Corporate Context for
National Nuclear Security Administration (NS) Programs

This section on Corporate Context that is included for the first time in the Department's budget is provided to facilitate the integration of the FY 2003 budget and performance measures. The Department's Strategic Plan published in September 2000 is no longer relevant since it does not reflect the priorities laid out in President Bush's Management Agenda, the 2001 National Energy Policy, OMB's R&D project investment criteria or the new policies that will be developed to address an ever evolving and challenging terrorism threat. The Department has initiated the development of a new Strategic Plan due for publication in September 2002, however, that process is just beginning. To maintain continuity of our approach that links program strategic performance goals and annual targets to higher level Departmental goals and Strategic Objectives, the Department has developed a revised set of Strategic Objectives in the structure of the September 2000 Strategic Plan.

For more than 50 years, America's national security has relied on the deterrent provided by nuclear weapons. Designed, built, and tested by the Department of Energy (DOE) and its predecessor agencies, these weapons helped win the Cold War, and they remain a key component of the Nation's security posture.

The Department's National Nuclear Security Administration (NNSA) now faces a new and complex set of challenges to its national nuclear security missions in countering the threats of the 21st century. One of the most critical challenges is being met by the Stockpile Stewardship program, which is maintaining the effectiveness of our nuclear deterrent in the absence of underground nuclear testing. Another critical challenge is the proliferation of weapons of mass destruction, where nuclear, chemical, or biological weapons or nuclear materials could fall into the wrong hands and be used against U.S. interests, both domestically or internationally. Additionally, international events and crises continue to arise to which the United States must project a forward presence and quickly protect our national interests. The U.S. Navy will meet those military deployment objectives using nuclear-powered submarines and aircraft carriers.

The NNSA was created by Congress through the National Defense Authorization Act for Fiscal Year (FY) 2000 (Public Law 106-065) to bring focus to the management of the nation's defense nuclear programs. Three existing organizations within the Department of Energy (DOE)–Defense Programs, Defense Nuclear Nonproliferation, and Naval Reactors–were combined into a new, separately organized and managed agency headed by an Administrator. The Administrator, who is also an Under Secretary within DOE, has authority over and is responsible for all programs and activities necessary to accomplish the mission of the NNSA.

The vision of the NNSA is to be an integrated nuclear security enterprise, operating an efficient and agile nuclear weapons complex, and recognized as preeminent in technical leadership and program management.

National Nuclear Security Administration (NS) Goal

Strengthen United States security through the military application of nuclear energy and by reducing the global threat from weapons of mass destruction.

Strategic Objectives

The National Nuclear Security Administration's business line goal is supported by the following strategic objectives. Offices requesting funding to achieve these objectives are identified with each objective:

NS1: Maintain and enhance the safety, security, and reliability of the nation's nuclear weapons stockpile to counter the threats of the 21st century.

NS2: Detect, prevent, and reverse the proliferation of weapons of mass destruction while promoting nuclear safety worldwide.

NS3: Provide the Navy with safe, militarily effective nuclear propulsion plants and ensure their continued safe and reliable operation.

NS4: Ensure the vitality and readiness of the NNSA's nuclear security enterprise.

NS5: Create a well-managed, responsive and accountable organization.

Budget Summary table

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Comparable Appropriation	FY 2003 Request
Office of the Administrator			
$ Program Direction (053)	$326,148	326,486	$347,705
	326,148	**326,486**	**347,705**
Weapons Activities (053)			
$ Defense Programs	4,531,533	4,811,761	5,116,913
$ Safeguards and Secuity	411,418	554,881	509,954
$ F&I Recapitalization	8,700	196,800	242,512
Total Weapons Activities	**4,951,651**	**5,563,442**	**5,869,379**
Defense Nuclear			
$ Nonproliferation (053)	864,131	1,026,586	1,113,630
$ Naval Reactors (053)	688,761	689,273	708,020
Other Defense Activities (053)	-3,244	-269	
Total NS	**6,827,447**	**7,605,518**	**8,038,734**

