upgraded to safety-class and design adequacy reviews were performed.

Seismic Deficiencies at Y-12. An evaluation by the Board of the Building 9212 Complex found that previously identified seismic deficiencies were not being adequately addressed and that a proposed replacement facility would not be ready to operate until late in the next decade. Based on these findings, the Board encouraged DOE to take steps to implement practical facility modifications in the near term and continue to reduce the quantity of at-risk nuclear material. As a result, DOE commenced evaluations of near-term upgrades and committed to perform a broad risk prioritization of upgrades needed to support operation of the Building 9212 Complex for the next 15 years.

Uranium Holdup at Y-12. The Board's staff reviewed two criticality safety issues related to uranium holdup in process equipment at Y-12. The first issue involved holdup in an air filter downstream from a uranium chip burner; the second involved holdup in a casting furnace vacuum system filter. Staff input and questions related to nondestructive assay procedures, criticality calculations, and filter cleanout procedures resulted in more rigorous treatment of the issues by DOE and its Y-12 contractor.

FY 2006 Performance Accomplishments

Tritium Extraction Facility. The Board continued to perform safety oversight of the Tritium Extraction Facility, which has completed construction and startup testing, and began readiness reviews in late FY06. The facility is now entering the final test phase, in which tritium will be extracted from irradiated tritium producing rods, processed through cleaning operations, and transferred to another tritium facility at SRS. Safety improvements that were implemented based on Board observations include a seismic alert system, the addition of an oxygen monitor at the lowest elevation in the Remote Handling Building, and improvements to the battery room ventilation system. In addition, reviews of the Worker Protection Safety System suggested by the Board have been completed.

LLNL Plutonium Facility Safety Basis. The Board reviewed the revised Documented Safety Analysis (DSA) for the LLNL Plutonium Facility and determined that it adequately addressed deficiencies identified in the Board's letter of April 12, 2004. The Board was particularly pleased that LLNL has renewed its commitment to a control strategy that includes robust, safety-class active confinement ventilation. The Board identified several isolated weaknesses that warranted consideration in the preparation of future annual updates to the DSA.

Configuration Management at LLNL. In a November 2004 letter, the Board identified the apparent lack of configuration management of vital safety systems at LLNL facilities. During FY 2006, LLNL established procedures and processes to maintain an interim configuration management system. The Board reviewed this interim system and found it to be reasonably adequate to support operations while a more durable, institutionalized program is developed and implemented.

Resumption of Programmatic Operations at LLNL. On October 11, 2005, limited operations in the LLNL Plutonium Facility were authorized to resume using a process for achieving and verifying readiness found generally acceptable by the Board. In April 2006, the Board observed LLNL's readiness assessment to remove the remaining compensatory measures and return to normal operations, and determined that operations could safely resume. On May 23, 2006, DOE authorized LLNL to resume normal operations.

Request for Proposal for the LLNL Management and Operating Contract. The Board evaluated the draft and final Requests for Proposal (RFP) for the LLNL management and operating contract issued by DOE during FY06. The Board determined that DOE had applied lessons learned from the draft LANL RFP, and that there were no ill-advised limitations on DOE's ability to oversee the safety of operations at LLNL.

Nuclear Material Packaging. The Board reviewed two principal deliverables of DOE's implementation plan for Recommendation 2005-1, *Nuclear Material Packaging*: (1) a repackaging prioritization methodology, and (2) nuclear material packaging requirements. The Board found that, although the basic approaches taken were sound, fundamental errors in analyses had substantially obviated the benefits of the contents of both documents. The Board identified these errors in analysis and reasoning in letters dated April 24, 2006, and May 1, 2006. DOE's responses, provided in letters dated June 8, 2006, and July 21, 2006, were not satisfactory to the Board. The Board is working with DOE to ensure that the commitments DOE has made to improve nuclear material packaging for protection of its workers are implemented.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2005 Accomplishments

Safety Basis at Pantex. The Implementation Plan for Board Recommendation 98-2, *Safety Management at the Pantex Plant*, includes commitments to re-engineer nuclear explosive processes and implement site-wide technical safety requirement controls for on site transportation. Satisfactory completion of these important commitments continues to be delayed. At the Board's request, senior DOE management is now providing monthly status briefings to the Board, which has focused management attention on completing these commitments, and improving safety at the Pantex Plant.

Nuclear Material Packaging. On March 10, 2005, the Board issued Recommendation 2005-1, *Nuclear Material Packaging*, following a series of reviews regarding the safety of practices for storage of programmatic nuclear materials at DOE defense nuclear facilities. The Board's reviews had found that, although DOE had made progress in the stabilization and safe storage of its excess nuclear materials, the storage requirements for other categories of nuclear materials were not defined and controlled sufficiently to ensure worker protection. The Board recommended that DOE require technically justified criteria for safe storage and handling of nuclear materials, identify which materials should be subject to this requirement, and implement the packaging criteria in a prioritized manner based on the hazards of the different material types and the risk posed by the existing package configurations and conditions. The Secretary of Energy accepted the Recommendation on May 6, 2005, and provided an implementation plan on August 17, 2005, which was accepted by the Board. Implementation will commence in FY 2006.

Special Tooling Program at Pantex. In a letter dated December 15, 2004, the Board identified a number of deficiencies in the Special Tooling Program, which plays a vital role in the safety of nuclear explosive operations at the Pantex Plant. DOE acknowledged that the tooling program had not demonstrated the necessary level of rigor, developed compensatory measures to address deficiencies, and tasked the site contractor to develop and implement a tooling improvement plan. With numerous organizational and process improvements implemented in the tooling program, DOE plans to conduct a follow-on review of the tooling program by the end of FY 2005, with the results becoming available in early FY 2006.

Conduct of Operations at Pantex. Based on a series of events, which indicated that deficiencies existed in the conduct of nuclear explosive operations at Pantex, the Board issued a letter on May 2, 2005, highlighting the deficiencies and querying DOE regarding development of a plan to improve conduct of operations. In response, DOE initiated efforts to address the cause of the deficiencies and to develop both near- and long-term plans to improve the conduct of operations, including training of technicians, improving the fidelity of training equipment, revising roles and responsibilities for supervisors, establishing performance monitoring metrics, and completing a root cause analysis.

Safe Storage of Pits. In response to the Board's Recommendation 99-1, *Safe Storage of Fissionable Material called "Pits,"* DOE continued to repackage pits into a robust container suitable for interim storage in FY 2005. DOE has now placed a required second type of container in service. Overall, DOE has repackaged its 12,000th pit. The Board has now closed this recommendation.

Lightning Protection at Pantex. In a letter dated November 3, 2004, the Board noted that a number of significant issues related to lightning protection at Pantex remain unresolved. Among these are an investigation into the potential for spalling of interior concrete surfaces as a result of a lightning strike and an evaluation of the impact of added inductance from facility bond wire. The Board also noted slow progress in addressing the potential for an indirect coupling mechanism from a lightning strike having an impact nuclear explosive operations. In response, DOE has prepared a project plan, *Investigation of Lightning Initiated Effects at Pantex*, and submitted it to the weapon laboratories for weapon response evaluation.

Examples of FY 2005 Accomplishments

Laboratory Support of Pantex Nuclear Explosive Operations. The Board reviewed test programs at LLNL and LANL, which involve the response of high explosives to insults, especially with respect to electrostatic discharge and low-velocity mechanical impact. The laboratories have now agreed to a general approach to high explosive material testing, and are approaching agreement on electrostatic discharge testing of weapon components. These tests will provide vital information for the development of effective safety controls for nuclear explosive operations at Pantex.

Readiness to Dispose of a Damaged Nuclear Weapon. The Board has consistently highlighted to DOE the need to develop the programs and infrastructure at NTS necessary to safely dispose of a damaged nuclear weapon or improvised nuclear device. On March 28, 2005, the Board sent a letter requesting that DOE identify the desired conditions of readiness for G-Tunnel, including facility and equipment improvements, and provide its plan and schedule to establish those conditions. A follow-up review by the Board conducted in May 2005 identified further issues regarding lightning protection. DOE is now addressing the lightning protection issues at G-Tunnel, while continuing to make substantial physical and procedural improvements and to provide training to be prepared to safely dispose of a damaged nuclear weapon or improvised nuclear device at NTS should the need arise.

Subcritical Experiments. The Board reviewed DOE's assessments and readiness for subcritical experiments, identifying inadequate nuclear safety management programs; inadequate mechanisms for verification of readiness of subcritical experiments and test readiness (should nuclear weapons testing be resumed); and inadequate safety bases for subcritical experiments and nuclear weapons testing. In FY 2005, DOE's Nevada Site Office improved safety basis reviews, improved the readiness review process, and committed to improve the implementation of controls and the conduct of readiness reviews. As a result, subcritical experiments have a more complete documented safety analysis and thorough verification of readiness.

Electrical Systems and Lightning Protection at NTS. In a letter dated July 1, 2003, the Board noted several safety issues related to electrical and lightning protection systems at NTS. DOE responded on May 14, 2004, and presented a reasonable approach to address many of the issues raised by the Board. In FY 2005, DOE developed a site-wide directive for the lightning protection program and lightning protection studies were completed, but a follow-up review performed by the Board in January 2005 found that a significant number of the actions to which DOE had committed remained unfinished. By March, 2005, DOE had addressed the electrical and lightning protection issues, significantly improving the safety posture across the site.

Device Assembly Facility at NTS. The Board identified deficiencies in safety management programs, implementation of controls, readiness reviews, seismic analysis, and several potential structural issues at the Device Assembly Facility at NTS. In response, DOE narrowed the scope of near-term operations, increased the resources to support the implementation of controls, committed to a readiness review process, and initiated a seismic analysis and structural assessment.

LANL Resumption Activities. Following the suspension of nuclear operations at LANL on July 16, 2004, the Board assessed conditions at the laboratory and reviewed its restart approach. The Board emphasized the need to closely monitor and appropriately adjust plant conditions to maintain a safe and stable configuration during the stand-down. The Board supplemented its full-time site-representatives with additional staff to provide real-time feedback to DOE and LANL personnel responsible for resumption activities. The Board has been encouraging DOE to make certain that adequate resources are provided for full implementation of the corrective action plans emerging from the resumption process.

Confinement Ventilation at the LANL Plutonium Facility. The current safety basis for the LANL Plutonium Facility credits a passive confinement strategy (i.e., no active confinement ventilation) as a safety-class control to protect the public from postulated accidents. In response to issues raised by the Board, LANL analysts performed a comprehensive set of air-flow calculations to estimate potential releases under accident conditions and concluded that a passive confinement strategy was inadequate as a safety-class control. DOE is currently preparing a plan and

schedule for implementation of an effective safety-class control to protect the public from the consequences of a potential event at the Plutonium Facility.

Full-Scale Aqueous Processing of Plutonium-238 at LANL. In preparation for near-term startup, the Board continued to evaluate the safety of the LANL full-scale aqueous processing line for plutonium-238. The Board observed that LANL had not adequately resolved previously identified issues, such as the flammability hazards posed by the generation of hydrogen gas in process equipment. LANL subsequently committed to strengthen the technical bases and add necessary safety controls.

Conduct of Engineering at LANL. The Board previously noted continued delays in the full implementation of DOE Order 420.1A, *Facility Safety*, which provides design requirements for nuclear facilities, at LANL. The Board also observed that some of the more complex and higher-hazard research, development, demonstration, testing and production work would benefit from a structured application of engineering standards and practices, a formal conceptual design phase similar to that for large facility projects, and design reviews following conceptual and final design. LANL has now incorporated corrective actions to address these issues as part of the Operational Efficiency project that emerged from the suspension of operations at LANL.

Fire Protection at LANL. The Board reviewed the fire protection program at LANL and concluded that while LANL and DOE had increased their attention to fire protection and taken some appropriate actions, resolution of issues had been piecemeal. Issues that needed to be addressed included: incomplete documentation and delays in the completion of inspections, tests, and maintenance; fire hazard analyses recommendations not implemented on a timely basis; no formal plan to address the Baseline Needs Assessment for fire and emergency services; no long-term contract for fire and emergency services with Los Alamos County; and fire alarm systems in several defense nuclear facilities still requiring upgrades. The Board has requested that DOE define a multi-year strategy for timely resolution of all fire protection deficiencies and achievement of site-wide improvements.

Request for Proposal for the LANL Management and Operating Contract. On December 1, 2004, DOE issued a draft Request for Proposal (RFP) for the LANL management and operating contract. The Board's review of the draft RFP found that it placed unnecessary and ill-advised limitations on the DOE's right to inspect and oversee the activities of the contractor, undermined DOE's system for identifying and implementing safety requirements, and omitted relevant safety requirements. The Board issued a letter to DOE on December 16, 2004, identifying these problems. The RFP was subsequently amended to address the issues raised by the Board, significantly strengthening DOE's safety posture at the laboratory.

Safety Basis at Sandia National Laboratories, New Mexico. In late FY 2005, the Board identified fundamental weaknesses in the implementation of nuclear safety requirements and controls at a defense nuclear facility located at Sandia National Laboratories. In response, the Sandia Site Office has reassessed the adequacy of the safety basis for other defense nuclear facilities at Sandia and has rescinded start-up approval for the initial facility in question, where safety basis deficiencies remain, until the documented safety analysis can be revised.

Hazard Analysis Deficiencies at Sandia National Laboratories, New Mexico. In an October 8, 2004 letter, the Board identified multiple failures of the hazard analysis and work control process at Sandia National Laboratories. In response, DOE developed a corrective action plan to ensure the associated weaknesses are corrected and that integrated safety management is fully implemented.

Y-12 Seismic Deficiencies. An evaluation by the Board of the Enriched Uranium Operations building at Y-12 indicated extensive seismic deficiencies. In light of DOE's plan to build a replacement facility by 2013, the Board encouraged DOE to take steps to implement practical facility modifications in the near term and reduce the quantity of at-risk nuclear material. DOE is developing a plan to address this issue.

Y-12 Glovebox Installation. The Board reviewed the new glovebox installation and hazard analysis for the Assembly/Disassembly Building at Y-12. Discussion of the results of the Board's review with DOE and the Y-12 contractor resulted in certain improvements in the equipment design and the procedures.

Examples of FY 2005 Accomplishments

Y-12 Electrical Safety. As a result of a small electrical fire in the Enriched Uranium Operations Building in 2003, DOE initiated a corrective action plan that included thermal imaging and evaluation of all Y-12 electrical panels. Initial inspections determined that more intrusive inspections were required for some of the panels. The Board noted that these prudent actions were apparently being delayed by other priorities and encouraged DOE to complete them in a timely manner. As a result, DOE applied additional resources and expects to finish by the end of 2005.

Y-12 Authorization Basis Implementation Validation. The Board reviewed Y-12 processes for conducting independent implementation validation reviews for documented safety analysis (DSA) controls developed under 10 CFR 830. The Board noted that Y-12 did not intend to make periodic use of such reviews to ensure controls continued to be properly implemented. In response, Y-12 now intends to require comprehensive independent validation of implementation of DSA controls in each nuclear facility at least every three years.

LLNL Plutonium Facility Safety Basis. In an April 2004 letter, the Board outlined fundamental flaws in DOE's approach to safety basis development at this facility, particularly the downgrading of the safety-class ventilation system based on questionable calculations. Following an independent analysis of these calculations, DOE reported to the Board in FY 2005 that it had directed the laboratory to maintain the Plutonium Facility's ventilation system as a safety-class system.

Configuration Management at LLNL. In a November 2004 letter, the Board identified the apparent lack of configuration management of vital safety systems at LLNL facilities. DOE responded on January 4, 2005, agreeing that prompt action needed to be taken to review the configuration and condition of all vital safety systems in LLNL defense nuclear facilities. During FY 2005, DOE completed evaluations of the application of configuration management for the vital safety systems at LLNL defense nuclear facilities, and developed plans to establish the needed configuration management program.

Resumption of Programmatic Operations at LLNL. In January 2005, DOE's Office of Independent Oversight and Performance Assurance (OA) issued a report identifying serious deficiencies in the administrative control programs mandated by the Technical Safety Requirements for the Plutonium Facility (including the configuration management program), as well as deficiencies in the supporting analyses for safety systems. Because of these findings, LLNL suspended programmatic operations in the Plutonium Facility. The Board issued a letter to DOE on March 8, 2005, cautioning DOE against resuming substantial programmatic activity in the Plutonium Facility prior to adequately addressing the findings of the OA report, and requesting a report detailing DOE's path forward for resuming programmatic operations. In July 2005, DOE and LLNL briefed the Board on a generally acceptable path forward toward achieving and verifying readiness to resume a limited scope of programmatic operations. Execution of this plan will continue into FY 2006.

Nuclear Material Packaging and Storage at LLNL. During a November 2004 review at LLNL, the Board identified weaknesses in the packaging and storage of nuclear materials not covered by either Recommendation 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, or the inactive materials program. Deficiencies in storage criteria and packaging systems indicated that LLNL was not pursuing a systematic, technically justified approach to packaging. In response, DOE directed the laboratory to evaluate this problem and make improvements to ensure the safe storage of these materials.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2004 Accomplishments

Support of the Defense Nuclear Complex. As a result of concerns over the continued erosion of technical competence and a need to reemphasize the priority of work that directly supports nuclear safety, the Board issued Recommendation 2002-2, *Weapons Laboratory Support of the Defense Nuclear Complex.* In FY-04, DOE established at each national laboratory a single point of contact for each weapon system; DOE established at each site office a requirement to track and ensure closure of nuclear safety support requirements for weapon laboratories. These changes have enhanced the timely resolution of safety concerns in the nuclear weapon complex.

Safe Storage of "Pits." In response to the Board's Recommendation 99-1, *Safe Storage of Fissionable Material called "Pits,"* DOE continued to repackage pits into a robust container suitable for interim storage in FY 2004. DOE has repackaged its 10,000th pit. The associated container surveillance program has been rejuvenated and the entire surveillance backlog was worked off during FY 2004.

Improvements in Safety Bases at Pantex. The Implementation Plan for Board Recommendation 98-2 includes a commitment to improve the safety bases at the Pantex Plant. In FY 2004, Pantex completed and approved documented safety analysis for facility and site-wide operations. Pantex has begun implementing a number of new and enhanced controls to improve the safety of nuclear explosive operations.

Readiness to Dispose of a Damaged Nuclear Weapon. The Board has consistently highlighted to DOE, the need to develop the programs and infrastructure at NTS necessary to safely dispose of a damaged nuclear weapon or improvised nuclear device. In FY2004, DOE made substantial organizational and procedural improvements, and provided training, and developed a safety basis for G-tunnel. As a result, DOE has made substantial physical and procedural improvements and provided training to be prepared to safely dispose of a damaged nuclear weapon should the need arise.

Lightning Protection at LANL. The Board noted that the safety-class lightning protection system at LANL's Weapons Engineering and Tritium Facility (WETF) did not appear to provide adequate lightning protection for the facility. Subsequently, DOE has directed LANL to require that all hazard and accident analysis scenarios be re-evaluated. In addition, LANL is required to upgrade fire barriers and package material-at-risk in approved containers.

Deficiencies in Safety Basis of the Plutonium Facility at LLNL. The Board identified deficiencies in the safety basis for Building 332, the Plutonium Facility, at LLNL. In particular, the Board expressed concern regarding the downgrading of several safety-class systems as part of LLNL's new approach to hazard confinement during accident scenarios. In response, DOE commissioned an independent calculation of the Leak Path Factor and committed to ensuring that system reclassification does not result in downgraded system performance.

Subcritical Experiments. The Board reviewed DOE's assessments and readiness for subcritical experiments, identifying inadequate nuclear safety management programs; inadequate mechanisms for verification of readiness of subcritical experiments and test readiness (should nuclear weapons testing be resumed); and inadequate commitment to improve the readiness review process for subcritical experiments and nuclear weapons testing. In FY 2004, DOE's Nevada Site Office improved the safety basis documents, developed a USQ process, improved the readiness review process, and committed to improve the implementation of controls and the conduct of readiness reviews. As a result, subcritical experiments have a documented safety analysis and there is some verification of readiness.

Examples of FY 2004 Accomplishments

Lightning Protection at NTS. In 2003, the Board noted that lightning protection at NTS did not appear to provide adequate protection for the nuclear operations and personnel. In response, NTS initiated compensatory measures and a study of the lightning protection needs at NTS. In 2004, lightning protection controls were included in the safety basis of several nuclear facilities. As a result, NTS acknowledged the need to make safety improvements, implemented lightning protection controls, and continues to study lightning protection for NTS.

Hoisting and Rigging at NTS. The Board noted deficiencies in hoisting and rigging, maintenance, and practices for nuclear and nuclear explosive operations at NTS. As a result, DOE has reclassified the critical safety equipment (at G-tunnel) used for the handling of damaged nuclear weapons and improvised nuclear devices as safety-class, improved controls for handling unvented drums of transuranic waste, and improved maintenance of hoisting and lifting equipment. As a result, controls have improved the safety of nuclear and nuclear explosive operations.