Defense Nuclear Nonproliferation

Proposed Appropriation Language

For Department of Energy expenses, including the purchase, construction and acquisition of plant and capital equipment and other incidental expenses necessary for atomic energy defense, defense nuclear nonproliferation activities, in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion, **[**$803,586,000,**]** *$1,113,630,000,* to remain available until expended. *(Energy and Water Development Appropriations Act, 2002.)*

[For emergency expenses to respond to the September 11, 2001, terrorist attacks on the United States, and for other expenses to increase the security of the Nation's nuclear weapons complex, for "Defense Nuclear Nonproliferation", $226,000,000, to remain available until expended, to be obligated from amounts made available in Public Law 107–38.**]** *(Energy Supplemental Act, 2002.)*

Defense Nuclear Nonproliferation

Executive Summary

Mission – Post Cold War Threat

The Office of Defense Nuclear Nonproliferation mission is to address the danger that hostile nations or terrorist groups may acquire weapons of mass destruction (WMD) or weapons-usable material, dual-use production or technology, or WMD expertise.

The events of September 11 make clear: the threat facing the United States today has evolved dramatically from the days of the Cold War. There are now any number of actors–"rogue" states as well as terrorist organizations–seeking to procure WMD capabilities. To these states, the threat posed by under-secured stockpiles of weapons-usable materials in Russia and elsewhere pose not a threat, but an opportunity. Indeed, a recent report from the International Atomic Energy Agency estimates that in the past decade, there have been some 175 cases of possible nuclear trafficking in sensitive nuclear materials.

Enormous strides have been made in securing this material in Russia and elsewhere. But the fact remains that the theft of only a few kilograms of High-Enriched Uranium or Plutonium, the deadly ingredients needed to fashion a nuclear device would be enough for a crude nuclear device. The threat that weapon-usable material could be stolen or sold to terrorists or hostile nations and used against American citizens is a clear and real threat that cannot be underestimated.

Within the United States Government, only the Department of Energy's National Nuclear Security Administration (NNSA) has the breadth of people, technology, and facilities within its corporate enterprises to resolve nonproliferation issues; and only the NNSA is situated to fully exploit the world-class expertise of the U.S. national laboratories–a key national asset in our arsenal.

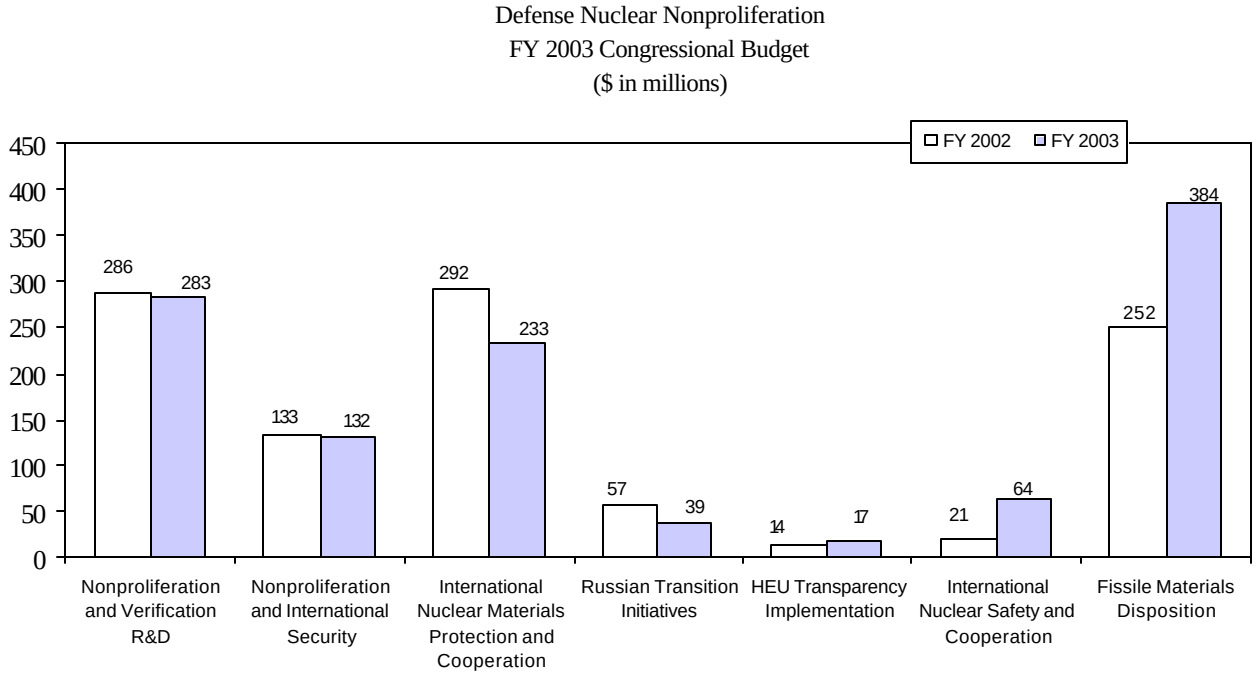
The Office of Defense Nuclear Nonproliferation is moving forward and where possible, accelerating a number of programs to address the proliferation threat.