Critical Experiments Facility at LANL. The Board raised concerns that the unmitigated consequences predicted for the worst nuclear accidents at TA-18 are significant, but DOE and LANL are relying on the compliance of operators with a set of administrative controls and interim compensatory measures to prevent such accidents. LANL suspended operations at TA-18 after reviewing information provided by the Board and after an LANL review of a safety requirement violation at TA-18 identified weaknesses that reinforced concerns raised by the Board.

Improvements in Quality Assurance related to the Tooling Program at Pantex. In a June 18, 2004-letter, the Board expressed concern that there continue to be serious weaknesses in the program to design and fabricate tools for nuclear explosive operations at Pantex. Additionally, the Board noted that an effective quality assurance program is essential to the safe design, fabrication, procurement, inspection, and maintenance of special tooling. The Board has requested that DOE conduct a comprehensive review of quality assurance as it affects the tooling program at the Pantex Plant. DOE is developing plans to conduct a comprehensive, independent review of quality assurance at the Pantex Plant.

Hoisting and Rigging Operations. During FY2003 and FY2004, the Board's staff reviewed the hoisting and rigging programs at the Savannah River Site, the Pantex Plant, the Nevada Test Site, and Sandia National Laboratory. In letters dated July 10, 2003 and January 21, 2004, the Board expressed concerns regarding the maintenance of hoisting equipment, the safety classification of hoisting, vendor communication, and training for emergency scenarios. The Board also provided DOE substantive comments for the revision of DOE standard 1090, "Hoisting and Rigging." The safety of hoisting and rigging operations across the complex has improved, in particular the hoisting and rigging program at the Pantex Plant.

W78 Operations at Pantex. The Board has been urging DOE to improve the safety of weapons-related work at the Pantex Plant since it issued Recommendation 98-2, *Safety Management at the Pantex Plant.* Principle among the Board's recommendations was that DOE simplify and expedite its process for re-engineering nuclear explosive processes at Pantex such that the attendant safety improvements could be put in place sooner. In FY 2004, DOE completed the start-up of the Seamless Safety for the 21st Century (SS-21) W78 Disassembly & Inspection Program. The W78 Disassembly & Inspection program is now significantly safer and more efficient than it had been previously.

Safety of Dismantlement Operations. In a January 20, 2004 letter, the Board identified a number of deficiencies in various processes at the Pantex Plant that led to the attempted dismantlement of a damaged unit in a manner that was not intended, that was not adequately reviewed, and may not have incorporated adequate safety measures. As a result of this incident, Pantex has made improvements in the training of production technicians, in the conduct of unreviewed safety question evaluations, in the performance of nuclear explosive safety evaluations, and in the requirements for involvement of process engineers in certain types of operations.

Examples of FY 2004 Accomplishments

Y-12 Building 9212 B-1 Wing Fire Protection. The Board identified concerns to DOE Headquarters regarding the adequacy of fire protection in the B- wing of Building 9212 at Y-12. Following a performance-based review, Y-12 recommended upgrades that include installation of sprinklers on the first floor, a new system shutdown interlock and relocation of certain equipment, and the installation of fire-protective coatings on portions of primary extraction column supports, as well as changes (e.g., new catch basin) to divert primary and secondary extraction combustible liquids to the first floor. Design and planning efforts for the modifications/upgrades have been started by BWXT. The full project is planned (and is to be funded) to be completed by late Fiscal Year 05. When completed, it will improve the degree of fire protection in the facility to a level appropriate for the remaining life of the facility.

Y-12 Oxide Conversion Facility. The Board identified concerns in a December 2003 letter regarding the startup of the Oxide Conversion Facility (formerly referred to as the Hydrogen-Fluoride facility). These concerns included missing weld radiographs, lack of proper designation of certain safety equipment, a credible criticality scenario not addressed, and worker safety concerns. DOE re-radiographed significant welds, upgraded the functional classification of safety system equipment, added seismic reinforcement to address the criticality concern and addressed the worker safety concerns.

Y-12 Conduct of Operations. The Board raised concerns over the formality of operations at Y-12 and the adequacy with which management oversight was exercised. An overall improvement initiative was started by Y-12 that includes a management observation program to provide increased and documented on-the-floor observations of nuclear operations. Y-12 also instituted a "Conduct of Operations Representatives" program to provide ongoing, independent oversight and mentoring during nuclear operations. Six of these representatives have now been deployed.

Y-12 Independent Validation of Safety Basis Controls. The Board inquired on lack of a Y-12 process for independent validation of implementation of new or revised safety basis controls. Y-12 has instituted independent validation protocols for new/revised safety basis controls. Initial implementation validation reviews in certain Y-12 nuclear facilities showed the need for several enhancements to line management implementation efforts and personnel training. Corrective actions are ongoing.

Y-12 Activity Level Work Planning for Infrequent, Potentially Hazardous Operations. The Board identified planning weaknesses that led to inadequate definition of safety controls for infrequent, potentially hazardous operations. DOE prompted a contractor assessment resulting in higher levels of review and approval for such evolutions. A successful trial application is being expanded for use by all major nuclear facilities at Y-12.

Y-12 Conduct of Engineering Improvements. After operations failures related to engineering changes at Y-12, the Board raised concerns regarding the adequacy of engineering analysis used to support the changes. Y-12 evaluated its engineering processes and took steps to strengthen requirements on proper design input and verification for engineering changes and to conduct improved training for Y-12 engineering personnel on these issues.

Performance Goal 1	Nuclear Weapon Operations. DOE operations that directly support the nuclear stockpile and defense nuclear research are conducted in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2003 Accomplishments

W84 Disassembly and Inspection Operations. W84 disassembly and inspection operations have not been conducted at Pantex since 1998, and the authorization basis is no longer valid. The Board briefed National Nuclear Security Administration (DOE) management on several occasions regarding efforts to restart the W84 disassembly and inspection operations without an adequate authorization basis. The Board raised numerous potential safety issues, which resulted in DOE conducting an internal study that ultimately validated the Board's concerns. W84 operations have been postponed until these issues can be adequately addressed.

Support of the Defense Nuclear Complex. As a result of concerns over the continued erosion of technical competence and a need to reemphasize the priority of work that directly supports nuclear safety, the Board issued Recommendation 2002-2, *Weapons Laboratory Support of the Defense Nuclear Complex*. DOE's Implementation Plan (IP) was negotiated over the next several months and was issued on June 30, 2003. DOE has taken preliminary steps to reemphasize the priority of nuclear weapons work. DOE is also establishing at each site an office that will track and ensure closure of nuclear safety support requirements for weapon laboratories.

Storage of "Pits." Continuing to respond to the Board's Recommendation 99-1, *Safe Storage of Fissionable Material called "Pits,"* in FY 2003, DOE repackaged its 7500th pit into a robust container suitable for interim storage. The associated container surveillance program has also been rejuvenated; almost all of the surveillance backlog will be eliminated by the end of FY 2003.

Criticality Safety at Y-12. The Board expressed its concern that line management at Y-12 was not placing sufficient emphasis on simplifying and standardizing all fissile material handling operations in order to build a criticality safety program structured to assure success. The confusing controls that exist in many current Y-12 facilities with many different forms of uranium, dozens of different containers, and different postings for storage arrays have resulted in a significant number of operator failures. The letter stated that the standardization should extend to requirements, postings, and containers. In response, DOE has started to reduce the amount of stored nuclear materials and to standardize fissile material storage containers.

Nuclear Explosive Operations at Pantex. The Board has been urging DOE to improve the safety of weapons-related work at the Pantex Plant since it issued Recommendation 98-2, *Safety Management at the Pantex Plant*. Principle among the Board's recommendations was that DOE simplify and expedite its process for re-engineering nuclear explosive processes at Pantex such that the attendant safety improvements could be put in place earlier than planned. In FY 2003, DOE completed the start-up of the Seamless Safety for the 21st Century (SS-21) W62 Disassembly & Inspection Program. This program is now significantly safer and more robust than weapons programs to which the SS-21 process has not yet been fully applied. In FY 2003, the Pantex contractor took delivery of the prototype SS-21 tooling for W88 bay operations and W78 bay and cell operations.

Procedural Compliance at Pantex. In October 2001, the Board sent DOE a letter expressing concern with the increasing number of procedural adherence issues observed at Pantex. Although an action was initiated to address this problem, in March 2002, the Board wrote DOE, noting that further improvements were still warranted. During FY 2003, observations indicate that a significant improvement has been achieved.

Building 12-64 Seismic Analysis at Pantex. In 1998, the Board wrote to DOE expressing concern with the seismic response of Building 12-64. In 2002, DOE informed the Board of its intention to upgrade Building 12-64 in preparation for resuming nuclear explosive operations there. Subsequent meetings and discussions in FY 2002 and 2003 between DOE personnel and the Board's staff have identified concerns with analyses that had been completed to address the Board's original concerns. Although DOE's conceptual design for upgrading Building 12-64 addresses the concern for the seismic response of the facility, specific details regarding corrective actions are lacking. Efforts to improve the analyses and identify potential engineering solutions continue.

Examples of FY 2003 Accomplishments

Pantex Fire Protection. In FY 2003, DOE completed modification of the fire detection and suppression system in Building 12-44 and completed its Readiness Assessment Report for Fire Protection at the Pantex Plant. DOE has taken beneficial occupancy of the 12-44 facilities. DOE experienced numerous delays within their readiness activities for fire protection and completion of the fire protection final report. Under the impetus of continual Board urging, DOE ultimately completed the Readiness Assessment Report for Fire Protection, and delivered it to the Board as Commitment 4.3.2 to Recommendation 98-2.

Improvements in Safety Bases for the Pantex Plant. Fulfilling commitments made in response to Recommendation 98-2, DOE completed the Transportation Safety Analysis Report, Phase 1, Group 1, Readiness Assessment; the Readiness Assessment Report for Fire Protection; and approved the Transportation Safety Analysis Report (SAR) and Technical Safety Requirements (TSRs), as well as Pantex Zone 12 & Zone 4 Staging Facilities SAR and TSRs. Although these accomplishments provide improvements in the safety bases for the Pantex Plant, final implementation of these onsite transportation controls remains to be completed. The Board continues to urge DOE to expedite the implementation of onsite transportation controls.

NTS Readiness to Dispose of a Damaged Nuclear Weapon. The Board has consistently highlighted to DOE the need to develop the programs and infrastructure at NTS necessary to safely dispose of a damaged nuclear weapon or improvised nuclear device. In FY 2003, DOE responded by improving its capabilities to conduct these activities safely, including making further physical improvements to and maintaining G-tunnel, conducting training on specific hazards and controls and disposition capabilities, beginning the development of a safety basis for G-tunnel, and beginning to improve NTS conduct of operations. As a result, DOE has made substantial physical and procedural improvements and provided training to be prepared to safely dispose of a damaged nuclear weapon (should such a need arise).

Emergency Power System at the LLNL Plutonium Facility. In April 2002, the Board identified deficiencies in LLNL's emergency electrical power system, which did not meet safety-class standards and IEEE codes. As a result of the Board's efforts, LLNL developed an action plan to correct the deficiencies. As of August 2003, LLNL has completed most of the commitments related to this action plan, including system upgrades and updating important system drawings and calculations. The remaining commitments will ensure that the system will be assessed against appropriate electrical standards, and that backfits involving further upgrades will be considered, if necessary.

Lightning Protection at LANL. The Board noted that the safety-class lightning protection system at LANL's Weapons Engineering and Tritium Facility (WETF) did not appear to provide adequate lightning protection for the facility. In addition, the Board submitted a report presenting additional deficiencies with the lightning protection systems at various facilities at LANL. In March 2003, a subject matter expert study of the WETF lightning protection system concluded that the existing system could not perform its safety-class function. To adequately protect this operating nuclear facility against lightning hazards, a defensible lightning protection scheme must now be developed and implemented at WETF.

Deficiencies in LLNL Safety Bases. The Board identified significant deficiencies in the current safety bases for some of LLNL's defense nuclear facilities, most notably the Plutonium Facility, Building 332. A lack of vigorous DOE oversight has allowed these deficiencies to exist for years. In a letter dated April 10, 2003, the Board established a 60- day reporting requirement for DOE to ensure that these identified weaknesses are adequately addressed in a timely manner or establish appropriate compensatory measures until the deficiencies can be adequately addressed.

Subcritical Experiments. The Board reviewed DOE's assessments and readiness for subcritical experiments, identifying inadequate nuclear safety management programs; inadequate mechanisms for verification of readiness of subcritical experiments and test readiness (should nuclear weapons testing be resumed); and inadequate commitment to improve the readiness review process for subcritical experiments and nuclear weapons testing. In FY 2003, DOE's Nevada Site Office committed to improve the safety basis documents, develop a USQ process, and improve the readiness review process. As a result, subcritical experiment program requirements are being revised, safety basis documents are being improved, and a USQ process is being developed.

4. PERFORMANCE GOAL 2: NUCLEAR MATERIAL PROCESSING AND STABILIZATION

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

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

SUMMARY:

The Department of Energy continues to aggressively pursue acceleration of stabilization and cleanup work at facilities at many of its defense nuclear sites, in some cases in response to Recommendations and other formal correspondence from the Board. Examples of the most significant new and ongoing projects are summarized below:

Nuclear Material Stabilization—The Board's Recommendations 94-1, *Improved Schedule for Remediation*, and 2000-1, *High Level Waste Management at the Savannah River Site*, focused on improving the safety of nuclear materials stored across the DOE defense nuclear complex through stabilization and disposal. Significant stabilization activities continue at the Hanford Site and Los Alamos National Laboratory (LANL). This year, DOE revised the Hanford K-Basins sludge removal commitments under the Implementation Plan (IP) for Recommendation 2000-1. This is discussed in more detail below. DOE also revised the commitments under the IP for Recommendation 2000-1 for the stabilization of LANL materials. LANL is currently on schedule to complete stabilization of all 2000-1 materials by October 2009. The Savannah River Site is expected to complete its final commitment, stabilization of pre-existing neptunium-237 solution, by December 2006.

Nuclear Material Consolidation, Storage, and Disposition—Senior managers at DOE must carefully coordinate and integrate the activities of many DOE Offices and sites to consolidate and dispose of many metric tons of excess nuclear materials. These materials, which include plutonium, uranium, neptunium, and spent nuclear fuel, can pose significant hazards if not stored, shipped, and disposed of properly. The Board continues to carefully monitor the activities of DOE as it attempts to manage these materials and meet its commitments under Board Recommendations 2000-1 and 2005-1, *Nuclear Material Packaging*. As part of this effort, the Board is also following the activities

of the Nuclear Materials Disposition and Consolidation Coordination Committee which was chartered by the Secretary of Energy to specifically address the coordination need.

High-Level Waste (HLW) Retrieval and Processing—The Idaho, Hanford, and Savannah River Sites are continuing decades-long projects to retrieve and treat HLW from tanks that date as far back as the World War II-era Manhattan Project. At each of these sites, retrieval of waste from old storage tanks has begun, but is progressing slowly. In coming years, DOE plans to significantly expand waste retrieval activities, with the attendant hazards of extremely radioactive liquids and sludges, old systems and equipment, and conditions that are poorly characterized. Large new facilities needed to treat and dispose of the wastes are in various states of design and construction. Oversight of retrieval operations, as well as the development, design, and operation of planned treatment facilities will require a substantial share of the Board's resources for the indefinite future.

Hanford K-Basin Sludge Cleanup—Retrieval, stabilization, and safe interim storage of the highly radioactive sludge in the K-Basins continues to require substantial safety oversight. DOE did not meet its commitments to the Board for completing this activity and subsequently revised the commitments in the IP for Recommendation 2000-1. The containerization of sludge is now scheduled to be complete by July 2007, with removal of the sludge scheduled to be complete by November 2009. The Board continues to review the designs of the required retrieval, transfer, stabilization, and packaging systems; perform oversight of the preparations for startup of each of these systems; and assess the safety of operations once they begin.

Facility Decommissioning—DOE is continuing to pursue accelerated decommissioning of defense nuclear facilities at several sites. Closure activities were completed at Fernald and Rocky Flats. New decommissioning contracts were placed at Hanford and Idaho National Laboratory. The Board's observations of the ongoing D&D work is that weaknesses exist in the areas of criticality controls, fire prevention, and conduct of operations. Although DOE has taken corrective actions to strengthen these weaknesses, the corrective actions have not always been completely successful. In addition, lessons learned from individual sites do not always seem to be effectively disseminated across the complex. A positive observation is that a number of D&D personnel have moved from existing and closed D&D sites to the sites with new D&D work, which should improve the rate of transfer of valuable experience and lessons learned.

Transuranic (TRU) Waste Management—Several DOE sites store large quantities of TRU waste on concrete pads and in soil-covered trenches. Many sites are actively retrieving this waste and shipping it to the Waste Isolation Pilot Plant (WIPP) for disposal. The Board has encouraged DOE and the contractor at WIPP to improve cooperation and communications between WIPP and the various TRU waste generator sites to overcome weaknesses in the program. The DOE's TRU Waste Corporate Board has responded with an effort intended to standardize certain TRU waste handling and characterization activities so that operational safety is enhanced. The Board plans to continue to follow DOE's efforts to improve safety as additional quantities of TRU wastes are permanently disposed at WIPP. The Board is also reviewing preparations for the characterization, shipment and disposal of higher hazard, remote-handled TRU (RH-TRU) waste. These preparations have been underway since FY 2006 and are expected to culminate with the initiation of RH-TRU disposal in FY 2007.

Performance Goal 2	**Nuclear Material Processing and Stabilization.** The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2008 Performance Objectives

The Board and its staff will conduct assessments of DOE's efforts to characterize, stabilize, process, and safely store plutonium, uranium, and other actinides, residues, spent fuel, and wastes from the nuclear weapons program, to ensure that these efforts are performed safely and that the risks posed by these materials are addressed in a timely manner. These reviews will be conducted using the principles of Integrated Safety Management and will include assessments of the adequacy of current storage conditions, evaluations of proposed treatment and disposal technologies, evaluations of the design of new facilities and process lines, assessments of facility readiness to safely begin new operations (including implementation of 10 CFR 830, *Nuclear Safety Management*), the safety of ongoing operations, and the suitability of long-term storage and disposal facilities. Representative areas for review include:

- Safe long-term storage of neptunium oxides at the Idaho National Laboratory (INL) resulting from stabilization operations at the Savannah River Site (SRS) (Recommendations 94-1/2000-1).
- Integrated, complex-wide planning for consolidation and disposition of special nuclear materials.
- Safety of design of modifications to Building 3019 at the Oak Ridge National Laboratory in preparation for the processing of uranium-233 inventory.
- Stabilization and disposal of plutonium-bearing residues at Los Alamos National Laboratory (LANL) (Recommendations 94-1/2000-1).
- Safety of efforts to consolidate, store, and disposition spent nuclear fuel at Hanford, INL, and SRS.
- Consolidation of complex wide activities involving plutonium-238 used for national security purposes.
- Design of treatment facilities for high level waste (HLW) liquids and salts at the SRS, and system improvements to ensure safe management of the SRS HLW (Recommendation 2001-1).
- Final cleanout and closure of selected HLW tanks at SRS (including the annuli around the tanks).
- Maintaining HLW tank structural and leak integrity at SRS and the Hanford Site and application of the results of DOE's corrosion testing program to corrosion chemistry controls.
- Safe operation of HLW retrieval and transfer systems at the Hanford tank farms.
- Conduct of operations and work planning at the Hanford Site.
- Final cleanout and closure of the HLW tanks at INL.
- Safety of spent nuclear fuel sludge retrieval, treatment, and storage at the Hanford Site (Recommendations 94-1/2000-1).
- INL decommissioning activities.
- SRS deactivation and decommissioning activities.
- Hanford Site decommissioning activities (e.g., monitoring of decommissioning work at the Plutonium Finishing Plant, K-Basins, and River Corridor Closure Project).
- Safety of the retrieval, characterization, and packaging of transuranic (TRU) waste drums at the Hanford Site, INL, LANL, and SRS.
- Safe operations at the Melton Valley TRU/alpha low level waste treatment facility at Oak Ridge National Laboratory, including processing of remote-handled TRU waste.
- Safety of ongoing contact-handled TRU waste operations and new remote-handled TRU waste operations at the Waste Isolation Pilot Plant (WIPP).
- Improvement in cooperation and communication between the WIPP contractor and TRU waste storage/generator sites.

Performance Goal 2	Nuclear Material Processing and Stabilization. The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2007 Performance Objectives

The Board and its staff will conduct assessments of DOE's efforts to characterize, stabilize, process, and safely store plutonium, uranium, and other actinides, residues, spent fuel, and wastes from the nuclear weapons program, to ensure that these efforts are performed safely and that the risks posed by these materials are addressed in a timely manner. These reviews will be conducted using the principles of Integrated Safety Management and will include assessments of the adequacy of current storage conditions, evaluations of proposed treatment and disposal technologies, evaluations of the design of new facilities and process lines, assessments of facility readiness to safely begin new operations (including implementation of 10 CFR 830, *Nuclear Safety Management*), the safety of ongoing operations, and the suitability of long-term storage and disposal facilities. Representative areas for review include:

- Stabilization, packaging, and storage of neptunium oxide at the Savannah River Site (SRS) (Recommendations 94-1/2000-1).
- Safe long-term storage of neptunium oxides at the Idaho National Laboratory (INL) resulting from stabilization operations at the SRS (Recommendations 94-1/2000-1).
- Integrated, complex-wide planning for consolidation and disposition of special nuclear materials.
- Safety of design of modifications to Building 3019 at the Oak Ridge National Laboratory in preparation for processing of the uranium-233 inventory.
- Stabilization and disposal of plutonium-bearing residues at Los Alamos National Laboratory (LANL) (Recommendations 94-1/2000-1).
- Consolidation of complex wide activities involving plutonium-238 used for national security purposes.
- Safety of spent nuclear fuel sludge retrieval, treatment, and storage at the Hanford Site (Recommendations 94-1/2000-1).
- Safety of efforts to consolidate, store, and disposition spent nuclear fuel at Hanford, INL, and SRS.
- Safety of cesium and strontium capsule storage at the Hanford Site.
- Design of treatment facilities for high-level waste (HLW) liquids and salts at the SRS, and system improvements to ensure safe management of the SRS HLW (Recommendation 2001-1).
- Maintaining HLW storage tank structural and leak integrity at SRS and the Hanford Site and application of the results of DOE's corrosion testing program to corrosion chemistry controls.
- Safe operation of HLW retrieval and transfer systems at the Hanford tank farms.
- Conduct of operations and work planning at the Hanford tank farms.
- Final cleanout and closure of the HLW tanks at INL.
- SRS deactivation and decommissioning activities.
- INL decommissioning activities.
- Hanford Site decommissioning activities (e.g., monitoring of decommissioning work at the Plutonium Finishing Plant, K-Basins and River Corridor Closure Project).
- Safe execution of the Tank W-1A retrieval project at the Oak Ridge National Laboratory (ORNL), including excavation and removal of remote-handled transuranic waste.
- Final closure activities at the Miamisburg (Mound) Closure Project.
- Continued safe operation of the Melton Valley TRU/alpha waste treatment facility at ORNL.
- Safety of ongoing contact-handled transuranic (TRU) waste operations and safe startup of anticipated remote-handled TRU waste operations at the Waste Isolation Pilot Plant (WIPP).
- Safety of the retrieval, characterization, and packaging of TRU waste drums at the Hanford Site, INL, LANL, and SRS.
- Improvement in cooperation and communication between the WIPP contractor and TRU waste storage/generator sites.

Performance Goal 2	Nuclear Material Processing and Stabilization. The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2006 Performance Accomplishments

Hanford Sludge Retrieval and Disposition Project. The Board noted that the fabrication of sludge transfer equipment was not in accordance with the documented safety analysis (DSA) assumptions for the equipment and also noted the lack of a systematic engineering approach to verify the DSA assumptions. The project corrected the discrepancy and initiated a tracking mechanism for future design efforts. The Board also identified a problem with the integration of safety into the design for the sludge treatment project. DOE investigated the extent of the condition and suspended the procurement authorization pending DOE approval of the preliminary DSA.

High Level Waste (HLW) Tank Integrity—Vapor Space Corrosion. In response to a Board letter regarding corrosion in the vapor space of HLW tanks, DOE sponsored an expert panel at Hanford during July 10-12, 2006, to evaluate the mechanisms of this type of corrosion. The expert panel identified several mechanisms by which corrosive species could concentrate on tank walls and plans to propose a series of laboratory experiments to evaluate these mechanisms. This should allow DOE to identify additional measures to protect the integrity of HLW tanks.

Tank AN-107 Chemistry Control at Hanford. The DSA for Hanford's HLW tanks requires the liquid waste to have a minimum pH of 13 to prevent corrosion. However, the liquid in the sludge of Tank AN-107 was at pH 11 and decreasing to pH 10. The Board questioned DOE's approval of a waiver to accept this lower pH without adequate technical justification. DOE responded by establishing a test program to determine optimum waste chemistry limits for maintaining tank integrity. The first phase of this program studied the effect of pH on corrosion. The results showed the pH could as be as low as 10 without significantly increasing the corrosion rate. To confirm the laboratory results, DOE plans to install a corrosion probe in tank AN-107 to continuously monitor corrosion.

Decommissioning Activities at Hanford's Plutonium Finishing Plant (PFP). Because of reduced funding, decommissioning activities at PFP have slowed, and the date for completing decommissioning has been extended from 2009 to 2016. The Board continues to evaluate the transition of PFP from a near-term decommissioning mission to an extended layup period. Through a number of walk downs of the PFP facilities, the Board identified deficient areas (e.g., structure and fire protection piping deterioration) that will require additional attention from DOE if the safety systems and features are to remain operational during the extended layup period.

Soil Remediation at Hanford. The Board reviewed the safety basis and work planning for the 118-K Burial Ground remediation activity to determine if nuclear criticality concerns had been adequately addressed and if the DSA was compliant with guidance from DOE. The initial version of the DSA contained numerous criticality controls that did not comply with DOE criteria. The Board provided feedback to DOE, resulting in a revision to the DSA such that the DOE criteria were met and unnecessary criticality safety controls were removed.

Hanford Site Conduct of Operations. The Board routinely observed operations at the Hanford Site's Tank Farms, the K Basin Closure Project, and the Plutonium Finishing Plant and commented on deficiencies in conduct of operations. In response, DOE implemented improvement plans for conduct of operations. The Board has recently noted improvements in the safety of these operations.

Waste Drums Containing Plutonium-238 at Hanford. Since 2002, the Board has noted the potential hazards associated with the retrieval, handling, and disposition of 12 drum containing plutonium oxides with a high plutonium-238 content. The drums were located in a burial ground at the Hanford Site. In October 2005, DOE safely retrieved the 12 drums and placed them in interim safe storage.

Transuranic (TRU) Waste Drum Handling at Hanford. The Board reviewed hydrogen controls for vented TRU waste drums at Hanford and found the controls to be non-conservative. DOE was using a control level of 15% hydrogen, while the safe and commonly accepted control level is 4% (the lower flammability limit for hydrogen). After this concern was communicated, DOE reduced the control level for hydrogen concentration in vented drums. This represented a significant improvement in safety margin for these operations.

FY 2006 Performance Accomplishments

Safe storage of neptunium oxides at Idaho National Laboratory (INL). Operators at the Material & Fuels Complex at the INL have received and stored neptunium oxide materials shipped from SRS. The Board reviewed the neptunium storage plans and provided feedback to DOE regarding the adequacy of the storage plans. As a result, DOE is working to develop a new surveillance and maintenance plan for this activity.

Decommissioning at the Fernald Closure Project. The Board reviewed and provided comments to DOE on the safety of final decommissioning and closure work at the site. In response, DOE made changes to improve safety during the demolition of the Silos waste treatment facilities and during placement of contaminated soil and debris in the On-Site Disposal Cells. DOE completed all site closure work in FY 2006.

Tank 48 Disposition at SRS. In response to Board Recommendation 2001-1, DOE submitted a letter report assessing alternatives for treatment of organic compounds and HLW contained in Tank 48. Also, in response to Board concerns, DOE made a new commitment in the Implementation Plan for Recommendation 2001-1 to return Tank 48 to waste processing service by 2010, utilizing organic destruction in a newly designed treatment facility.

Trapped Hydrogen in Process Systems. Based on information from the Waste Treatment Plant at Hanford, the SRS contractor identified all components (e.g., piping) in the Defense Waste Processing Facility (DWPF) that could be capable of trapping hydrogen, which could lead to pressure loads during an explosion. In response to Board observations, additional validation of the hydrogen explosion model was performed to ensure it could generate accurate predictions for DWPF piping configurations. Furthermore, to address Board concerns regarding hydrogen buildup in failed tank cooling coils, the contractor formed a team to incorporate consideration of this hazard into the work planning process, and issued a report listing equipment of concern, along with corresponding recommended controls.

Startup Readiness Reviews at SRS. The Board observed the readiness review performed by the contractor for the retrieval of waste from an older-style HLW tank, using a new mixer pump and equipment, and found that the rigor and scope of the readiness review was inadequate. In response, DOE required the contractor to perform additional reviews to demonstrate readiness to begin waste retrieval operations. Furthermore, the procedure for performing readiness assessments was significantly revised to incorporate lessons learned and good practices. Observations from the Board's extensive oversight of readiness reviews during the year resulted in a number of weaknesses being corrected and subsequently, a noticeable improvement in the planning, conduct, and thoroughness of contractor readiness reviews.

DOE Technical Oversight at SRS. On March 3, 2006, the Board issued a letter informing the DOE Savannah River Operations Office (DOE-SR) that it was not aggressively pursuing the new oversight requirements contained in DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, and that DOE-SR must fill a substantial gap if it is to fully implement the new oversight directives by the required date. Included in the letter was a 90-day reporting requirement to the Secretary of Energy requesting implementation plans for DOE Order 226.1 across the defense nuclear complex. The Board is continuing to provide extensive oversight of site office corrective actions to ensure they have the desired effect.

Conduct of Operations at SRS. The Board pointed out several deficiencies in the conduct of nuclear operations at SRS. These observations resulted in further DOE and contractor reviews of radiological protection, increased senior management watches, the addition of safety prerequisites to procedures, the performance of mockups, and improved critiques. Formal conduct of operations is now improving, leading to safer nuclear operations.

TRU Waste Drum Retrieval and Characterization. During visits to several DOE sites, the Board noted inconsistent, and in some cases unsafe, approaches from site to site during the retrieval, characterization, and handling of unvented and newly vented TRU waste drums. In response, DOE's TRU Waste Corporate Board is addressing the need for a consistent approach for dealing with unvented TRU drums, the hydrogen gas hazard, and other hazards associated with handling TRU waste. DOE's effort is expected to culminate in the issuance of a new DOE Standard for TRU waste handling activities.

FY 2006 Performance Accomplishments

Soil Sampling at Tank W-1A, Oak Ridge National Laboratory. The Board pointed out deficiencies in work planning for the sampling and characterization of soils near Tank W-1A at the Oak Ridge National Laboratory. Areas of weakness included hazard analyses, work instructions, and preparation of radiation work permits. In response, DOE revisited and completed thorough radiological work planning efforts that culminated in a safe and efficient sampling and characterization effort.

Adequacy of Plutonium Storage at Savannah River Site. The Board issued its third *Annual Report to Congress, Plutonium Storage at the DOE's Savannah River Site.* Most of the actions required ti improve storage conditions at the site have been completed. Upgrades to the fire protection system in K-Area Materials Storage Facility are currently under way.

Performance Goal 2	Nuclear Material Processing and Stabilization. The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2005 Accomplishments

Nuclear Material Stabilization and Storage at LANL. The Board increased its oversight of the efforts of DOE and the contractor at LANL to establish adequate systems, safety bases, and procedures for the stabilization of plutonium scrap materials. The efforts at LANL continue to lag far behind the commitments made by the Secretary of Energy. The Board continued to ensure that DOE addressed safety issues communicated to DOE in previous years.

Surveillance and Monitoring Program for Plutonium Storage. The Board continued to monitor activities within DOE to comply with DOE-STD-3013, *Stabilization, Packaging, and Storage of Plutonium-Bearing Materials*, which establishes requirements for the long-term storage of plutonium metal and oxides and requires a surveillance and monitoring program to verify safe storage parameters. Through the Materials Identification and Surveillance Program, the Board provided feedback on the scientific and statistical methodology being employed for surveillance of plutonium in storage.

High-Level Waste Tank Integrity. The Board closely followed the HLW tank integrity program for double-shell tanks at Hanford. The Board issued a letter to DOE questioning DOE's approval of a plan to exempt a tank from waste chemistry limits established in the technical safety requirements, and requested a report on the long term management of tank space while maintaining waste chemistry within TSR limits. DOE responded to the Board's request, and sponsored laboratory corrosion studies to establish optimum waste chemistry limits for maintaining tank integrity. In a letter to DOE, the Board noted that laboratory studies for vapor space corrosion within the tanks was not included. DOE is assessing the feasibility of including vapor space corrosion studies in the program.

Hanford Tank Farms Integrated Safety Management. The Board reviewed a series of occurrences, incidents, near misses, and other operational events indicating serious weaknesses in work planning, conduct of operations, and responses to unexpected conditions. The Board issued a letter requesting that DOE provide a report on the weaknesses in integrated safety management at the tank farms and on corrective actions to improve worker safety. Hanford's tank farms contractor identified and implemented corrective actions, and DOE conducted a two-part improvement validation review at the tank farms in November 2004 and March 2005.

Tank 48 Disposition. The Board reviewed the safety of DOE's proposed disposition of HLW from Tank 48 at SRS, which poses a potential explosion hazard due to the generation of flammable vapors. The Board found that DOE did not have enough validated experimental data to show that an explosion would not occur during processing or disposal. DOE committed to perform additional analyses and experiments with better analytical techniques and equipment to ensure the safety of this operation.

Hydrogen Release from HLW. The contractor at SRS developed a hydrogen retention model for HLW tanks that led to a program for periodic agitation of the waste in certain HLW tanks to prevent a large hydrogen release. The Board questioned the conservatism of the model; subsequently, an actual hydrogen release event showed that the model was non-conservative. As a result, the contractor developed and implemented a conservative hydrogen retention model and agitation program that reduces the possibility of a fire or explosion due to the release of hydrogen.

Safety System Upgrades at SRS. As a result of safety issues raised by the Board, the contractor at SRS made safety equipment upgrades on HLW Tanks 3, 11, and 41 at the SRS. The upgrades included the installation of ventilation interlocks, lower flammability limit interlocks, and devices to prevent inadvertent addition of liquid to the tanks.

Transfer Control Program at SRS. In the last year, several inadvertent transfers of HLW occurred at the tank farms at SRS. The Board reviewed the transfer control program and suggested improvements to reduce the possibility of transfer errors. The contractor revised the transfer control program and incorporated the Board's suggested improvements.

Examples of FY 2005 Accomplishments

Hanford Spent Nuclear Fuel Project. The Board's review of ongoing spent nuclear fuel project operations at Hanford identified that changing conditions were not being appropriately reviewed by the contractor for safety implications. Reevaluation of these activities led the implementation of new controls to provide adequate safety for fuel removal operations. The contractor completed spent nuclear fuel removal with the exception of a limited number of fuel pieces that will be removed during sludge retrieval efforts. The removal of spent nuclear fuel from the K Basins represents a significant reduction in risk at the Hanford Site.

Hanford Sludge Retrieval and Disposition Project. The Board continued to provide oversight of the contractor's efforts to retrieve of sludge from the K-East Basin at Hanford and to design the sludge transfer system. Safety issues identified by the Board led the contractor to make design changes and DOE to commission a Sludge Review Board to provide additional oversight. The Board urged DOE and the contractor to reevaluate the effectiveness of corrective actions identified in response to past deficiencies. After delays and difficulties with sludge retrieval operations, the project began to make some progress toward the goals of completing sludge retrieval and preparing for sludge treatment.

Decommissioning of Building 371 at the Rocky Flats Environmental and Technology Site (RFETS). The Board completed its safety oversight responsibilities with the dismantlement of Building 371, which was the last plutonium building at RFETS. The RFETS closure project is near completion with only industrial hazards remaining. The Board conducted several meetings with both DOE and the contractor and visited the site, reinforcing the importance of worker safety. The Colorado Department of Public Health and Environment now has responsibility for oversight of DOE's program for monitoring and surveillance of legacy materials.

Hanford Site Decommissioning Activities. The Board reviewed decommissioning activities at the Plutonium Finishing Plant (PFP) and identified safety issues regarding the criticality safety and fire protection programs. The Board sent letters to DOE on these subjects, and the contractor developed corrective actions to resolve the issues. Although the contractor made some improvements, PFP managers noted additional difficulties. Subsequently, the Board met with representatives of DOE and contractor to discuss ongoing corrective actions to improve worker safety.

Deactivation Activities at the Savannah River Site (SRS). The Board reviewed deactivation and decommissioning activities at SRS and concluded that the program is reasonably well run. The program is ahead of the target schedule to demolish 239 buildings before the end of the current contract, September 30, 2006. The Board has emphasized criticality safety and fire protection, and has sent a letter to DOE requesting increased effort on hazard analysis and worker protection.

Decommissioning at the Miamisburg Closure Project. The Board closely followed the decommissioning work at Miamisburg, stressing worker safety, which has been good at the site. Site closure work is expected to be complete by December 2005—this includes demolition of 66 buildings and transfer of 9 buildings to the Miamisburg Mound Community Improvement Corporation for commercial use.

Decommissioning at the Fernald Closure Project. The Board reviewed safety documentation and readiness preparations for the Silo 1, 2, and 3 projects at Fernald, which are designed to retrieve and package uranium-bearing wastes for shipment and disposal offsite. The Board and the site readiness review teams found several deficiencies in the Silos 1 and 2 project and determined that corrective actions were needed before radioactive operations could begin. The Board sent a letter to DOE stating that improvements were needed in the management self-assessment process used by the contractor to verify that the project was ready to begin operations. As a result, project managers corrected the self-assessment process, successfully completed a startup readiness review, and safely began waste processing operations.

Examples of FY 2005 Accomplishments

Deactivation of the Heavy Element Facility at the Lawrence Livermore National Laboratory. Laboratory operators removed sufficient inventory of radioactive material from the Heavy Element Facility to allow it to be downgraded to a Radiological Facility. Facility operators then began decontamination and disposal of gloveboxes. The Board provided oversight of these activities and ensured that lessons learned from decommissioning activities at other DOE sites were incorporated into the deactivation and decommissioning work.

Melton Valley TRU/Alpha Low-Level Waste Treatment Facility. Prior to startup of this new facility, the Board pointed out deficiencies in the conduct of operations for radiological work. In response, the contractor upgraded the safety of non-routine radiological work by requiring verbatim compliance with procedures.

Retrieval of TRU Waste Drums at Hanford. The Board reviewed DOE plans to retrieve TRU waste drums from soil-covered trenches and noted a lack of adequate controls to protect the workers. In response to a letter from the Board, DOE and its contractor implemented more robust controls for handling unvented drums and began planning for the safe retrieval and handling of high-source term drums containing plutonium-238.

Performance Goal 2	Nuclear Material Processing and Stabilization. The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2004 Accomplishments

Nuclear Material Stabilization and Storage at LANL. As part of the implementation of the Board's Recommendations 94-1 and 2000-1, the Board has continued to evaluate NNSA's plans for repackaging high-risk materials at LANL into robust containers, and to urge NNSA to pursue alternative approaches that could accelerate this work. As a result, LANL and NNSA have developed a comprehensive nuclear materials packaging and storage plan that will result in a substantial reduction in risk by accelerating the schedule for stabilization, packaging, and improved storage of nuclear materials.

Inactive Actinide Materials. The Board evaluated NNSA plans for managing non-programmatic actinide materials stored at LANL, LLNL, SNL, the Pantex Plant, and Y-12. The Board found that NNSA has begun to define and execute adequately its strategy to characterize materials for storage or disposition, to identify which materials fall under this effort, and to analyze and upgrade, where appropriate, material packaging and storage facility conditions. The Board continues to evaluate the approaches taken by each NNSA site, as well as NNSA's programmatic direction.

Surveillance and Monitoring Program for Plutonium Storage. DOE-STD-3013, *Stabilization, Packaging, and Storage of Plutonium-Bearing Materials*, which establishes requirements governing the long-term storage of plutonium metal and oxides, requires a surveillance and monitoring program to verify safe storage parameters. The Surveillance and Monitoring Program managed by the DOE Savannah River Operations Office was established for this purpose, but despite assurances provided last year, DOE again under funded the LANL portion of this effort, thereby jeopardizing verification of safe storage parameters as required by the standard. At the urging of the Board, the Assistant Secretary for Environmental Management restored the funding for this program for fiscal year 2004. The Board also reviewed the scientific and statistical methodology for surveillance of plutonium in storage and provided input that corrected overly optimistic assumptions regarding the validity of extrapolations.

Hanford Tank Farms Fill Height. The Board questioned the safety of DOE's plan to fill certain high-level waste tanks beyond the height which was tested for leaks during construction. In response to these questions, DOE limited the proposal to only those tanks which had been leak tested to the proposed fill height.

Safety Basis for Hanford Tank Farms. The Board identified that the revised Technical Safety Requirements for flammable gas and waste transfers had eliminated key safety controls and that the site's independent validation of the implementation of the Documented Safety Analysis was inadequate. Continued questions by the Board led to the further discovery that the contractor had inadvertently put a tank at risk of retaining and releasing significant quantities of flammable gas. As a result, DOE rewrote the Technical Safety Requirements to reinstate controls such as Process Control Plans, convened a second independent review to ensure all safety controls had been implemented, and increased the frequency of key tank waste measurements to better ensure that the safety of current waste conditions was understood.