The importance of NN's work has just been reaffirmed by the National Security Council which endorsed continuation and acceleration of our programs in Russia and elsewhere. To strengthen programs within Russia to better secure weapon-usable fissile material, we reached an unprecedented access agreement with Russia that will identify, and make more secure, additional locations in Russia where nuclear materials are located. We are accelerating our cooperation with Russia's Ministry of Atomic Affairs (MINATOM) and strengthening Russia's borders. We are committed to improving safety at Russian reactors that now operate at levels below accepted international standards. NN has

also reached an access agreement with Russia that will greatly facilitate the U.S. ability to carry out programs under the Nuclear Cities Initiative.

These are just a few of the steps that NN is taking to contribute to this nation's efforts to address the proliferation threat–what has been called the most compelling threat of our time.

The Office of Defense Nuclear Nonproliferation requests $1,113,630,000 for Fiscal Year (FY) 2003, an increase of $87,044,000 over the FY 2002 level. The FY 2002 budget included supplemental appropriations of $233 million as one-time funding to accelerate priority efforts of the program in response to the September 11 attacks. The FY 2003 budget request reflects the Department's strong commitment to fulfill its role in helping to prevent the spread of weapons of mass destruction. A comparison of the FY 2002 and FY 2003 funding levels is shown in Figure 1. Table 1 provides a



funding profile by program, and Table 2 displays funding by site.

Figure 1

Program Strategic Performance Goals

NS 2-1: Enhance the capability to detect WMD, including nuclear, chemical, and biological systems.

Perform cutting-edge research and development that drives the state of the art in detection technologies.

Develop and deliver innovative detection technologies, in partnership with monitoring agencies.

Demonstrate mechanisms to enable successful inspection and transparency regimes.

NS 2-2: Prevent and reverse proliferation of weapons of mass destruction.

Expand new cooperative science and technology efforts with foreign countries and international organizations for nonproliferation, monitoring, verification, and confidence building measures.

Develop, promote and implement innovative approaches to address international security, nonproliferation, and regional stability.

NS 2-3: Protect or eliminate weapons and weapons-usable nuclear material or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

Protect or eliminate nuclear weapons and nuclear weapons-usable material.

Redirect or shut down the highest risk nuclear facilities.

Engage foreign weapons scientists in civilian employment.

NS 2-4: Reduce the risk of accidents in nuclear fuel cycle facilities worldwide.

Improve safety or shut down nuclear reactor or other fuel cycle facilities worldwide.

Assist foreign countries in achieving and sustaining international nuclear safety norms and standards.

These goals are implemented in FY 2003 in the following major programs:

- Nonproliferation and Verification Research and Development
- International Nuclear Safety and Cooperation
- HEU Transparency Implementation
- Nonproliferation and International Security
- International Nuclear Materials Protection and Cooperation
- Fissile Materials Disposition

Nonproliferation and Verification Research and Development (R&D)

Our vision is to be recognized for excellence in the execution of critical national security missions and for preeminent contributions to science and technology.

John Gordon, Administrator

To meet this challenge while addressing continuing nonproliferation and expanding homeland security missions, this program conducts applied research, development, testing, and evaluation to produce technologies that lead to strengthening the U.S. response to current and projected threats to national security and world peace posed by the proliferation of weapons of mass destruction and the diversion of special nuclear materials. Activities focus on the development, design, and construction of prototype sensor systems needed for proliferation detection; the development and production of sensor systems and analytical techniques for nuclear explosion monitoring; and development of capabilities for response to domestic threats from chemical and biological agents.