Salt Waste Processing Facility at SRS. The Board evaluated the safety risks associated with delays in the design and construction of the Salt Waste Processing Facility and urged DOE not to eliminate funding for this important work. DOE has since restored funding for this project and is currently pursuing a program plan that will accelerate waste stabilization and risk reduction. The Board reviewed the Critical Decision (CD)-1 facility design documentation and identified weaknesses in the performance categorization and potential seismic interactions of various portions of the facility. DOE plans to perform further analysis and upgrades to the facility's structural components to address the Board's concerns.

Mercury Hazards at the SRS High-Level Waste System. In 2002, the site identified the potential for workers to be exposed to mercury vapors and compounds in the high level waste tank farms. Since the initial discovery, the Board has had held discussions with DOE and the contractor regarding actions to protect site workers and verified the adequacy of the engineered and administrative controls implemented to protect workers from mercury exposure.

Examples of FY 2004 Accomplishments

Hanford High-Level Waste Tank Integrity. The Board reviewed the tank inspection program at Hanford and proposals to relax requirements for corrosion inhibitors in the tank waste. The Board provided input during meetings of a Corrosion Expert Panel held at Hanford to evaluate the proposed changes. The panel recommended maintaining the existing corrosion inhibitor controls until a solid technical basis can be developed.

Hanford Spent Nuclear Fuel Project. The Board's review of ongoing spent nuclear fuel project operations at Hanford identified that changing conditions were not being appropriately reviewed by the contractor for safety implications. Reevaluation of these activities led to multiple positive unreviewed safety questions and the implementation of new controls to provide adequate safety for fuel removal operations.

Hanford Sludge Retrieval and Disposition Project. The Board continued to provide close oversight of the contractor's efforts to start the retrieval of sludge from the K-East Basin at Hanford. The Board urged DOE to require a formal Operational Readiness Review (ORR) for sludge retrieval and to identify new milestones for completing sludge retrieval. DOE and its contractor both completed ORRs that were rigorous and the contractor began limited sludge retrieval. Additionally, DOE committed to new milestones for sludge retrieval and treatment.

Melton Valley Transuranic/Alpha Low-Level Waste Treatment Facility. Prior to startup of this new facility, the Board pointed out deficiencies in the conduct of operations for radiological work. In response, the contractor upgraded the safety of non-routine radiological work by requiring verbatim compliance with procedures.

Safety Basis for Mobile Transuranic Waste Characterization Units. The Board reviewed the DOE-authored Basis for Interim Operation for the operation of mobile transuranic waste characterization units. The Board discovered inadequacies concerning quantities of material at risk, analysis of deflagrations, and in the controls specified in the Technical Safety Requirements. Following several discussions and a Board letter, DOE agreed to add several new controls including a formal container inspection program and lid restraints for unvented drums, and will require an Operational Readiness Review for new deployments to ensure sites receiving the units are ready to operate them safely.

Retrieval of Transuranic Waste Drums at Hanford. The Board reviewed DOE plans to retrieve transuranic waste drums from soil-covered trenches and noted a lack of adequate controls to protect the workers. In response to a letter from the Board, DOE and its contractor implemented more robust controls for handling unvented drums and began planning for the safe retrieval and handling of high-source term drums containing plutonium-238.

Rocky Flats Environmental Technology Site Building 371 Fire. The Board completed its evaluation of the significant fire that occurred on May 6, 2003, during decommissioning of a glovebox. In a letter of December 2, 2003, the Board identified broad weaknesses in the planning and execution of decommissioning work at RFETS, as well as the site's failure to properly investigate the fire or address the problems which led to the fire. In response, DOE and the contractor conducted extensive reviews and implemented corrective actions such as restricting the use of generic work packages to only simple tasks, instituting more comprehensive review of work packages, improving chemical decontamination and combustible control procedures with associated improvements in conduct of operations, retraining workers on the proper response to fires, and improving daily pre-evolution briefings to better communicate hazards and controls to the workers. Lessons learned have been shared with other DOE sites performing decommissioning work.

Fernald Silo 3 Waste Disposition Project. The Board reviewed the safety analysis for the Silo 3 waste disposition project and raised questions regrading the proper classification of the project, the new form of safety documentation (a nuclear health and safety plan), and various assumptions used in the safety analysis. The contractor subsequently made changes in the safety documentation to improve worker safety. The Board also provided comments on ways to improve the readiness review plans for the startup of the Silo 3 project that were accepted by the contractor and DOE.

Examples of FY 2004 Accomplishments

Decommissioning at SRS. The Board evaluated the safety of decommissioning activities at SRS and expressed concern to DOE regarding several potentially serious events, including a release of tritium from contaminated piping, exposure of workers to an unshielded cesium-137 source, falling pipes and duct work, cutting into active electric lines, a grass fire, and several other events. Although the contractor implemented corrective actions after each event, the Board is evaluating the broader issues regarding the adequacy of training, procedures, and supervision for decommissioning work at SRS.

Sodium Fluoride Traps at ORNL. In a September 2002 Board letter regarding storage of sodium fluoride traps containing uranium-233 hexafluoride in Building 3019, the Board noted the safety issues due to increasing pressure in the traps from radiolytic gas production. ORNL now has completed the depressurization of all sodium fluoride traps susceptible to high pressures.

Performance Goal 2	Nuclear Material Processing and Stabilization. The processing, stabilization, and disposition of DOE defense nuclear materials are performed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2003 Accomplishments

Inactive Actinide Materials. The Board evaluated the National Nuclear Security Administration's (NNSA) plans for improving the management of non-programmatic actinide materials stored at sites such as Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and the Y-12 National Security Complex (Y-12). The Board found that NNSA did not define and execute adequately its strategy to characterize materials for storage or disposition, to identify which materials fall under this effort, and to analyze and upgrade, where appropriate, material packaging and storage facility conditions. The Board continues to evaluate the approaches taken by each NNSA site, as well as the programmatic direction provided by NNSA Headquarters.

Depleted Uranium at Savannah River Site (SRS). The Board continued to pursue the disposition of depleted uranium stored in inadequate containers and facilities at SRS. During FY 2003, the disposal of the most vulnerable materials began safely with the first shipments of such items to an offsite low-level waste disposal facility.

High-Level Waste Tank Integrity. During FY 2003, as the culmination of an effort that began with the Board's Recommendation 2001-1 in 2001, the Board obtained a commitment from DOE to accomplish ultrasonic inspections of all double-shell high-level waste tanks at SRS by 2006. This plan represents a significant increase in scope and a significant acceleration compared with the proposed inspection program.

Documented Safety Analysis for the SRS High-Level Waste System. The Board's review of the new documented safety analysis for the high-level waste facilities at SRS found that it did not provide a bounding unmitigated accident analysis as required by DOE directives. This problem resulted from the use of non-bounding input values and assumptions regarding operator actions to detect and terminate accidents. In response to a Board letter on this subject, DOE required the contractor to perform additional analyses and to implement specific administrative controls to protect assumptions made in the documented safety analysis.

Advanced Mixed-Waste Treatment Project. The Board identified significant shortfalls in the quality of the activity-level hazards analysis performed to support the identification of effective controls to protect workers involved in waste retrieval in the Advanced Mixed-Waste Treatment Project at the Idaho National Engineering and Environmental Laboratory (INEEL). In response, DOE required the contractor to implement conservative protective measures and to improve its analysis of the hazards associated with this work.

Hanford Spent Nuclear Fuel Project. The Board evaluated readiness preparations for startup of the K-Basins Fuel Transfer System and determined that the contractor had not corrected persistent problems regarding the premature declaration of readiness to operate. DOE identified a series of corrective actions that proved to be inadequate, as demonstrated by the failed attempt to start up the K-East Basin Sludge Water System later in the fiscal year. The Board is continuing to provide input and oversight as DOE works to solve this problem.

Laboratory Support for Long-Term Plutonium Storage. The Board identified that DOE was not planning to provide adequate resources for surveillance, laboratory testing, and shelf-life studies, which provide essential technical support for the safe long-term storage of plutonium. In response, DOE committed to provide adequate resources to continue the required activities and to develop a program plan that would identify how these activities would be carried out in future years.

Sodium Fluoride Traps at Oak Ridge National Laboratory (ORNL). DOE has begun to take actions in response to a letter issued by the Board in late-FY02 regarding the safe storage of sodium fluoride traps containing uranium-233. These vessels store uranium-233 recovered from the Molten Salt Reactor Experiment, and are becoming pressurized from radiolytic gas production. ORNL has completed the depressurization of several traps in the interim, and is evaluating the results to determine the path forward for the remaining traps.

Examples of FY 2003 Accomplishments

Fernald Closure Project. A review by the Board indicated significant progress is being made toward cleaning up and remediating the Fernald Site. However, there has been an increase worker injuries and near misses. The site attributed this rise in the accident rate to an increase in the number of new workers and the greater amount of work being performed on the site. The Board informed DOE that additional training to identify clearly the safety responsibilities and activities of all levels of management, the development of performance-based safety incentives for the contractor, and a more thorough screening of the qualification of new workers ought to be considered.

Rocky Flats Environmental Technology Site (RFETS) Vandalism. In May 2003, the Board learned that 14 high-efficiency particulate air filters installed in the Building 771 ventilation exhaust system had been vandalized by decommissioning workers and had to be replaced. The Board's evaluation of this event found that the report filed by RFETS in the DOE Occurrence Reporting and Processing System was inaccurate and did not acknowledge that the filter deficiencies were the result of deliberate vandalism. The Board further determined that neither the manager of the DOE Rocky Flats Field Office nor appropriate personnel within DOE Headquarters were aware of the vandalism. A corrected occurrence report was issued after the Board notified DOE Headquarters of the situation. The Board discussed this matter directly with the senior management of the RFETS contractor and the DOE field office manager to ensure they understood the seriousness of the workers' actions and the inaccurate reporting of this incident.

RFETS Building 371 Fire. The Board evaluated a significant fire that occurred on May 6, 2003, during glovebox removal activities in Building 371 at RFETS. The Board's review confirmed DOE's findings that inadequate work planning was a key contributor to the fire and that the workers' response to the fire could have resulted in serious harm to the workers, but found that the site's investigation into the cause of the fire was not adequate. The Board issued correspondence requesting DOE to document measures that had been taken to ensure that ongoing glovebox removal operations were safe and to ensure that materials recovered from the scene of the fire were adequately analyzed to support determining the cause of the fire. The Board further determined that there were fundamental weaknesses in procedure compliance by decommissioning workers and in DOE oversight, including the failure to provide DOE Facility Representatives to cover decommissioning activities in Building 371. These problems were identified to DOE, and corrective actions continue.

Activity Level ISM of Hanford Decommissioning Work. The Board continued to review planning and implementation of work being done at Hanford. The Board found that the work control procedures and practices need improvement to meet the intent of Integrated Safety Management and the DOE Orders and Guides for worker protection. The approach to hazard analysis does not use techniques such as those described by the American Institute of Chemical Engineers Guidelines for Hazard Evaluation Procedures, or the U.S. Department of Labor, Occupational Safety and Health (OSHA) publication, OSHA 3071, Job Hazard Analysis. These deficiencies are such that it is not clear that the controls are adequate to protect personnel performing decommissioning work at Hanford. Areas in need of improvement have been communicated directly to DOE. Some improvements are being implemented and have proven to be effective, however further effort is necessary.

Mound Closure Project. The Board reviewed decommissioning activities at Mound following the implementation of a new accelerated closure contract. DOE plans to reduce and relocate the DOE site office staff, while accelerating cleanup of the site. The Board informed DOE that the impacts on DOE's ability to provide adequate safety oversight of closure activities needed to be addressed.

Lawrence Livermore National Laboratory. The Board reviewed preparations for deactivation of Building 251 at the Lawrence Livermore National Laboratory and observed a readiness assessment for removal of heavy elements from the underground storage vaults. Weaknesses in conduct of operations and the use of procedures were identified to the laboratory. Corrective actions are in progress.

5. PERFORMANCE GOAL 3: NUCLEAR FACILITIES DESIGN AND INFRASTRUCTURE

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

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

SUMMARY:

For the next ten years, DOE is undertaking significant development of new capability to process legacy special nuclear materials, as well as replacing aging facilities needed to maintain the nuclear weapons complex. Much of this activity is well underway for some major projects with construction of the Waste Treatment Plant and Highly Enriched Uranium Materials Facility; and with design of the Salt Waste Processing Facility, and the Chemistry and Metallurgy Research Replacement project. DOE design and construction activity in FY 2008 will continue to require the Board to expend significant resources in exercising its oversight in this area to ensure that new facilities will be adequate to perform their intended functions safely. The key performance objectives for FY 2008 in this strategic area of concentration are:

- Ensure adequate design and construction of the Waste Treatment Plant at the Hanford Site.
- Ensure adequate design and construction of the Salt Waste Processing Facility for treatment of high-level waste liquids and salts at the Savannah River Site (SRS).
- Review final design of the Pit Disassembly and Conversion Facility at SRS.
- Ensure adequate design and construction of the Integrated Waste Treatment Unit to treat sodium-bearing waste at the Idaho National Laboratory.
- Ensure adequate design of the Chemistry and Metallurgy Research Replacement Project at the Los Alamos National Laboratory.
- Ensure adequate design of the Component Evaluation Facility at the Pantex Plant.

- Continue construction reviews and review preparations for the start of operations of the Highly Enriched Uranium Materials Facility at the Y-12 National Security Complex.

- Ensure adequate preliminary design of Uranium Processing Facility at the Y-12 National Security Complex.

Challenges for the Board's Safety Oversight:

Design and Construction of Nuclear Facilities. One of the Board's statutory responsibilities is the review of design and construction projects for DOE's defense nuclear facilities to ensure that adequate health and safety requirements are identified and implemented. These facilities must be designed and constructed in a way that will support safe and efficient operations for 20 to 50 years. This requires a robust design process that will ensure appropriate safety controls are identified and properly implemented early in the process. Integrated Safety Management (ISM) provides the framework for this process. The Board's expectation is that the design and construction phases will identify the set of risks for each project and demonstrate clear and deliberate implementation of ISM principles and core functions.

The Board has recognized during the past several years that DOE has not been conservatively designing safety into new defense nuclear facilities early in project life. Subsequent changes to the facility design to enhance the safety to a level expected for these facilities is often expensive and causes schedule slippage. The Board has held two public meetings intended to allow the Board to consider how DOE incorporates safety into the design and construction of defense nuclear facilities.

As a result of preparing for the first meeting, DOE determined that improvements were needed to better incorporate safety into the design of nuclear facilities and reported undertaking a number of initiatives to address the identified shortcomings. During this meeting, DOE's Deputy Secretary outlined his top level expectations regarding integration of safety into design and construction, which included that:

- DOE revise its directives to require that safety be integrated early into the project,
- line management follow these requirements,
- line project teams have the needed experience, expertise, and training,
- the Chiefs of Nuclear Safety provide safety oversight, and
- the Energy Systems Acquisition Advisory Boards be provided complete information to highlight tailoring of the requirements and safety issues.

The Board must continue to evaluate the changes to the DOE directive to ensure the Board agrees that the changes are appropriate and will help integrate safety into the design of new defense nuclear facilities early in the process. Additionally, the Board will need to assess the effectiveness of the changes initiated by DOE.

The Board's reviews of the design and construction of major facilities and projects are resource intensive and time consuming, but they result in significant safety improvements. The Board has demonstrated the value of rigorous technical oversight to ensure that safety is addressed early in the design process. The following list provides a brief description of major DOE projects currently underway, or planned for the near future, which will require significant Board resources to review.

The list describes each project and provides an informal rating of three characteristics: Significance (overall importance of the facility to the mission of the complex); Complexity (relative assessment of the difficulty in successfully implementing the design); and Risk (assessment of programmatic risk and safety risk for the facility).

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

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

- **Hanford Site (Office of River Protection)** - Immobilized High-Level Waste Interim Storage Facility - to provide storage for glass waste canisters produced at the Waste Treatment Facility. HIGH SIGNIFICANCE, LOW COMPLEXITY, LOW RISK.

- **Hanford Site (Office of River Protection)** - Supplemental processing capabilities are being developed to reduce the burden on the WTP and improve the rate of retrieval of waste from tanks. Demonstration Bulk Vitrification facility - a new facility to demonstrate the capability to vitrify low-activity Tank Farm waste is being designed. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK

- **Idaho National Laboratory** - Integrated Waste Treatment Facility - a new facility being planned to treat about one million gallons of sodium-bearing wastes. MODERATE SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

- **Lawrence Livermore National Laboratory** - Tritium Facility Modernization Project - Modify the existing Tritium Facility to expand tritium research and development capability. MODERATE SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

- **Los Alamos National Laboratory** - TA-18 Mission Relocation - to relocate to the Nevada Test Site and/or upgrade the criticality facility to replace the current facility. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Los Alamos National Laboratory** - TA-54 Waste Management Mitigation - to mitigate fire-related vulnerabilities in TA-50 (radioactive liquid waste operations) and TA-54 (solid waste) operations. MODERATE SIGNIFICANCE, LOW COMPLEXITY, LOW RISK.

- **Los Alamos National Laboratory** - Chemistry and Metallurgy Research Replacement Facility - to replace the current aging and deteriorating facility with a modern facility. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Nevada Test Site** - Criticality Experiments Facility - a facility within the DAF to which the criticality experimental and complex-wide criticality training capability from TA-18 at Los Alamos National Laboratory can be transferred. HIGH SIGNIFICANCE, HIGH COMPLEXITY, MODERATE RISK.

- **New Pit Production Facility** (location to be determined) - new facility for production of pits for the nuclear stockpile. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Pantex Plant** - Component Evaluation Facility - new facility that will increase existing capacities and provide new capabilities for the surveillance and re-qualification of weapons and weapons components. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, HIGH RISK.

- **Pantex Plant** - Special Nuclear Material Component Requalification Facility - to convert an area in 12-86 (currently used for joint test assembly operations) for use with various operations necessary to requalify certain special nuclear material for reuse. MODERATE SIGNIFICANCE, LOW COMPLEXITY, MODERATE RISK.

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

- **Savannah River Site** - Pit Disassembly and Conversion Facility - to convert surplus weapons-grade plutonium metal into oxide for subsequent feed to the Mixed Oxide (MOX) Fuel Fabrication Facility. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Savannah River Site** - Container Surveillance and Storage Capability and K-Area Interim Surveillance capability - to provide a capability to store, conduct surveillance of containers, stabilize, and package plutonium consolidated at the Site from the DOE complex. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

- **Savannah River Site** - Plutonium Vitrification Project - to process excess plutonium to allow disposal. HIGH SIGNIFICANCE, HIGH COMPLEXITY, HIGH RISK.

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

- **Savannah River Site** - Actinide Removal Process and Modular Caustic-side Solvent Extraction Unit - to remove actinides and cesium from high-level waste prior to treatment in the Defense Waste Processing Facility or disposal in Saltstone. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

- **Y-12 National Security Complex** - Highly Enriched Uranium Materials Facility - to provide long term consolidated storage for all highly enriched uranium material forms at the Y-12 Site. HIGH SIGNIFICANCE, MODERATE COMPLEXITY, MODERATE RISK.

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

Performance Goal 3	Nuclear Facilities Design and Infrastructure. New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2008 Performance Objectives

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

- Continue design and construction reviews of the Waste Treatment Plant at the Hanford Site.
- Review the final design and review construction of the Demonstration Bulk Vitrification facility at the Hanford Site.
- Complete review of the design and continue construction reviews of the Integrated Waste Treatment Unit for treatment of sodium-bearing waste at the Idaho National Laboratory.
- Review the final design and start of construction of the Chemistry and Metallurgical Research Replacement facility at the Los Alamos National Laboratory.
- Review design and construction of the Criticality Experiments Facility at the Device Assembly Facility at Nevada Test Site.
- Continue review of the design of the Component Evaluation Facility at the Pantex Plant.
- Review the final design and start of construction of the Container Surveillance and Storage Capability (CSSC) project at the Savannah River Site.
- Review the final design of the Pit Disassembly and Conversion Facility at SRS.
- Review the final design and construction of the Salt Waste Processing Facility at SRS.
- Continue construction reviews and review preparations for start of operations for the Highly Enriched Uranium Materials Facility at the Y-12 National Security Complex.
- Review the preliminary design of the Uranium Processing Facility at the Y-12 National Security Complex.