In FY 2003 this program will continue to leverage its considerable nuclear nonproliferation R&D base to address important objectives which include: detecting proliferation activities worldwide; satellite-based and ground-based nuclear explosion monitoring; countering nuclear smuggling and terrorism; pursuing nuclear warhead dismantlement initiatives; and applying NNSA's and DOE's resident chemical and biological science expertise to support U.S. preparation for and response to the use of chemical and biological agents.

The Nonproliferation Research and Development Program enhances U.S. national security through needs-driven research and engineering resulting in prototype demonstrations and resultant operational detection systems. The program maintains close ties and partnerships with stakeholders and system users to eliminate redundant research programs, minimize risks, and maximize customer satisfaction with the goal of transitioning technologies to user agencies such as the Department of Defense. Further, the

program continues to support commercialization of technologies.

The three strategies that contribute to the program are:

Proliferation Detection R&D activities are focused primarily on the nonproliferation mission while adopting technologies and expanding activities to address homeland security. Accomplishing this requires: (1) developing and demonstrating innovative sampling and analysis technologies needed to improve the detection and tracking of special nuclear materials; (2) analysis to detect the early stages of a proliferant nation's nuclear weapons program or non-compliance with international treaties and agreements; (3) handheld and unattended sensor systems; and (4) developing and demonstrating technologies as needed to remotely detect the early stages of a proliferant nation's nuclear weapons program as depicted in Figure 2.

Nuclear Explosion Monitoring R&D activities focus on two areas: (1) delivery of nuclear explosion monitoring satellite sensors while continuing to develop improved satellite sensors for next generation systems for detecting nuclear detonations in the atmosphere and in space and (2) developing of regional-based seismic monitoring methods for detecting very low yield events that might arise from a proliferant nation's efforts as depicted in Figure 3.

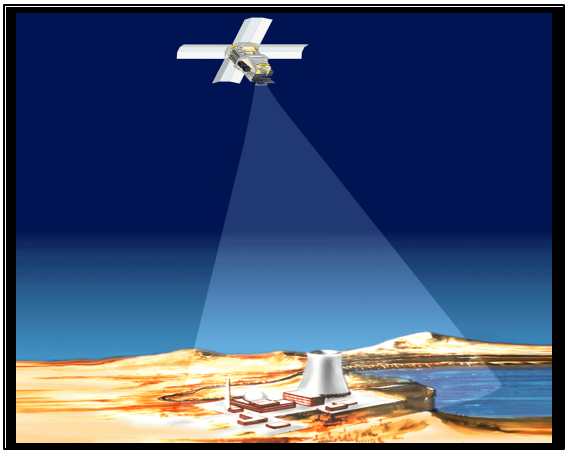
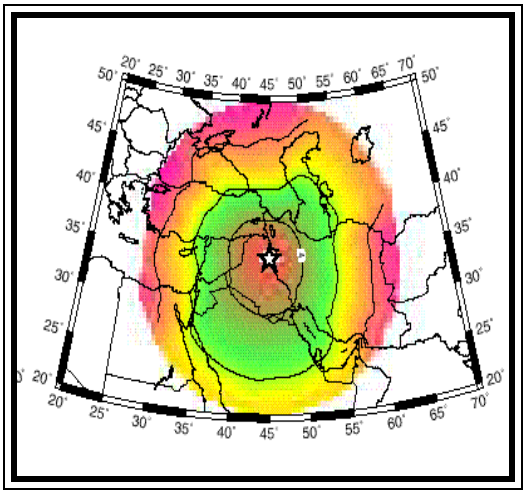


Figure 2



Regional Seismic Monitoring
Figure 3

Chemical and Biological National Security R&D activities capitalize on existing DOE technical strengths in developing capabilities that can have a major impact on civilian preparation and response to

chemical and biological terrorism incidents as depicted in Figure 4. Technology development initiatives are designed to identify and mature key enabling technologies suitable for integration into operational systems in three to five years.