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

Performance Goal 3	**Nuclear Facilities Design and Infrastructure.** New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2007 Performance Objectives

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

- Continue design and construction reviews of the Waste Treatment Plant at the Hanford Site. Resolve outstanding issues with seismic and structural design, hydrogen in pipes and ancillary vessels, and fire protection.
- Review final design of the Demonstration Bulk Vitrification facility at the Hanford Site.
- Review the final design and review start of construction of the Integrated Waste Treatment Unit at the Idaho National Laboratory.
- Review the preliminary design of the Chemistry and Metallurgical Research Replacement Facility at the Los Alamos National Laboratory.
- Review design and construction of the Criticality Experiments Facility at the Device Assembly Facility at the Nevada Test Site.
- Review final modifications and preparations for operations for the Special Nuclear Material component Requalification Facility at the Pantex Plant.
- Review of the design of the Component Evaluation Facility at the Pantex Plant.
- Review the design of the Salt Waste Processing Facility for treatment facility for high-level waste liquids and salts at SRS.
- Review modifications to existing SRS facilities to increase long-term plutonium storage capacity and provide long-term stabilization/packaging capability through the Container Surveillance and Storage Capability (CSSC) project and K-Area Interim Surveillance project. (Public Law 107-314, Section 3183)
- Review the final design of the Pit Disassembly and Conversion Facility at SRS.
- Continue construction reviews of the Highly Enriched Uranium Materials Facility at the Y-12 National Security Complex.
- Review the conceptual design for the Uranium Processing Facility at the Y-12 National Security Complex.
- Review the development of geotechnical probabilistic seismic hazard curves for the SRS, LANL and Idaho sites.

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

Performance Goal 3	**Nuclear Facilities Design and Infrastructure.** New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

FY 2006 Performance Accomplishments

The Board and its staff continued providing technical evaluations of numerous design and construction projects through out the DOE complex. These evaluations have led to DOE improving their design process, enhancing the design of new facilities, correcting construction deficiencies noted, as well as starting actions to correct identified issues. Some of these actions are:

Safety-in-Design Public Meetings. As a result of reviews conducted by the Board during the past several years, it became apparent to the Board that safety was not being integrated into the design of new facilities early in the design process. The Board held two public meetings to delve into how safety could be better integrated into the DOE design process. As a result, DOE acknowledged that improvements were needed to better incorporate safety into the design of nuclear facilities and reported undertaking a number of initiatives to address the identified shortcomings. DOE has now established new expectations for identifying and resolving safety issues earlier in the design process, revised the existing DOE Order for project management and is working to provide more detailed guidance for project management. Further, DOE is developing a new standard to implement a more rigorous approach to safety-in-design. The Board expects that these actions, when fully implemented, should lead to significant improvements in the design of new defense nuclear facilities.

Waste Treatment Plant at the Hanford Site. The Board has continued its review of the design and construction of important-to-safety structures, systems, and components in the Waste Treatment Plant facilities. The design and construction of these facilities slowed significantly during this past year while DOE addressed budget issues. The Board's activities primarily consisted of considering the resolution of previously identified issues. Subsequent deficiencies and concerns have been identified during these reviews, for example:

- The Board had earlier identified that the DOE-specified seismic requirements may not have been sufficiently conservative. DOE evaluation of this concern identified that the seismic requirements were underestimated by about 40 percent. DOE is now evaluating the impact this increase will have on the design of the structure and equipment and using state-of-the-art techniques to develop new data to resolve some uncertainty in the modeling used to predict the seismic hazard. The Board is evaluating the techniques being used to collect these data.
- DOE significantly underestimated the impact of hydrogen hazards on pipes and small process vessels and components. At the urging of the Board, DOE has continued to evaluate design solutions to address the issue and re-evaluated and issued new design criteria to ensure the design remains fully protective of the public's health and safety.
- The Board continues to follow the status of the design and installation of fire-protective coating on structural steel subsequent to DOE directing the contractor to comply with code requirements. Questions on the basis for not coating some steel have resulted in DOE developing criteria and a methodology to justify the decisions. The Board has questioned the basis for much of the criteria in an attempt to improve its technical adequacy.

Demonstration Bulk Vitrification Facility at the Hanford Site. In September 2005, the Board identified potential weaknesses in areas such as the design, safety analysis, and the safety of workers that needed to be considered in finalizing the design of the Demonstration Bulk Vitrification Facility. Design of the facility continued in fiscal year 2006 including an independent expert review arranged by DOE. Additionally, a more formal approach to project management was implemented. As a result, the design has continued to evolve and improvements in radioactive material confinement and worker safety features have been developed.

FY 2006 Performance Accomplishments

Integrated Waste Treatment Unit at the Idaho National Laboratory. The Board reviewed major aspects of the project organization, preliminary design, and safety basis development for the Integrated Waste Treatment Unit (IWTU). Primary areas of focus included: process design and confinement strategy, safety strategy as detailed in the preliminary documented safety analysis, and pilot plant testing. In response to Board concerns, the DOE directed the project to use a more conservative and commonly used computer code for estimating radiological consequences for co-located workers and the public from postulated accidents. Further, the project directed a review of key safety analysis inputs and subsequently changed its inputs for many of the postulated accidents. The Board is continuing to review concerns including: control strategy for hydrogen deflagration prevention in process equipment, rapid shutdown system design, and waste characterization/radionuclide inventory controls.

Los Alamos National Laboratory Chemistry and Metallurgy Research Replacement Facility. The Board performed a series of reviews on the conceptual design and initial portions of the preliminary design. A number of significant concerns were identified, including an inadequate suite of safety controls that would not provide confinement under all accident scenarios. NNSA is currently working to address the concerns raised by the Board.

Device Assembly Facility at the Nevada Test Site. The Board noted to DOE deficiencies in the seismic analysis and potential structural issues associated with extensive cracking and water leaks in the Device Assembly Facility (DAF) at the Nevada Test Site. The criticality testing capability from TA-18 at Los Alamos National Laboratory is being relocated to the Criticality Experiments Facility, which will be housed in DAF. The Board had previously reviewed the plans for the Criticality Experiments Facility (including design reviews and preliminary documented safety analysis) and took issue with the lack of design criteria and an inadequate safety analysis. In FY 2006, the Board provided additional feedback to DOE regarding the progress on the safety analysis, ongoing seismic analysis, and evaluation of the cracking concerns. As a result, DOE now plans to perform a new structural and seismic analysis, has plans to address water leaks, and is preparing a new safety analysis. The Board informed DOE that further testing of the concrete strength was prudent to fully evaluate the impact of the extensive cracking in DAF.

Pit Disassembly and Conversion Facility at the Savannah River Site. The Board continued to review the safety of the design of the Pit Disassembly and Conversion Facility (PDCF). The Board reviewed the surface settlement profiles at the building foundation as a result of soft zones unique to the Savannah River Site (SRS). Based on this review, the Board found that although the final predicted surface settlement is deemed adequate, the methods used need to be improved. The Board will address this concern with SRS separately. The Board also suggested several improvements in the electrical design of PDCF. The Board observed that the design rating of the diesel generator may not be adequate to handle the necessary loads during startup following a loss of offsite power.

Salt Waste Processing Facility at the Savannah River Site. The Board's review of the conceptual design of the Salt Waste Processing Facility at SRS identified weaknesses in the facility's design criteria for natural phenomena hazards. As a result, DOE has now directed its contractor to pursue a more robust structure, which will provide the confinement required by the DOE safety basis. The Board continues to review the new enhanced design as well as site geotechnical investigations.

Highly Enriched Uranium Manufacturing Facility. The Board initiated its review of construction activities for the Highly Enriched Uranium Materials Facility (HEUMF) at the Y-12 National Security Complex. The initial assessment focused on implementation of the construction quality program for reinforced concrete installation. Several fundamental concerns were noted and discussed with DOE. However, shortly after DOE initiated corrective actions, a significant number of quality related deficiencies became evident. Short term compensatory actions were initiated on the project while long-term corrective actions are being developed and implemented.

Performance Goal 3	**Nuclear Facilities Design and Infrastructure.** New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2005 Accomplishments

The Board and its staff continued providing technical evaluations of numerous design and construction projects through out the DOE complex. These evaluations have led to DOE improving the design, correcting construction deficiencies noted, as well as starting actions to correct identified issues. Some of these actions are:

Hanford Waste Treatment Plant. The Board has continued its extensive review of the design and construction of important-to-safety structures, systems and components in the Waste Treatment Plant facilities. Numerous deficiencies and concerns have been identified during these reviews, for example:

- The Board had earlier identified that the DOE-specified seismic requirements may not have been sufficiently conservative. DOE evaluation of this concern identified that the seismic requirements were underestimated by about 40 percent. DOE and its contractor are now evaluating the impact this increase will have on the design of the structure and equipment.
- DOE significantly underestimated the impact of hydrogen hazards on pipes and small process vessels and components. At the urging of the Board, DOE is now evaluating design solutions to address the issue.
- At the Board's suggestion, DOE completed a detailed review of the blackcell concept. Components in the blackcells will not be readily accessible for the life of the plant. This review revealed problems associated with erosion of components. DOE has now enhanced their understanding of erosion and is developing a surveillance and testing program to better ensure components in the blackcells will last for the life of the plant.
- The Board has identified deficiencies in the structural evaluation methodology. An independent Peer Review Team brought on at the Board's suggestion by DOE to help them with the structural evaluation agreed with the Board. DOE has now required the contractor to change its analysis methodology to correct the deficiencies.
- The Board continues to follow the status of the design and installation of fire protective coating to structural steel subsequent to DOE directing the contractor to comply with code requirements. Questions on the basis for deleting coatings on some steel have resulted in the contractor committing to develop criteria and a methodology to justify the decisions. DOE now monitors the work and recently questioned the contractor's basis for reducing the approved thickness of the applied coatings, which is still under review.
- The Board identified deficiencies with plans for protection of operators who must remain in the control room during accidents to safely shutdown the plant. WTP has now redesigned the habitability system for the emergency shutdown facility. The new design provides for a dramatic improvement in protection of the operators.

Salt Waste Processing Facility at SRS. The Board's review of the conceptual design of the Salt Waste Processing Facility identified weaknesses in the facility's design criteria for natural phenomena hazards and with DOE directives, as well. DOE commissioned an independent review team of subject matter experts to review the Board's issue. This independent review team agreed with the Board's issue and made recommendations to improve the design criteria for the facility. As a result, DOE is developing new criteria to ensure that the design of the facility will adequately confine hazardous materials. The Board has also informed DOE of the concerns with the DOE directives associated with developing facility design criteria.

Pit Disassembly and Conversion Facility. The Board continued to review the safety of the design of the Pit Disassembly and Conversion Facility (PDCF). The Board found the Preliminary Documented Safety Analysis comprehensive and acceptable. However, the Board questioned the impact of geologic soft zones at the site and their possible impact on the PDCF plutonium processing building during a Design Basis Earthquake. Because the PDCF plutonium processing building is a bermed structure, it has much larger vertical soil stresses than other SRS buildings. Hence, surface settlement profiles at the building foundation become a critical design parameter and the details of the soft zone characteristics take on an added significance. DOE has initiated a review of this issue.

Examples of FY 2005 Accomplishments

Tritium Extraction Facility. The Board continues to provide oversight of the Tritium Extraction Facility, which has completed construction and is now in the testing and startup phase. The facility has an advanced computerized process control and worker protection system. At the Board's urging, a special one week software review was conducted by experts from the NNSA Service Center, and reviews of the computerized systems have been added to the DOE Operational Readiness Review (ORR). Also, there are certain maintenance and operations evolutions that cannot be demonstrated during the ORR. At the Board's urging, DOE ORR team members are observing selected items of maintenance and operations being conducted prior to the ORR.

Los Alamos National Laboratory Chemistry and Metallurgy Research Replacement Project. The Board reviewed the major safety aspects of the Critical Decision 1 package submittal. In a letter dated February 24, 2005, the Board raised concerns with the project's acquisition strategy and compressed federal oversight schedule. In response to the letter, NNSA developed a detailed review plan that outlines direct federal involvement to monitor the integration of safety throughout the design process. The Board also identified weaknesses with the project's confinement strategy, which will be addressed during the preliminary design.

Pantex Building 12-64 Upgrade Project. The project team established an administrative limit on the quantity of high explosives to preclude failure of the roof slabs. However, the Board questioned whether the initial analysis work justified the new explosive limits. DOE thereafter modified the methodology to include a quantification of the hazard so that a rational and justifiable limit could be selected. The final explosive limits were reviewed by the Board and found to provide an adequate level of safety.

Hanford Demonstration Bulk Vitrification Facility. During review of the preliminary design of the Demonstration Bulk Vitrification Facility, the Board identified deficiencies with the safety controls specified for protection of the workers. In particular, confinement of the hazardous material involved was not sufficient. DOE commissioned an independent review of the project safety basis and confinement strategy. This independent review agreed with the Board. DOE is now taking action to revise the design to provide better safety controls and confinement strategy.

Plutonium Storage at SRS. In Public Law 107-314, Section 3183, *Study of Facilities for Storage of Plutonium and Plutonium Materials at Savannah River Site*, Congress tasked the Board to conduct a study of the adequacy of K-Area Materials Storage facility (KAMS) and related support facilities such as Building 235-F (235-F), at SRS. In 2005, the Board issued its annual update to Congress. The Board proposed nine actions it considered necessary to enhance safety, reliability, and functionality of the plutonium storage facilities at SRS. Based in part on these extensive proposals, DOE has now decided against using 235-F and is now consolidating its plutonium in KAMS. DOE has agreed with the proposals to upgrade KAMS and is evaluating implementation of the needed actions.

Highly Enriched Uranium Manufacturing Facility at Y-12 National Security Complex. The Board has completed its design reviews of the High Enriched Uranium Materials Facility (HEUMF) and believes the design will adequately protect the public and workers. Some design enhancements remain to be implemented. For example, the contractor has agreed to correct emergency lighting deficiencies—system components are not seismically qualified, subjecting the building to a total blackout during an earthquake. The contractor will analyze the ability of the safety controls to protect against large fires involving canned subassemblies. The project configuration management system is being upgraded.

Performance Goal 3	Nuclear Facilities Design and Infrastructure. New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2004 Accomplishments

Plutonium Storage at SRS. In Public Law 107-314, Section 3183, *Study of Facilities for Storage of Plutonium and Plutonium Materials at Savannah River Site*, Congress tasked the Board to conduct a study of the adequacy of K-Area Materials Storage facility (KAMS) and related support facilities such as Building 235-F (235-F), at the Savannah River Site (SRS) in South Carolina. In FY 2004, the Board issued its initial report as well as a follow up report to Congress. The Board proposed nine actions it considered necessary to enhance safety, reliability, and functionality of the plutonium storage facilities at SRS. DOE has agreed with the proposals and is currently evaluating implementation of appropriate actions during the next year.

Hanford Waste Treatment Plant Design and Construction. The Board has continued its extensive review of the design and construction of important to safety structures, systems and components in the Waste Treatment Plant facilities. Numerous deficiencies and concerns have been identified during these reviews, for example:

- The contractor had planned to eliminate much of the fire-resistive coatings on the structural steel used in the facilities. Eliminating the coatings is inconsistent with DOE's own requirements as well as industry standards. This decision is now being reversed.
- The cesium ion exchange system could accumulate explosive concentrations of hydrogen gas. Furthermore, the hydrogen generation rates, hydrogen gas retention and release in waste tanks, and the ability of the mixing systems to prevent gas accumulation in the stored high-level waste tanks was not understood. DOE has now added an inerting system to the cesium ion exchange system to manage hydrogen flammability.
- One of the facilities in the WTP contains areas that by design will not be accessible after construction. The Board was concerned that the design of equipment in these areas were not sufficiently robust to operate normally for 40 years without maintenance. The Board encouraged DOE to further evaluate the performance criteria and validate that this equipment could in fact be expected to perform for this extended period of time. DOE conducted the study and is now correcting noted deficiencies and is also considering providing limit access to the areas for maintenance.
- In response to Board concerns with the large number of weld defects and missing leak tests for a high-level waste vessel, DOE performed root cause analyses which identified significant weaknesses in vessel technical specifications, fabrication oversight, and engineers' understanding of safety requirements. DOE is now implementing corrective actions for these weaknesses.
- DOE proposed delegating their approval of safety-related expectations (codes, major design changes, and safety control modifications) to the contractor. As a result of the Board's objections, DOE significantly modified their process and maintained their control of the standards and design of the Waste Treatment Plant.
- The criteria proposed by the contractor to be used to accept a new, experimental concrete mixture was inadequate. As a result, additional acceptance criteria were developed to ensure the concrete's quality would be suitable.

High Enriched Uranium Materials Facility at Y-12 National Security Complex. The Board has continued its design reviews of the High Enriched Uranium Materials Facility (HEUMF). Based on detailed reviews, the Board identified concerns with important safety systems such as the structure, electrical, ventilation, and instrument and control (I&C) systems. Based on these Board concerns, the contractor has made the electrical design more reliable, added concrete details to the structure to better resist an earthquake, and is actively working to resolve additional safety concerns raised by the Board.

Examples of FY 2004 Accomplishments

Pit Disassembly and Conversion Facility. The Board has been reviewing the structural design for the Pit Disassembly and Conversion Facility (PDCF) to be located at the Savannah River Site. The Board has ensured the structural design criteria were adequate, the geotechnical evaluations were appropriate, and the soil-structure interaction (SSI) analysis was adequate for the PDCF structures. In response to a Board letter dated May 13, 2003, the contractor conducted a fire risk analysis to assess a seismically induced full-facility fire. The Board is reviewing the final design to ensure that it is adequate and incorporates appropriate defense-in-depth.

Pantex Building 12-64 Upgrade. In a letter dated October 10, 2003, the Board noted that DOE was not addressing the structural weaknesses of the bays in Building 12-64 during conceptual design of upgrades. The Board emphasized the need to improve the structure's ability to withstand a potential earthquake and to establish a limit on explosive loading that appropriately accounts for known design deficiencies in the facility structure. As a result, the project was modified to include a structural repair to the building that should significantly reduce the likelihood of facility failure during an earthquake. In addition, the project has worked toward establishing an appropriate explosives limit to preclude impacting nearby facilities should there be an explosion.

High Efficiency Particulate Air Filter Testing at the Savannah River Site. High Efficiency Particulate Air (HEPA) filters provide an important confinement safety function in many DOE nuclear facilities. The Secretary of Energy committed to the Board to maintain the Filter Test Facility (FTF) in Oak Ridge, Tennessee and to independently test important-to-safety HEPA filters to ensure they will perform as expected. In July 2003, the Board noted that the Savannah River Site (SRS) had been installing HEPA filters in safety class and safety significant applications in nuclear facilities without testing the filters at the FTF. In response to the Board SRS replaced the vast majority of the incorrectly installed filters, and will replace the remaining few filters in the near future.

Nuclear Air Cleaning Handbook. The Board has urged DOE to issue an update to the *Nuclear Air Cleaning Handbook*, DOE-HDBK-1169, which forms the technical basis for the ventilation systems in most DOE nuclear facilities. The previous version was published in 1976. After much involvement by the Board, DOE issued an update to this important handbook in December 2003. The Board will continue to ensure that the handbook is appropriately implemented.

Salt Waste Processing Facility at the Savannah River Site. The Salt Waste Processing Facility will be used to remove cesium, strontium and actinides from high-level waste before it is vitrified. In a June 18, 2004 letter the Board outlined safety risks associated with delays to the salt processing program and urged DOE not to eliminate funding for this important work. DOE has restored funding and is now pursuing a sound program plan that will accelerate waste stabilization and risk reduction.

Hanford Plutonium Finishing Plant. Previously the Board identified electrical deficiencies at the Plutonium Finishing Plant. Specifically, baseline short circuit calculations, which are used to confirm the adequacy of installed electrical equipment, were not consistent with the electrical configuration drawings. During this fiscal year, the contractor evaluated this situation and in June 2004 concluded that many of the electrical system protective devices in the facility have been applied above their rated capability resulting in an unsafe condition and a violation of the National Electrical Code. Actions to correct this situation are underway.

Electrical Safety Handbook. In a letter to DOE dated August 7, 2003, the Board identified weaknesses with the proposed revision to the Electrical Safety Handbook, DOE-HDBK-1092-98. The Board requested that DOE provide effective, detailed guidance to contractors on electrical safety programs. In July 2004, DOE revised the handbook to include the details of electrical safety and a guidance for effective electrical safety program. This version is under review.

Performance Goal 3	Nuclear Facilities Design and Infrastructure. New DOE defense nuclear facilities, and modifications to existing facilities, are designed and constructed in a manner that ensures adequate protection of health and safety of the workers and the public.

Examples of FY 2003 Accomplishments

Hanford Waste Treatment Plant. The Board continued to review the design and construction activities related to the Hanford Site's Waste Treatment Plant. Reviews of concrete quality, structural adequacy, site geotechnical, process safety, electrical system design, and adequacy of standards were conducted. The Board issued letters on November 4, 2002, addressing safety and design basis concerns; January 21, 2003, addressing Hanford ground motion issues; March 7, 2003, addressing electrical concerns; and on May 29, 2003, addressing authorization basis and standards issues. Resolution of the issues raised by the Board is taking place as the design progresses.

High Enriched Uranium Materials Facility (HEUMF). In a Board letter dated December 27, 2002, concerns were expressed about the confinement system design for HEUMF at the Y-12 National Security Complex, which was based on isolation (holdup) of the facility following a design basis fire event. The Board also identified potential inadequacies related to the form and packaging requirements of uranium for long-term storage at HEUMF. In response, the ventilation system design has been modified to address this safety issue and the contractor is developing a plan to evaluate facility storage containers and determine a minimum set of storage containers that meet facility safety and operational needs.

HEUMF–Geotechnical. In December 2002, the Board informed DOE about concerns with the foundation design for the HEUMF. The contractor had started the structural design process without completing the geotechnical report and using only a best estimate of the required seismic loading. Also, the proposed foundation fill material had not been tested and the response of this material under earthquake loading was unknown. The contractor has subsequently completed the necessary geotechnical studies to address the Board's concerns and is finalizing the foundation design. It was concluded from the studies that the use of limestone fill as a base for the foundation could produce adverse building responses during an earthquake. Currently, the site is evaluating using concrete as the engineered fill below the building foundation.

Nevada Test Site Electrical and Lightning Protection Systems. In a letter dated July 1, 2003, the Board noted that compensatory measures to mitigate potential lightning hazards are needed at the Nevada Test Site (NTS) until robust lightning detection and protection programs have been implemented. The Board also identified deficiencies with the electrical systems for selected facilities at NTS. DOE is evaluating these conditions.

Tritium Extraction Facility Design Review. During the past five years, the Board has conducted extensive design reviews of the Tritium Extraction Facility (TEF) at the Savannah River Site. The Board has provided a series of comments to DOE as the design progressed from its initial conceptual stage to its final form. DOE formally responded to all of the issues raised by the Board and on December 19, 2002, the Board issued a response concurring with DOE's proposed resolution. As a result, the safety of TEF has been significantly improved.

Hanford 221-T Building (T-Plant) Design. The T-Plant has been proposed as a potential storage facility for K-Basin sludge. Due to the age (built in 1944) and configuration of the structure, this facility presented a unique condition, to which the Uniform Building Code's simplified procedures were not easily applied. The Board conducted a structural evaluation and informed DOE in a letter dated May 30, 2003, that the structure was adequate for it's intended storage mission, but new missions that increased the material at risk would require further evaluation.

Fire Safety at LANL. The Board continued to follow the fire protection upgrade program and Cerro Grande Fire recovery work currently underway at Los Alamos National Laboratory (LANL). In a January 2003 letter to the Secretary of Energy, the Board expressed concern over the safety impacts of rescinding $75M of Cerro Grande funds on fire protection projects. The funds were subsequently reinstated for these critical projects.

Examples of FY 2003 Accomplishments

Pit Disassembly and Conversion Facility. The Board has been reviewing the Title I design for the Pit Disassembly and Conversion Facility (PDCF). While the main structure of the PDCF Plutonium Processing Building was designed to survive the design basis earthquake, this is not the case for many of the 2-hour fire barriers between fire zones. As a result, a postulated seismically-induced full-facility fire could lead to calculated offsite dose that exceed the evaluation guideline. The Board issued a letter on May 13, 2003, urging DOE to consider upgrading the design of the fire barriers to withstand the design basis earthquake, eliminating the potential for a full-facility fire.

Emergency Operations Center at LANL The Board identified a weakness in DOE's plans for construction of a new Emergency Operations Center (EOC) at LANL. Located on a seismic fault, the EOC could itself become nonoperational during a seismic event, and thus be unable to coordinate emergency operations related to that event. The Board suggested that it would be better to consider the new EOC as one element in an emergency system that included an older EOC and a mobile command center. In FY 2003, a mobile command center was procured and the new EOC system is now nearing completion.

Plutonium-238 Scrap Recovery Line at LANL. In FY 2003, the Board urged DOE and LANL to take action to address safety issues with startup of the new Pu-238 scrap recovery line that had been identified by the Board in FY 2002. DOE and LANL have taken some actions to improve safety, including revising the process hazard analysis. The Board continues to urge DOE and LANL to make improvements in implementing engineered controls and Technical Safety Requirements (TSRs) that are appropriate for a production operation. While these activities are in progress, LANL and DOE have deferred the start-up of the scrap recovery line.

LANL Classified Experiment. For several years, the Board has pushed for resolution of longstanding concerns regarding the hazards of certain portions of the operations associated with the LANL dynamic experiments. The Board has observed some improvements; however, the preliminary design review suffered from inadequate coverage of the relevant engineering disciplines and limited participation from the reviewers. These concerns were communicated to DOE and LANL management. As a result, portions of the design review will be repeated. The Board also successfully enforced agreement on a project standard on vessel construction.

Plutonium Storage at SRS. In response to a Congressional reporting requirement, the Board has performed numerous reviews of the adequacy of facilities and systems for long-term storage of plutonium at SRS. This study is not yet complete, but the Board has already informed DOE of several issues of near-term safety significance regarding fire protection; lightning protection; electrical, instrumentation, and control systems; and the safety bases for plutonium storage and packaging facilities at SRS.

6. PERFORMANCE GOAL 4: NUCLEAR SAFETY PROGRAMS AND ANALYSIS

DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

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

SUMMARY:

For FY 2008, the key performance goals and initiatives of the Board in this area are intended to resolve continuing problems and ensure safety is improved at the level of the workers. If safety of the workers at DOE defense nuclear facilities can be improved, then the safety of the public more distant from the hazards will be substantially improved. Major efforts to achieve this goal in FY 2008 include:

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

- Ensure that directives that inform DOE personnel and contractors how to fulfill their responsibilities safely are evaluated and strengthened where necessary, including the development of new safety directives to provide guidance in areas for which none is currently available.

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

- Ensure that verifications of integrated safety management implementation are conducted at sites where new operating contractors are in place and where new integrated safety management systems are invoked; and ensure that such verifications are conducted in a manner that assures the public and worker safety and the protection of the environment.

Performance Goal 4	Nuclear Safety Programs and Analysis. DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

FY 2008 Performance Objectives

The Board will continue to assess the adequacy of proposed changes to DOE directives to ensure that any revisions are appropriate and adequate. The results of reviews completed by the Board will be provided to DOE for action. The Board anticipates that approximately 20 DOE directives that may impact public and worker health and safety require review, of which two or three are likely to require significant Board and staff interaction to ensure satisfactory resolution of potential issues. In those rare cases in which new directives are determined to be required, the Board will work with DOE to ensure that the applicable documents are developed adequately. The Board also expects to continue its involvement in the efforts of the National Nuclear Security Administration (NNSA) to establish its own directive system. It is estimated that 15 NNSA directives will also require review. As a result of these reviews, new or modified health and safety directives will be issued in an enhanced form, resulting in improved safety through standardized requirements and guidance that provide for adequate protection of the workers and the public.

The Board will continue its reviews of DOE's implementation of Integrated Safety Management (ISM), as well as ongoing efforts to make ISM more effective. At least five reviews will be completed. Candidates for review include:

- Activity-level ISM implementation at sites with performance indicators judged to have higher than expected rates of abnormal occurrences related to worker protection.
- Validation of at least one site office review of activity-level ISM.
- Validation of at least one ISM review by the DOE Office of Independent Oversight and Performance Assurance.
- Implementation and effectiveness of ISM at defense nuclear facilities.

The Board has noted that considerable progress has been made in the implementation of ISM, but that continued DOE efforts are necessary to maintain ISM systems and ensure continuous improvement across the complex. Specific functional areas will be sampled to a greater depth, such as training and qualification, quality assurance, nuclear criticality safety, software quality assurance, conduct of operations, configuration management, maintenance management, and readiness preparations. As a result of these reviews, DOE will provide an adequate approach and schedule for resolution of identified issues that supports safe operation of defense nuclear facilities.

Performance Goal 4	**Nuclear Safety Programs and Analysis.** DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

FY 2007 Performance Objectives

The Board will continue to assess the adequacy of proposed changes to DOE directives to ensure that any revisions are appropriate and adequate. The results of reviews completed by the Board will be provided to DOE for action. The Board anticipates that approximately 20 DOE directives that may impact public and worker health and safety require review, of which two or three are likely to require significant Board and staff interaction to ensure satisfactory resolution of potential issues. In those rare cases in which new directives are determined to be required, the Board will work with DOE to ensure that the applicable documents are developed adequately. The Board also expects to continue its involvement in the efforts of the National Nuclear Security Administration (NNSA) to establish its own directive system. It is estimated that 15 NNSA directives will also require review. As a result of these reviews, new or modified health and safety directives will be issued in an enhanced form, resulting in improved safety through standardized requirements and guidance that provide for adequate protection of the workers and the public.

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- Activity-level ISM implementation at sites with performance indicators judged to have higher than expected rates of abnormal occurrences related to worker protection.
- Validation of at least one site office review of activity-level ISM.
- Validation of at least one ISM review by the DOE Office of Independent Oversight and Performance Assurance.
- The Board will continue to evaluate the implementation and effectiveness of DOE's efforts to satisfy the intent of Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*. In this regard, the Board will conduct safety reviews at selected NNSA and EM sites to verify that the commitments associated with the Recommendation have been fully implemented.
- Implementation of Federal line oversight in DOE Headquarters, Field and contractor organizations.
- Implementation or Recommendation 2000-2, *Configuration Management, Vital Safety Systems*.
- Implementation and effectiveness of ISM at defense nuclear facilities.

The Board has noted that considerable progress has been made in the implementation of ISM, but that continued DOE efforts are necessary to maintain ISM systems and ensure continuous improvement across the complex. Specific functional areas will be sampled to a greater depth, such as training and qualification, quality assurance, nuclear criticality safety, software quality assurance, conduct of operations, configuration management, maintenance management, and readiness preparations. As a result of these reviews, DOE will provide an adequate approach and schedule for resolution of identified issues that supports safe operation of defense nuclear facilities.

The Board anticipates that the effort to complete the revised implementation plan associated with Recommendation 2004-1, *Oversight of Complex, High Hazard Nuclear Operations*, will require significant Board and staff interaction with multiple federal and contractor agencies.

The Board will review the progress on relocation of critical experiment capability to the Nevada Test Site, review results of NCS site reviews by DOE, and monitor DOE efforts to fill site office NCS oversight positions.

The Board will continue to follow the progress by DOE to implement Board Recommendation 2004-2, *Active Confinement Systems*.

Performance Goal 4	Nuclear Safety Programs and Analysis. DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

FY 2006 Performance Accomplishments

DOE Directives. As part of its ongoing review of new and revised DOE directives, the Board and its staff evaluated and provided constructive critiques of 32 directives associated with, but not limited to nuclear design criteria, maintenance management, worker protection, emergency management, and project management. At year's end, both staffs were in the process of resolving issues on 12 pending directives to improve the content, clarity, and consistency in safety requirements and guidance. Examples of completed directives include:

- DOE Order 151.1X, *Comprehensive Emergency Management System*
- DOE Order 251.1X, *Directives Program*
- DOE Order 420.1B, *Facility Safety*
- DOE Guide 424.1-1A, *Implementation Guide for use in Addressing Unreviewed Safety Question Requirements*
- DOE Order 452.1C, *Nuclear Explosive and Weapon Surety Program*
- DOE Order 452.2C, *Safety of Nuclear Explosive Operations*
- DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis Documents*

Recommendation 2004-2. The Board issued Recommendation 2004-2, *Active Confinement Systems*, in December 2004, to ensure that a reliable and effective control would be available to mitigate the consequences of potential accidents at defense nuclear facilities. DOE has now screened all hazard category 2 and 3 defense nuclear facilities against criteria designed to identify those with the potential for benefitting from the intent of the Recommendation. DOE also completed another major milestone in February 2006, developing and issuing its Ventilation System Evaluation Guidance document. This document identifies a set of design and performance attributes that ventilation systems can be evaluated against for identification of potential upgrades. Several pilot facilities have been identified by DOE to which these attributes will be applied, in order to identify potential improvements, before the guidance document is applied to the rest of hazard category 2 and 3 facilities that were screened and identified earlier in the year. The evaluation process will be completed over the next two years, resulting in significant improvement in the safety posture of defense nuclear facilities across the complex

DOE Technical Capability. In response to the Board's Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, DOE is making progress in a number of areas:

- In May 2006, DOE conducted the initial accreditation review of the Technical Qualification Program (TQP) at the site office for the Y-12 National Security Complex. The Y-12 Site Office had a solid program and served as a good benchmark for this accreditation process.
- DOE budgeted $2M for FY08 to re-establish the Corporate Technical Intern Program, which would fund ten interns.
- DOE developed and executed a Senior Technical Safety Manager (STSM) overview course in Albuquerque in February 2006 for qualified STSMs in the process of requalification and for new STSM candidates to assess gaps in their knowledge level. DOE will use lessons learned from this course to improve its next scheduled course. Additionally, DOE is strengthening its STSM qualification criteria with mandatory performance activities through a significant revision to DOE-STD-1075, *Senior Technical Safety Manager Functional Area Qualification Standard*. DOE expects to issue this standard later this year.

Recommendation 2004-1. In 2006, the Board issued technical report, DNFSB/TECH-36, *Integrated Safety Management: The Foundation for an Effective Safety Culture*. The report examines the current status of the effectiveness of integrated safety management (ISM) systems at the seven NNSA weapons sites, summarizes failures and good practices, and proposes changes to enhance the effectiveness of ISM. In response to Recommendation 2004-1, DOE completed the following actions in 2006: DOE designated an ISM Champion to chair an ISM Champions Council, which will assist in developing and sustaining vital, mature ISM systems throughout the Department; established two Central Technical Authorities (CTAs) with associated technical support staff; issued a new DOE policy and order on DOE oversight; implemented a nuclear safety research function; strengthened the technical qualification program for Federal safety assurance personnel; implemented a formal safety delegation and assignment process; and took steps to improve the implementation of the ISM "feedback and improvement" function, including issuance of a new DOE Order describing the Operating Experience Program. In 2006, DOE performed a review of the Recommendation 2004-1 Implementation Plan commitments. Based on the results of the review and experience with implementation to date, DOE developed a revision to the implementation plan that is still responsive to the recommendation. Implementation activity will continue beyond FY 2007.

Administrative Controls. In Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*, the Board identified the need for DOE to improve its guidance and expectations with respect to important administrative controls at defense nuclear facilities. As a result of the Board's Recommendation, the Department developed and implemented a plan to improve the reliability and effectiveness of administrative controls that serve in safety functions. DOE developed a new standard governing the development and implementation of specific administrative controls in the defense nuclear complex. Additionally, DOE has developed a set of training materials that were used to introduce the new and revised requirements to its field elements and has taken actions to verify the adequacy and implementation of the revised guidance and expectations throughout the complex. Further, DOE has made significant revisions to the "safe harbor" methodologies used to comply with 10 CFR 830, *Nuclear Safety Management*, to codify and incorporate the provisions of the Recommendation. With the exception of the completion of several annual updates, DOE has indicated that it believes that all of the commitments associated with the Recommendation have been met. The Board will work to evaluate the effectiveness and implementation of DOE's efforts in satisfying these commitments in 2007.

Use of Quantitative Risk Assessment Methodologies. The Board continues to follow DOE's activities associated with the use of quantitative risk assessment at defense nuclear facilities. Previously, the Board conducted a comprehensive assessment of DOE's policies, programs, processes, and procedures with respect to the use of quantitative risk assessment and related methodologies. The Board's review suggested that DOE and its contractors have employed quantitative risk assessment in a number of activities, including the development of documented safety analyses and other facility-level decision making activities. The precise use, as well as the level of formality of these assessments, varied over a wide range. As a result of the Board's observations and concerns, DOE has chartered a working group comprised of representatives from the major program offices, field elements, national laboratories, and major contractors to guide the efforts in this area. This group has worked to develop a draft policy, along with draft implementation guidance, which is scheduled to be released for general comment later this year. The Board will continue to oversee DOE's progress in developing an effective policy, along with useful implementing guidance, to govern the use of risk assessment methodologies at DOE facilities.

Nuclear Criticality Safety. Concerns expressed by the Board regarding the lack of Nuclear Criticality Safety (NCS) site reviews led to the establishment of a formal program to monitor contractor and federal NCS programs across the complex. The reviews are performed using senior contractor and federal NCS personnel; results of these reviews will be a component of subsequent DOE NCS Annual Reports. In response to the DOE FY 2005 NCS Annual Report, the Board requested additional information from DOE for three items: an updated schedule for relocation of critical experimental capability from Los Alamos National Laboratory (LANL) to the Nevada Test Site; an analysis of DOE site office staffing needs for effective federal NCS oversight and plans to fill those positions; and the latest status and schedule for conducting NCS engineer training classes, which had been discontinued at LANL in 2004. By the end of FY 2006, DOE had provided their response which the Board found acceptable.

FY 2006 Performance Accomplishments

Implementation of ISM: Activity-Level Work Planning. In 2006, the National Nuclear Security Administration completed work on their expectations of the contractors work planning and control processes, as well as criteria and review approach documents to comprehensively assess these processes for the first time. These documents will assist the sites in their goal of continuously improving worker safety. Based upon these documents and similar criteria and review approach documents developed by DOE's Office of Environmental Management, reviews were conducted at each of the sites to determine the baseline state of the work planning and control process. From this baseline, DOE has committed to take actions that will improve work planning and control at the sites as a part of the Recommendation 2004-1 Implementation Plan. Since that time, DOE has identified that the specific commitments will not be met as identified in the recommendation 2004-1 Implementation Plan, but that other actions will be taken as a part of the normal oversight of the sites. The Board will continue to work with them throughout FY 2006 to improve performance in this key area.

Recommendation 2002-1, *Quality Assurance for Safety-Related Software.* This recommendation was issued to correct problems caused by inadequate design, implementation, testing, and configuration management of safety-significant computer software. During the past year, DOE has completed identification, selection, and assessments of safety system software and firmware at its defense nuclear facilities. In addition, DOE has made some progress in properly training and qualifying personnel assigned to software quality assurance (SQA) positions to the requirements of DOE-STD-1172-2003, *Safety SQA Functional Area Qualification Standard.* Finally, DOE has issued three SQA-related directives and has revised DOE Manual 411.1C, *Safety Management Functions, Responsibilities and Authorities Manual* to reflect software-related organizational changes and responsibilities. Overall, DOE's ability to assure the validity of safety information developed by use of software is improving.

Performance Goal 4	Nuclear Safety Programs and Analysis. DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

Examples of FY 2005 Accomplishments

DOE Directives. As part of its ongoing review of new and revised DOE directives, the Board and its staff evaluated and provided constructive critiques of 32 directives associated with, but not limited to, worker protection management, electrical safety, quality assurance, internal and external dosimetry, and natural phenomena hazard mitigation. At year's end, both staffs were in the process of resolving issues on 19 pending directives to improve the content, clarity, and consistency in safety requirements and guidance. Examples include:

- DOE Order 251.1X, *Directives Program*
- DOE Order 151.1X, *Comprehensive Emergency Management System*
- DOE Standard 1104, *Review and Approval of Nuclear Facility Safety Basis Documents*
- DOE Order 420.1B, *Facility Safety*

Electrical Safety Handbook. The Board identified weaknesses with the proposed revision to the *Electrical Safety Handbook*, DOE-HDBK-1092-98, and requested that DOE provide effective, detailed guidance to contractors on electrical safety programs. In December 2004, DOE issued the revised handbook.

Administrative Controls. In Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*, the Board identified the need for DOE to improve its guidance and expectations with respect to important administrative controls at Defense Nuclear Facilities. As a result of the Board's Recommendation, the Department developed and implemented a plan to improve the reliability and effectiveness of administrative controls that serve in safety functions. DOE developed a new Standard governing the development and implementation of specific administrative controls in the defense nuclear complex. Additionally, DOE has developed a set of training materials that were used to introduce the new and revised requirements to its field elements. Further, as a result of the Recommendation, DOE is actively verifying the adequacy and implementation of the revised guidance and expectations throughout the complex. The Board continues to work closely with DOE to finalize the guidance to ensure that proper safety focus is afforded to administrative controls that provide important safety-related functions at DOE facilities.

Review of Documented Safety Analyses, Safety Basis Assumptions, and Safety Programs. The development of a comprehensive safety basis and the identification and selection of an appropriate control set are essential cornerstones of safe operation at defense nuclear facilities. The Board conducted numerous reviews of the safety bases throughout the DOE complex. The Board reviewed the critical assumptions used in the development of the safety bases as well as the control strategies used to prevent and mitigate accident scenarios of concern. The Board identified a number of specific weaknesses in the development and implementation of the safety bases at defense nuclear facilities. In particular, the Board highlighted concerns with the safety bases at the Nevada Test Site's Device Assembly Facility (DAF), as well as the training program at the DAF. Further, the Board continues to closely follow site specific concerns at the Pantex plant involving a number of weaknesses in the tooling program. As a result of these concerns, DOE and its contractors are implementing corrective actions to address these issues.