FY 2003 highlights include: (1) continue to develop technologies urgently needed by homeland security personnel for response to the threat of terrorism, (2) support remote effluent and physical detection of proliferation activity and the associated enabling technologies, and (3) support radiation and nuclear materials detection, and satellite-based and ground-based nuclear explosion monitoring.

Figure 4

International Nuclear Safety and Cooperation (INS&C)

The International Nuclear Safety and Cooperation program strengthens national security by helping to prevent nuclear incidents and accidents at foreign nuclear facilities, mitigating the consequences of accidents should they occur, and enhancing nuclear nonproliferation by assisting the Russian Federation in ceasing its production of weapons-grade plutonium. The program is the focal point within the NNSA and the Department of Energy (DOE) for international nuclear safety policies and program efforts. The program provides technical expertise and leadership for NNSA and DOE in interagency, bilateral, and multilateral fora involving the international nuclear safety matters.

Over the past several years, the program has focused on correcting specific safety deficiencies in Soviet-designed nuclear power plants. Numerous nuclear safety projects were completed in nine countries at 26 nuclear sites with 67 operating reactors. Substantial reductions in the operating risk have been achieved at these nuclear power plants. With the successful completion this year of the activities focused on Soviet-designed reactor safety, the program will reorient its activities to address critical nuclear safety issues in other countries and at foreign nuclear facilities of concern through an integrated and risk-based approach. Efforts will not only address current nuclear safety issues and mandates, but also support other broader policy objectives. Several of those objectives have changed or are changing as the result of the September 11, 2001 attacks.

The program is closely coordinated with the U.S. Department of State (DOS) to ensure that it supports and achieves foreign policy objectives. Program efforts are supplemented with country-specific funding from the Foreign Operations, Export Financing, and Related Programs Appropriations Act to support country-specific foreign policy objectives.

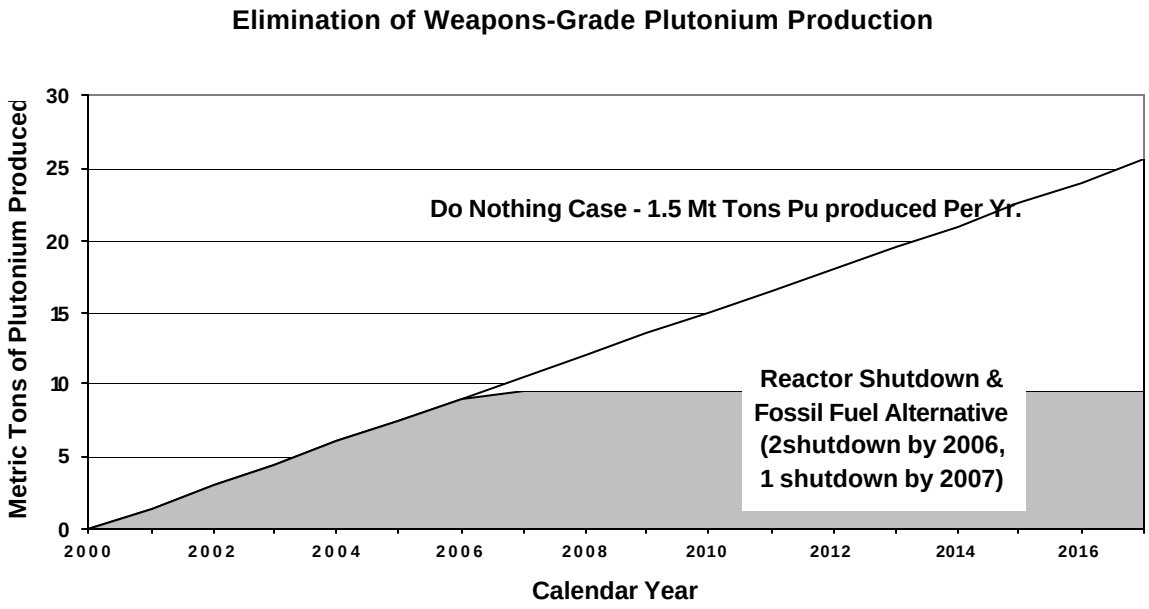
In addition, the Elimination of Weapons-Grade Plutonium Production in Russia program is being transferred from DOD to DOE. Its scope has changed from re-design of the three Plutonium Production Reactors (PPRs) at two sites, to a program of shutting down the PPRs after proving alternate fossil-fueled generating capacity. These three plants are currently producing 1.5 metric tons of enriched plutonium per year. Figure 5 shows the cumulative benefit of shutting down two of these reactors by 2006 and one by 2007, as planned; versus the status-quo do-nothing case.