Use of Quantitative Risk Assessment Methodologies. The Board continues to follow DOE's activities associated with the use of quantitative risk assessment at Defense Nuclear Facilities. Previously, the Board conducted a comprehensive assessment of DOE's policies, programs, processes, and procedures with respect to the use of quantitative risk assessment and related methodologies. The Board's review suggested that DOE and its contractors have employed quantitative risk assessment in a number of activities including the development of documented safety analyses and other facility-level decision making activities. The precise use, as well as the level of formality of these assessments, varied over a wide range. As a result of the Board's observations, DOE has developed a draft Policy governing the use of risk assessment methodologies at Defense Nuclear Facilities.

Examples of FY 2005 Accomplishments

Oversight of Complex, High-Hazard Nuclear Operations. From 2003-2004, the Board conducted eight public hearings to examine DOE's and NNSA's current and proposed methods of ensuring safety at its defense nuclear facilities. The Board cautioned DOE and NNSA that if any such changes are made, they must be done formally and deliberatively, with due attention given to unintended safety consequences that could reduce the present high level of nuclear safety. The Board also sought to benefit from the lessons learned as a result of investigations conducted following the Columbia Space Shuttle disaster and the discovery of the deep corrosion in the reactor vessel head at the Davis-Besse Nuclear Power Plant. From these hearings, the Board concluded that there was cause for concern with regard to the potential increase in the possibility of nuclear accidents as evident in: (1) the increased emphasis on productivity at the possible expense of safety, (2) the loss of technical competency and understanding at senior management levels within DOE's and NNSA's organizational structure, (3) the apparent absence of a strong safety research focus, and (4) the reduced central oversight of safety.

On May 21, 2004, the Board issued Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, to ensure that any fundamental reorganization at DOE and NNSA does not degrade nuclear safety, and that the likelihood of a serious accident, facility failure, construction problem, or nuclear incident will not be increased as a result of well-intentioned changes. On July 21, 2004, the Secretary of Energy accepted the Board's Recommendation, however, the DOE implementation plan submitted to the Board on December 23, 2004 did not provide sufficient emphasis and detail that would strengthen DOE's federal safety assurance, ability to learn from internal and external operating experience, or revitalize Integrated Safety Management (ISM). The Board rejected the implementation plan in a letter to DOE on February 14, 2005, and identified areas requiring further attention. Since that time, DOE has delivered a more thorough implementation plan, which was accepted by the Board August 5, 2005, and has taken steps to create a DOE and an NNSA Office of the Central Technical Authority (CTA), and a Nuclear Safety Research function. DOE has also issued two DOE directives on DOE Oversight process. The Board will continue monitor DOE's progress in upgrading its technical staffing and qualification of federal safety assurance personnel, establishing new processes and criteria for safety delegations, implementing its Operating Experience Program, and reinvigorating its ISM System to improve its work planning and work control.

NNSA Facility Representative Staffing and Training. In March 2004, the Board conducted on-site reviews of the staffing levels and training of Facility Representatives (FR) at the Pantex Site Office, the Sandia Site Office, and the Los Alamos Site Office. The Board observed that these three NNSA sites were not staffed with a sufficient number of FRs to perform their facility oversight responsibilities. Further, two sites had been under reporting their FR staffing needs for the past four years. Contributing to this deficiency is that the guidance in the FR staffing analysis in DOE-STD-1063-2000, *Facility Representatives*, did not adequately account for all of the hazardous facilities for which DOE and NNSA have oversight responsibility, and did not capture all of the FR work demands. During the review, the FR continuing training programs were found to be unstructured, informal, and generally weak in execution. In a letter dated May 14, 2004, the Board noted these concerns. During the latter part of 2004 and into 2005, NNSA has taken steps to improve its activity-specific hazard training for Facility Representatives. NNSA also developed and executed a more rigorous staffing analyses that determined that 20 additional Facility Representatives were needed at six NNSA sites. Actions to hire 10 FRs for this fiscal year are underway, and a budget request for 10 more FR positions has been submitted for FY2006. Additionally, the guidance for the FR staffing analysis in DOE-STD-1063-2000 is being revised, and projected for re-issuance in mid-2006.

Software Quality Assurance (SQA). The Board issued Recommendation 2002-1, *Quality Assurance for Safety-Related Software*, to correct problems caused by inadequate design, implementation, testing, and configuration management of safety-significant computer software. During the past year, DOE has completed identification, selection, and assessments of safety system software and firmware at its defense nuclear facilities. In addition, DOE has made some progress in properly training and qualifying personnel assigned to SQA positions to the requirements of DOE-STD-1172-2003, *Safety SQA Functional Area Qualification Standard.* Finally, DOE has issued three SQA-related directives and has revised DOE M 411.1C, *Safety Management Functions, Responsibilities and Authorities Manual* to reflect software-related organizational changes and responsibilities.

Performance Goal 4	Nuclear Safety Programs and Analysis. DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

Examples of FY 2004 Accomplishments

10 CFR 851, *Worker Safety and Health.* The Bob Stump National Defense Authorization Act, Public Law 107-314, directed DOE to promulgate regulations on worker safety and health, rather than rely exclusively on a contractual approach to establish safe and healthy workplaces. On December 8, 2003, DOE provided notification of a proposed Rule on worker protection, Title 10 Code of Federal Regulations, Part 851 (10 CFR 851), *Worker Safety and Health*, in the Federal Register. The Board is required by law to review and evaluate all applicable DOE Orders, regulations, and requirements. The Board conducted a detailed review of the proposed Rule and provided comments to DOE on January 23, 2004. As a result, the Secretary suspended the rulemaking until the Board's issues could be resolved. The Board worked closely with DOE to develop a new regulation, and in June 2004 a draft of the revised Rule was sent to the Office of Management and Budget to be prepared for publication in the Federal Register. The new Rule will assist in implementing Integrated Safety Management at the activity level, helping to assure the safety of the workforce.

Software Quality Assurance (SQA). The Board issued Recommendation 2002-1, *Quality Assurance for Safety-Related Software*, to correct problems caused by inadequate design, implementation, testing, and configuration management of safety-significant computer software. During the past year, DOE has responded to the Recommendation by developing new directives for SQA and software safety, training personnel whose duties involve SQA, and improving the quality of selected software codes used across the complex for the analysis of potential accidents.

Implementation of ISM: Activity-Level Work Planning. The Board reviewed the incorporation of safety into work planning at several NNSA sites, evaluating how each site accomplished the five ISM core functions (define the scope of work, analyze the hazards, develop and implement controls, perform the work, and provide feedback and continuous improvement) for programmatic work as well as maintenance. The Board's reviews revealed significant deficiencies in the ability to effectively incorporate ISM into the process for work planning and control. Problems were noted in the tailoring of generic work documents, the processes used to identify and analyze hazards, the development of appropriate and unambiguous controls to be included in work packages, the use of a hierarchy of controls, and the ability to effectively identify areas for improvement and take action accordingly. In a letter dated May 21, 2004, the Board noted that actions to address some of these issues were being developed; however, significantly more senior management attention was required. DOE and NNSA are just beginning to address these issues. The Board will continue to work with them throughout FY 2005 to improve performance in this key area.

Site Specific Safety Reviews. The development of a comprehensive safety basis and the identification and selection of an appropriate control set are essential cornerstones of safe operation at defense nuclear facilities. The Board conducted numerous reviews of the site-specific safety bases throughout the DOE complex. In particular, the Board reviewed the critical assumptions used in the development of the safety bases as well as the control strategies used to prevent and mitigate accident scenarios of concern for facilities and activities such as the Savannah River Site (SRS) and Hanford tank farms, the Waste Isolation Pilot Plant (WIPP) Mobile Waste Characterization and Loading Units, the Pantex Plant Onsite Transportation Program, Los Alamos National Laboratory's "Armando" subcritical experiment, Hanford Spent Nuclear Program's Sludge Removal Project, Sandia National Laboratories' Auxiliary Hot Cell Facility, and the Nevada Test Site (NTS) Device Assembly Facility, G-tunnel, and Onsite Transportation Programs. During the course of these reviews, the Board identified a number of specific instances where inappropriate assumptions and methodologies were used in the development of safety bases. These included analyses which did not always use bounding input assumptions and which implicitly credited non-qualified plant indications and equipment in the development of the safety analyses. These deficiencies resulted in situations where the safety analyses may not have appropriately bounded the actual hazard conditions for the facilities concerned. As a result of these concerns, DOE/NNSA and its contractors have implemented a number of corrective actions to address these issues. For example:

Examples of FY 2004 Accomplishments

- At the Pantex Plant, multi-unit nuclear explosive operations remain suspended for the present until further testing and analysis can resolve the concerns or until adequate controls can be developed. Additional controls have also been imposed on some operations to assure safety given new information regarding electro-static discharge environments.
- At the Hanford Tank Farms, DOE rewrote the Technical Safety Requirements to reinstate key controls (such as Process Control Plans) that the Board had discovered were improperly eliminated. A second independent review was convened to ensure all safety controls had been implemented. The contractor has increased the frequency of taking key tank waste measurements so that current waste conditions were better understood, due to the Board's discovery that the contractor had inadvertently put a tank at risk of retaining and releasing significant quantities of flammable gas.
- DOE is revising the Basis for Interim Operation (BIO) for the WIPP Mobile Waste Characterization and Loading Units to address the significant technical deficiencies identified by the Board, including incorrect modeling of accident scenarios; lack of proper documentation of accident analyses; and potentially inadequate identification and classification of controls for protection of the public and workers.

Recommendation 2002-3. In Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*, the Board identified the need for DOE to improve its guidance and expectations with respect to important administrative controls at defense nuclear facilities. As a result of the Board's Recommendation, the Department has developed and implemented a plan to improve the reliability and effectiveness of administrative controls that serve safety functions. Recent efforts have focused on development of a draft standard governing the development and implementation of specific administrative controls in the defense nuclear complex. Additionally, DOE has developed a set of training materials to be used to introduce the new and revised requirements to its field elements. The Board continues to work closely with DOE to finalize this guidance to ensure that a proper safety focus is afforded on administrative controls that provide important safety-related functions.

NNSA Training and Qualification. The Board noted concerns with Federal oversight of training and qualification at the Pantex Plant. Most notably, required reviews of contractor training and qualification programs were not being performed. In July, the Board broadened their concern to all National Nuclear Security Administration (NNSA) sites, citing the concern that failure to verify the adequacy of training and qualification programs would raise questions regarding the reliability of the significant number of administrative control programs within the NNSA system. In response, NNSA initiated a review at all field sites, and identified three sites, in particular, that did not meet program requirements. However, by August 2004, the Board found that senior NNSA management had not taken prompt action to upgrade the programs at these three sites. A letter to NNSA identified this situation as unacceptable—NNSA was given 45 days to define the bounds of the problem, and 30 days to develop a corrective action plan.

Functions Responsibilities and Authorities (FRA) Documents. The Board continued to follow DOE activities in the closure process associated with Recommendation 98-1, *Resolution of Issues Identified by DOE Internal Oversight*. DOE is also obligated under DOE Manual 411.1, *Safety Management Functions Responsibilities and Authorities (FRA) Manual* to annually update the FRA Manual to reflect changes in organizational responsibilities and authorities. After significant effort on the part of the Board, DOE has developed a credible FRA Manual at the corporate level, and sub-tier FRAs in key DOE organizational elements (e.g., the Office of Environmental Management, and NNSA). The Board will continue to work with the DOE program offices throughout FY 2004 to refine their FRA documents to ensure safety roles and responsibilities are clearly defined.

NNSA's Facility Representative Staffing and Training. In a letter dated May 14, 2004, the Board noted concerns with the insufficient staffing levels of Facility Representatives (FR), and the inadequate level of activity-specific hazards training, at the Pantex Site Office, the Sandia Site Office, and the Los Alamos Site Office. The Board broadened their concern to all NNSA sites, citing a concern that inadequate staffing of FRs at the NNSA sites will result in significant challenges to NNSA's ability to monitor nuclear weapon activities and perform assigned safety responsibilities. In response, NNSA is taking steps to improve its activity-specific hazard training for FRs, and will conduct more rigorous staffing analyses to ensure that staffing levels for NNSA's FRs are sufficient.

Performance Goal 4	Nuclear Safety Programs and Analysis. DOE develops, maintains, and implements regulations, requirements, and guidance; and establishes and implements safety programs at defense nuclear facilities as necessary to ensure adequate protection of health and safety of the workers and the public.

Examples of FY 2003 Accomplishments

DOE Directives. As part of its ongoing review of new and revised DOE directives, the Board and its staff evaluated and provided constructive critiques of 34 directives associated with, but not limited to, worker protection management, electrical safety, software quality assurance, and DOE's Occurrence Reporting and Processing System. At year's end, both staffs were in the process of resolving issues on 26 pending directives to improve the content, clarity, and consistency in safety requirements and guidance. Examples include:

- **Worker Protection Management.** Members of the Board's staff worked closely with DOE to revise the requirements in Change 1 to DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*. This effort was completed in June 2003, culminating in an updated directive that included important new biological agent protection requirements developed in response to increased homeland security awareness.
- **Electrical Safety.** In June 2001, the Board had urged DOE to take a proactive stance to ensure adequate electrical safety. DOE agreed to update the *Electrical Safety Handbook* in August 2002. However, in July 2003 the Board learned that DOE had deleted much of the technical content in the proposed revision. The Board informed DOE that this was unacceptable, especially in light of the high rate of electrical safety incidents observed across the defense nuclear complex. DOE is now revising the handbook.
- **Environment, Safety and Health Reporting.** During most of 2003, the Board worked closely with DOE to consolidate and revise the various DOE reporting orders into a single directive. The Board provided formal comments on draft DOE Order 231.1A, *Environment, Safety and Health Reporting*, plus its many supporting documents, including DOE Manuals 231.1-1, 231.1-2, *Occurrence Reporting and Processing of Operations Information*, and DOE Guides 231.1-1, *Occurrence Reporting and Performance Analysis Guide*, and 231.1-2, *Occurrence Reporting Causal Analysis*. These revisions, which are key to maintaining a strong feedback and improvement program across the defense nuclear complex, are being implemented at the start of FY 2004. The Board will monitor closely the effectiveness of the revised program during this implementation phase.

National Nuclear Security Administration (NNSA) Policy Letters. During FY 2003, NNSA instituted an internal system of directives under the authority of Public Law 106-65. However, the Board initiated a review of the system and found that the system architecture had not been adequately described, directives being issued were potentially in conflict with existing DOE directives, and all of the conditions of the public law had not yet been satisfied. The Board worked closely with NNSA throughout the year to design a system that would meet the needs of NNSA, while protecting the integrity of the environment, safety, and health requirements already established under DOE. This effort will continue into FY 2004. In the interim, the Board has reviewed 22 advance copies of proposed NNSA Policy Letters, in anticipation of their issue.

Software Quality Assurance: Considerable Board resources were expended during FY 2002 reviewing draft DOE Order 203.X, *Software Quality Assurance (SQA)*. As a result of inadequate progress toward resolution of the Board's concerns with SQA, on September 23, 2002, the Board issued Recommendation 2002-1, *Quality Assurance for Safety-Related Software*. Development of the Implementation Plan (IP) for this recommendation required significant interaction between the Board and DOE—it was finally accepted by the Board on April 10, 2003. The Board will follow DOE's implementation efforts closely in FY 2004. In a related effort, members of the Board's staff are leading efforts to revise and update ANSI/ANS Standard 10.4, *Guidelines for the Verification and Validation of Scientific and Engineering Computer Programs for the Nuclear Industry*. This standard will be important to both the Nuclear Regulatory Commission (NRC) and DOE.

Examples of FY 2003 Accomplishments

Integration of Hazards Analyses. The Board reviewed the contents of several DOE directives that contain requirements for hazard and accident analyses, performed site reviews, and identified less-than-adequate implementation of safety requirements due to inconsistencies and lack of integration of the directives. The directives included DOE Guides for implementation of 10 CFR 830, and DOE Orders 151.1A, 420.1, and 451.1A. As a direct result of the Board's activities, DOE issued a handbook entitled *Integration of Multiple Hazard Analysis Requirements and Activities*, which has helped several DOE contractors to perform their activities in a safer, more integrated, and significantly more cost effective manner. Several contractors realigned their organizational structure to benefit from the Board's findings and achieved improved operational safety.

Safety Analysis Methodology. As part of its ongoing review of the adequacy of health and safety directives, the Board noted a number of weaknesses with respect to the implementation of the methodology associated with the performance of safety analyses at several defense nuclear facilities. Consequently, the Board issued a series of letters to the Secretary of Energy outlining these concerns. As a result, the Department committed to increased attention and vigilance in its acceptance and oversight of documented safety analyses.

Design Requirements and Guidance for Facilities. The Board had previously noted that the design requirements for nuclear facilities in DOE Order 420.1, *Facility Safety,* and its associated guidance documents were not being implemented at LANL and requested a report describing the status of implementation of the DOE Order and applicable guidance at all NNSA sites having defense nuclear facilities. Such requirements and guidance are important for properly selecting discipline-specific industry codes and standards for safety-class and safety-significant structures, systems and components. As a result, NNSA has now developed complete crosswalks between the codes and standards in the implementation guide and those in the appropriate contractor documents such as design manuals, design criteria, and procedures, and is having contractors update their internal requirements and guidance documents.

National Nuclear Security Administration Training and Qualification. In a letter dated June 5, 2003, the Board noted concerns with Federal oversight of training and qualification at the Pantex Plant. Most notably, required reviews of contractor training and qualification programs were not being performed. In July, the Board broadened their concern to all National Nuclear Security Administration (NNSA) sites, citing the concern that failure to verify the adequacy of training and qualification programs would raise questions regarding the reliability of the significant number of administrative control programs within the NNSA system. In response, NNSA has initiated a review at all field sites. Necessary corrective actions will be implemented in FY 2004.

Functions Responsibilities and Authorities (FRA) Documents. The Board continued to follow DOE activities in the closure process associated with Recommendation 98-1, *Resolution of Issues Identified by DOE Internal Oversight.* DOE is also obligated under DOE Manual 411.1, *Safety Management Functions Responsibilities and Authorities (FRA) Manual* to annually update the FRA Manual to reflect changes in organizational responsibilities and authorities. Despite significant effort on the part of the Board, DOE remains without a credible FRA Manual at the corporate level, and without sub-tier FRAs in a number of DOE organizational elements. The Board will continue to work with the DOE program offices throughout FY 2004 to revise their FRA documents to ensure safety roles and responsibilities are clearly defined.

Contractor System Engineers. The Board worked with DOE to develop formal training and qualification requirements for contractor system engineers in response to Board Recommendation 2000-2, *Configuration Management, Vital Safety Systems.* The Board conducted progress reviews of the programs at the Y-12 National Security Complex, the Pantex Plant, the Hanford Site (Fluor Hanford, CH2M Hill, and Pacific Northwest National Laboratory), and Lawrence Livermore National Laboratory (LLNL), finding that the effectiveness of site contractors' systems engineer programs varied significantly. Only the contractors for Y-12 and the Hanford tank farms had maturing, well-founded, and robust programs. The contractors' systems engineer programs at the remaining sites suffered from a number of shortcomings and were much less effective. The Board will continue to engage with DOE as the contractors' system engineer programs are implemented.

Federal Technical Oversight of Safety Systems. While maintaining DOE's implementation of Board Recommendation 2000-2, *Configuration Management, Vital Safety Systems*, the Board found that the DOE subject matter expert (SME)/systems engineer programs were weak at all four sites reviewed. Although each DOE site office had established an SME organization, few site offices had a fully staffed and implemented program. DOE SMEs have not yet had a meaningful presence in the field, and the intended benefits from these programs in terms of contractor oversight have yet to be realized fully. While DOE has developed an adequate path forward to provide qualified federal personnel, no site reviewed had fully achieved that objective. The Board will continue to urge DOE to apply more senior management attention and resources to staff and qualify technical personnel for these systems engineering organizations.

Site Specific Safety Reviews. The Board conducted a number of site-specific safety reviews in the DOE complex. In particular, the Board conducted reviews associated with the adequacy of the development and implementation of the documented safety analyses (DSAs) performed as a result of the requirements specified in 10 CFR 830, *Nuclear Safety Management*. The Board performed detailed safety reviews at the following facilities: Savannah River Site (SRS) and Hanford tank farms, Lawrence Livermore National Laboratory (LLNL) plutonium facility, Waste Isolation Pilot Plant (WIPP) remote handled transuranic waste operations, and at the Nevada Test Site (NTS) device assembly facility, radioactive waste management complex and U1a underground facility. During the course of these reviews, the Board identified a number of important safety issues that required resolution by DOE. For example, the SRS review identified the need for additional rigor in the protection of important assumptions and selection of appropriate controls. At LLNL, the Board's review identified the need for additional analysis to ensure the appropriate safety classification of important equipment and also the need for DOE to exercise increased vigilance in ensuring that all the necessary conditions of approval are being met with respect to safety evaluation reports. At NTS, the Board found that NNSA and its primary support contractor did not have adequate staff or nuclear safety management programs to support the operation of nuclear facilities. DOE and NNSA are taking corrective actions for all of these findings.

Administrative Controls. In late 2002, the Board noted that many administrative controls currently serve in safety-related applications, but may not have been developed with the same rigor as an engineered control. As a result, these administrative controls may not always have the same level of reliability as would be expected from an analogous safety-related engineered feature. Therefore, the Board issued Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*. In response, DOE developed an Implementation Plan that committed to strengthen the guidance and expectations associated with the development of administrative controls and to review the existing set of administrative controls to ensure that these revised expectations are being met. This plan will be implemented throughout FY 2004-5.

Software Quality Assurance at the Pantex Plant. The Pantex Plant contractor attempted to reduce errors associated with several administrative control programs by using computer-based systems. Due to inadequate software quality assurance (SQA) practices, there has been a continuing series of problems with the installed Move Right software package, resulting in errors in material control and accountability. Similar problems were noted in the development of the site's Interactive Electronic Procedures. The Board highlighted these issues to DOE, and significant corrective actions are in progress for both of these software products. Additionally, Pantex procedures for improved SQA are being developed.

Hoisting and Rigging Safety. The Board has noted that reportable hoisting and rigging events continue to occur throughout the defense nuclear complex. As a result, the Board has developed a special initiative to review the adequacy of hoisting and rigging operations at selected DOE facilities. During this fiscal year, the Board completed reviews at the Savannah River Site and the Pantex Plant. Significant feedback for improvement was provided to the respective facilities. As a result of the success of this initiative, additional reviews are planned for the coming fiscal year.

Fire Safety at LANL. In a January 2003 letter to the Secretary of Energy, the Board expressed concern over the safety impacts of rescinding $75M of Cerro Grande funds on fire protection projects, as proposed by DOE. The funds were subsequently reinstated for these critical projects for FY 2003.

Examples of FY 2003 Accomplishments

Unreviewed Safety Question (USQ) Procedures. The USQ process required by 10 CFR 830.203 is the mechanism for ensuring that the substantial investment in the safety bases for defense nuclear facilities isn't invalidated by undocumented and/or unauthorized changes. In FY 2003, the Board reviewed seven USQ procedures and identified substantial areas of noncompliance with the governing requirements. Responding to discussions of the issues raised, DOE required substantial revisions of the procedures, and required the contractors to include guidance in the procedures submitted for approval that had previously been relegated to documents that were not subject to DOE approval.

OBJECT CLASS SUMMARY

Actual obligations for FY 2006, projected obligations for FY 2007, and the Board's Budget Request for FY 2008 are presented by object class accounts in Exhibit B. The Board proposes to utilize the budget resources requested in the following manner:

Salaries and Benefits (Object Class 10). The FY 2008 request includes funding of $16,278,878 to support the projected salary and benefit costs for 98 FTEs. The rationale and justification for the additional salaries and benefits costs are explained in detail in the executive summary on page 10. The funding for salaries and benefits represents 70 percent of the Board's FY 2008 estimated obligations. In calculating the projected salary and benefits needs of the Board, the following federal pay adjustment and benefits factors for Executive Branch employees are used:

- Pay increase of 2.64 percent beginning in January 2007.
- Pay increase of 3.1 percent beginning in January 2008.
- Employee benefits of 25.7 percent of salaries, or $31,837 per FTE in FY 2008. Note personnel benefit (Object Class 12) costs also include other costs such as change of station, public transit subsidies, etc.

In establishing the Board, Congress sought to bring the best talent available to focus on health and safety oversight questions associated with the design, construction, operation, and decommissioning of DOE defense nuclear facilities. The recruitment and retention of scientific and technical staff with outstanding qualifications are the key components in the Board's human capital strategy if we are to be successful in accomplishing the Board's mission. In order to accomplish the Board's highly technical mission, it is of paramount importance that the Board receives sufficient funds to meet the salary and benefit requirements of the staff.

The Board maintains its on–site safety oversight of defense nuclear facilities by assigning experienced technical staff members to full–time duty at priority DOE sites. Currently eleven full–time site representatives are stationed at six DOE sites. The Site Representatives Program provides a cost–effective means for the Board to closely monitor DOE activities, and to identify health and safety concerns promptly by having on–site staff conducting first hand assessments of nuclear safety management at the priority sites to which they have been assigned. Site representatives regularly interact with the public, union members, congressional staff members, and public officials from Federal, state, and local agencies.

Travel (Object Class 21). The Board requests $820,000 to support the official travel of the Board Members and staff. Extensive travel is necessary to the various DOE defense nuclear facilities located throughout the United States in order for the Board Members and staff to conduct first-hand assessments of operations and associated health and safety issues. The Board is required to react to incidents at the DOE defense nuclear facilities that may affect public health and safety, requiring unplanned travel expenditures to support its work at these sites. During FY 2006, Board Members, technical staff and the Board's outside technical experts made 182 team visits to major defense nuclear sites in support of its high priority public health and safety oversight mission.

The Board is also authorized to station staff members at DOE sites or facilities during critical construction and testing periods. The Board has assigned technical staff teams to round–the–clock monitoring of major start–up, testing, or restart activities at various DOE sites. The presence of its technical staff has proved to be invaluable in providing the Board with firsthand information on the demonstrated readiness, capabilities, and performance of the DOE and its contractors for ensuring safety in the conduct of such activities. During the coming fiscal years, the Board anticipates a continued need for Board technical staff teams to monitor construction and start-up of new DOE defense nuclear facilities, such as the Waste Treatment Facility in Richland, Washington and the Highly Enriched Uranium Materials Facility in Oak Ridge, Tennessee.

Transportation of Things (Object Class 22). The Board has included $100,000 in its FY 2008 Budget Request for the shipment of household goods for employees relocating to the Washington, D.C. area or to become site representatives at DOE facilities, a reduction of $100,000 from the amount included in the FY 2007 President's Budget. The Board anticipates filling all vacancies in FY 2007, and thus fewer relocations are projected in FY 2008.

Rental Payments to GSA (Object Class 23.1). The Board requests funds totaling $2,158,988 to reimburse the General Services Administration (GSA) for projected office rental costs. This overhead expense represents approximately 9 percent of the Board's FY 2008 Budget Request. GSA negotiated a new ten-year lease for the Board effective in March 2006. GSA has estimated that the Board's rental payment to GSA under the new lease will be $2.159 million for FY 2008.

Communications and Utilities (Object Class 23.3). The FY 2008 Budget Request includes $185,000 for projected communications support costs, the same amount included in the FY 2007 President's Budget. Funds in this account will be used for telephone (local, long distance, and cellular) services, Internet access charges, postage and overnight delivery costs, and special messenger services. Contracts for emergency communications services and the Board's alternate Continuity of Operations Facility (COOP) are also included in this account.

Printing and Reproduction (Object Class 24). The budget request includes $50,000 for reimbursing the U.S. Government Printing Office for publication of the required legal notices in the *Federal Register*. Routine printing and copying charges for Budget Requests, the Board's *Annual Report to Congress, the Performance Accountability Report (PAR)*, and technical reports, are also included in this account.

Consulting Services (Object Class 25.1). The Board maintains a highly skilled staff, but it is not economically feasible to maintain multiple permanent staff in very specialized technical disciplines. Therefore, it is necessary to have the funds available to immediately contract for this expertise when needed. For example, extensive use of technical consultants has been necessary to review the complex design and construction of the Waste Treatment Plant at Hanford. This includes the review of seismic analysis, structural loading, and construction plans to ensure the safety of this $11 billion project. The Board obtains specialized contractor expertise in a variety of technical disciplines to augment its internal review capability and avoid any unnecessary impact on DOE's construction schedule.

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

A list of major technical support contracts, with a brief description of each contractor's areas of expertise, and a chart that reflects funding levels for this support are included on pages 86 through 90. The FY 2008 Budget Request includes $875,000 in this account for technical support contracts to assist the Board in its health and safety reviews, a $25,000 reduction from the amount included in the FY 2007 President's Budget and approximately $400,000 less than actual FY 2006 obligations.

Other Services (Object Class 25.2). The budget request includes $1,575,000 to fund a wide range of recurring administrative support needs of the Board in FY 2008 such as the independent audit of the Board's financial statements, physical and cyber security, employee training, recruitment, information technology support, court reporting, records storage and retrieval, and drug-free workplace testing and support.

Government Services (Object Class 25.3). The Board's budget request includes $672,000 for reimbursable support agreements with other Federal agencies, a $30,000 reduction from the amount included in the FY 2007 President's Budget. The Board utilizes cross-service providers for accounting and payroll processing services consistent with government-wide lines of business objectives, and also utilizes cross-servicing arrangements for services such as: physical security, health unit, employee background investigations for security clearances, Employee Assistance Program services, the Library of Congress' FedLink for legal and legislative research, and Defense Contract Auditing Agency (DCAA) services to assist in determination of fair and reasonable contracting costs.

Operation and Maintenance of Equipment (Object Class 25.7). The Board requests $55,000 for maintaining and repairing Board equipment (i.e., copier maintenance agreements, repair of office equipment, etc.). Note the Board has historically budgeted and accounted for these costs within Object Class 25.2. However, in accordance with OMB Circular A-11, these costs should be budgeted and accounted for in Object Class 25.7. The Board has implemented this change effective FY 2007.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

FY2008 CONGRESSIONAL BUDGET REQUEST

BUDGET ACCOUNT -- (OC)	FY 2006 OBLIGATIONS (Actual)	FY 2007 FINANCIAL PLAN	FY 2008 BUDGET REQUEST
PERSONNEL SALARIES -- (11)	$ 10,393,564	$ 11,813,550	$ 12,498,837
PERSONNEL BENEFITS -- (12)	$ 2,799,170	$ 3,641,437	$ 3,780,041
TRAVEL -- (21)	$ 681,082	$ 800,000	$ 820,000
TRANSPORTATION OF THINGS -- (22)	$ 35,347	$ 100,000	$ 100,000
RENTAL PAYMENTS TO GSA -- (23.1)	$ 2,100,000	$ 2,154,919	$ 2,158,998
COMMUNICATIONS & UTILITIES (23.3)	$ 162,604	$ 185,000	$ 185,000
PRINTING & REPRODUCTION -- (24)	$ 49,583	$ 52,000	$ 50,000
ADVISORY & ASSISTANCE SERVICES -- (25.1)	$ 1,270,690	$ 875,000	$ 875,000
OTHER SERVICES -- (25.2)	$ 1,663,051	$ 1,550,000	$ 1,575,000
GOVERNMENT SERVICES -- (25.3)	$ 702,231	$ 662,000	$ 672,000
OPERATION & MAINT. OF EQUIPMENT -- (25.7)	$ -	$ 55,000	$ 55,000
SUPPLIES & MATERIALS -- (26)	$ 205,760	$ 215,000	$ 215,000
ACQUISITION OF ASSETS -- (31)	$ 381,989	$ 300,000	$ 300,000
*** TOTAL OBLIGATIONS ***	$ 20,445,071	$ 22,403,906	$ 23,284,866
NEW BUDGET AUTHORITY	$ 21,811,680*	$ 19,757,659 **	$ 22,499,000
UNOBLIGATED BALANCE - PREV. FY	$ 1,389,721	$ 3,443,742	$ 797,495
RECOVERY OF PRIOR YR OBLIGATIONS	$ 687,412	$ -	$ -
TOTAL BUDGETARY RESOURCES	$ 23,888,813	$ 23,201,401	$ 23,296,495
EST. UNOBLIGATED BAL. - CUR. FY	$ 3,443,742	$ 797,495	$ 11,629
OUTLAYS	$ 19,684,173	$ 21,955,828	$ 22,819,169
STAFF AND BOARD MEMBERS (FTE'S)	86	95	98

* $22,032,000 appropriation; $220,320 rescission
** Based on Full Year Continuing Resolution

Exhibit B

Supplies and Materials (Object Class 26). The Board requests $215,000 for continued access to numerous technical standards databases, legal research services, maintenance of the technical reference information for its library, and for general office supplies and materials, a $90,000 decrease from the amount requested in the FY 2007 President's Budget. The decrease includes $50,000 in costs for reference information that is now procured through software licenses which properly belong in Object Class 31.

Acquisition of Assets (Object Class 31). The Board requests $300,000 for recurring software licenses/maintenance agreements supporting the Board's operations and to replace outdated office equipment such as computers, printers, and copiers. The requested amount is $50,000 more than included in the FY 2007 President's Budget which are the costs previously included under Object Class 26.

The Board's budget request for assets does not include funding for any new systems. It does include a small amount (less than $50,000) for potential enhancements to existing systems. The priority for system enhancements will be to ensure that existing security requirements are maintained and/or addressed as part of the enhancement (e.g., no funds will be spent on systems enhancement without first ensuring systems meet existing security requirements, or will meet them as a result of the enhancement).

TECHNICAL SUPPORT CONTRACTS SUMMARY

A list of major technical support contracts, with a brief description of each contractor's areas of expertise, follows. The FY 2008 Budget Request includes $875,000 in this account for technical support contracts to assist the Board in its health and safety reviews.

DEFENSE NUCLEAR FACILITIES
SAFETY BOARD

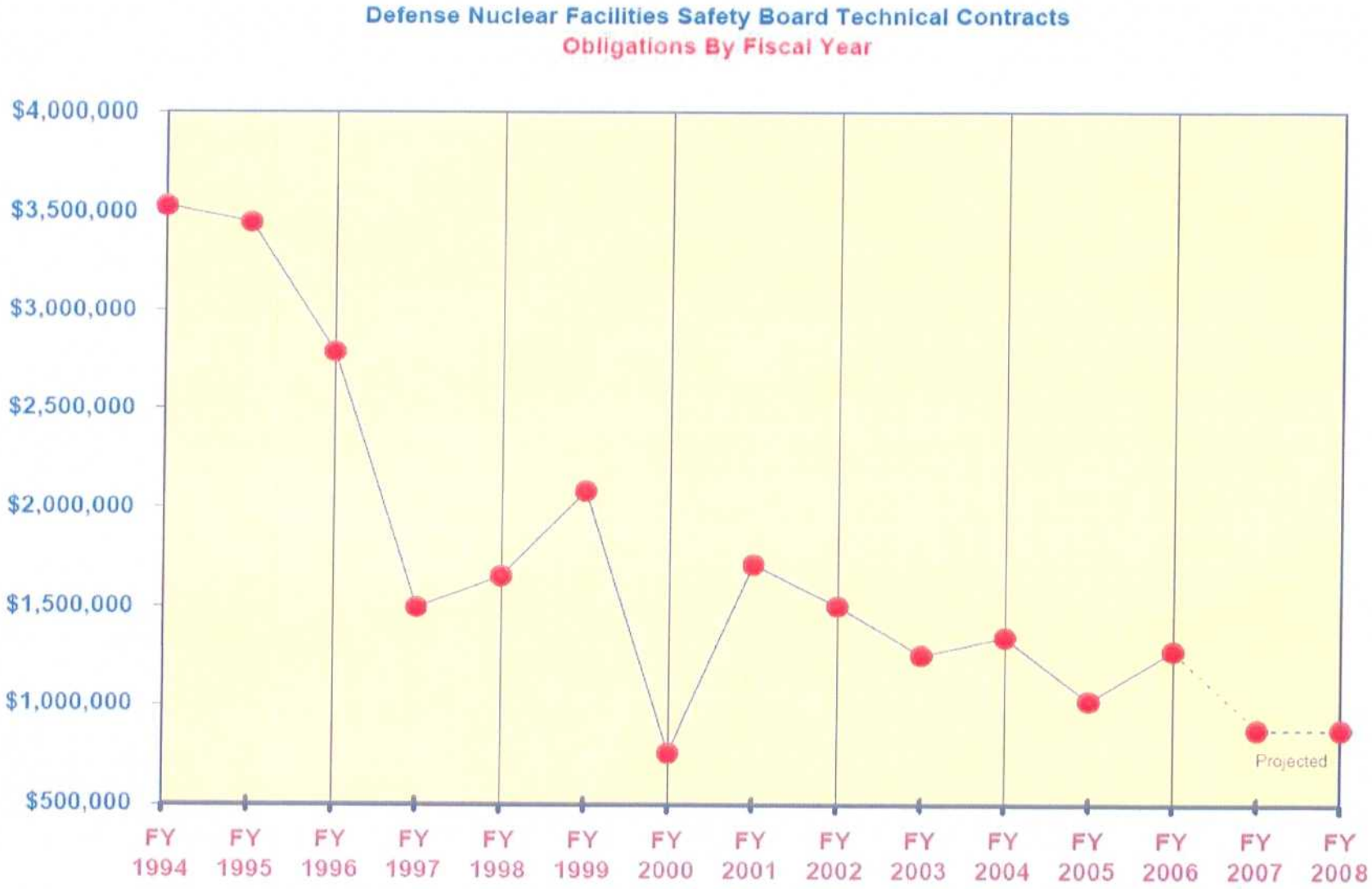
TECHNICAL SUPPORT CONTRACTS

(Status as of 01/31/07)

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Dr. Harold Agnew	12/15/07	Provide technical expertise related to assembly, disassembly and testing of nuclear weapons. These services include assisting the Board in oversight activities at facilities charged with disassembly, safe handling, and storage of nuclear weapon systems.
Mr. Richard Collier	09/30/07	Provide expertise related to lightning safety issues at DOE's defense nuclear facilities. These services include assisting the Board in review, analysis and modeling of lightning protection systems. Examples of work include analysis of the risk presented by lightning in explosive areas and in and around large structures.
Mr. Joseph DiNunno	10/14/07	Provide technical assistance in reviewing, evaluating, and advising the Board on various issues related to Integrated Safety Management (ISM) programs at defense nuclear facilities.
Dr. James Jirsa	06/30/07	Provide technical support to the Board, specifically in review and evaluation of concrete structures. These efforts include review of construction designs for structural performance during normal and extreme loading events, natural phenomenon events, and application of national consensus codes and standards.
Dr. James L. Liverman	06/30/07	Provide technical support to the Board in the general subject area of Integrated Safety Management (ISM), quality assurance and radiation protection, specifically involving review and evaluation of amendments to 10 CFR 835 Rule, radiological protection standards, other radiological and environmental health and safety issues, and reviewing the development of DOE's quality assurance improvement plan.

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Management Support Technology, Incorporated	03/31/07	Provides technical support to the Board, specifically involving the evaluation of directives and procedures governing operation and maintenance of defense nuclear facilities. In addition, provides technical support evaluating the implementation of Integrated Safety Management for ongoing operations and maintenance, and also preparations for startup or restart of defense nuclear facilities. Recent work involved reviewing readiness preparations for startup of defense nuclear facilities at the Pantex Plant, the Y-12 Security Complex, and the Hanford Site, as well as DOE's implementation of Integrated Safety Management.
Mr. Lary M. McGrew	01/31/08	Provide expertise related to safety issues associated with those facilities involved in the assembly, disassembly, and testing of nuclear weapons systems. Specifically, advise the Board from direct experience in conventional and nuclear explosive technology and safety, nuclear materials handling and storage, criticality safety, and nuclear weapons assembly, storage and testing. Recent work has included, for example, review of the W79 and W56 dismantlement processes and the W78 and W88 assembly and disassembly and inspections at the Pantex Plant.
Paul C. Rizzo Associates, Inc.	12/31/07	Provide technical support to the Board, specifically in the review and evaluation of systems and seismic engineering of structures, systems and components with particular emphasis on: geotechnical investigation and soil mechanics; systems engineering; adequacy of various types of analyses performed by DOE contractors; seismological hazards; safety analysis; hydrology; and environmental related issues.

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
J.D. Stevenson, Consulting	12/31/07	Provide technical support to the Board, specifically in the review and evaluation of systems and seismic engineering of structures, systems and components with particular emphasis on: applicability and content of orders and standards developed by DOE and its contractors as well as existing codes and standards used at DOE utilities, applicability of commercial nuclear industry standards as they apply to DOE facilities; quality assurance related matters; adequacy of various types of analysis performed by DOE contractors; and hazard and systems classification.
Briere Associates, Inc.	09/30/07	Provide technical editing services of Board documents that include, but are not limited to, technical reports, issue reports, the Board's Reports to Congress, and formal Recommendations to DOE. These services include analyzing manuscripts in terms of its objective, style, and manner of presentation and recommending revisions as appropriate.


Defense Nuclear Facilities Safety Board Technical Contracts
Obligations By Fiscal Year
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
Projected
FY 1994
FY 1995
FY 1996
FY 1997
FY 1998
FY 1999
FY 2000
FY 2001
FY 2002
FY 2003
FY 2004
FY 2005
FY 2006
FY 2007
FY 2008