FY 2003 highlights are (1) complete two full-scope training simulator in Ukraine, (2) complete the draining of sodium from the BN-350 breeder reactor in Kazakhstan to make shutdown irreversible, (3) initiate safety assistance cooperation with Vietnam by completing a needs assessment, (4) complete safety upgrades at research reactors in Romania and/or Uzbekistan, and

Figure 5

(5) begin construction and refurbishment efforts at two separate sites to provide replacement energy generating capacity to shut down three Russian Plutonium Production Reactors. Figure 5 illustrates the effect of reactor shutdown on the accumulation of plutonium.

HEU Transparency Implementation



The Highly Enriched Uranium Transparency Implementation Program (HEU TIP) is responsible for monitoring the implementation of the 1993 HEU Purchase Agreement between the U.S. and the Russian Federation. During a 20-year period, the United States Enrichment Corporation (USEC), acting as the U.S. executive agent, will purchase low-enriched uranium (LEU) derived from at least 500 metric tons (MT) of HEU from dismantled Russian nuclear weapons–enough to build approximately 20,000 nuclear devices. Conversion of the HEU components into LEU is performed in four Russian uranium processing facilities located in closed cities with restricted access. The program has developed and negotiated with the Russian Federation a transparency program that provides the U.S. with assurance that the terms of the Purchase Agreement are being met. The transparency program uses on-site monitoring teams, portable non-destructive assay instruments, and permanently installed

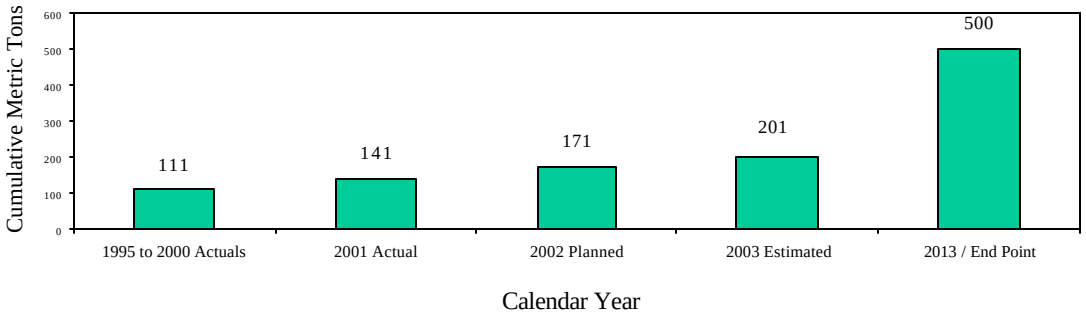
monitoring equipment to acquire the requisite data and information to assure the nuclear nonproliferation objectives of the Agreement are being achieved. The Agreement also requires that the U.S. support comparable Russian monitoring of certain U.S. facilities. As shown in Figure 6, a total of 141.3 MT of HEU have been converted to LEU from 1995 through December 2001, and delivered to USEC as the result of this Purchase Agreement. In return, the Russian Federation has received a total of $2.5 billion.

In FY 2001 and subsequent years, the HEU TIP program will continue to monitor the conversion and processing of 30 MT per year of HEU to LEU. Conversion quantities for the next five years should be negotiated by late CY 2001 between USEC and the Ministry of Atomic Energy (MinAtom).

FY 2003 highlights include the following: the program will continue collection and analysis of monitoring and other data to help provide overall confidence that the Russians are converting HEU from dismantled nuclear weapons into LEU. A schedule for conversion and delivery is shown in Figure 6.

Figure 6

Russian HEU Down-Blended



Nonproliferation and International Security

The mission of the Office of Nonproliferation and International Security is to detect, prevent, and reverse the proliferation of WMD materials, technology and expertise. It is the focal point within the National Nuclear Security Administration (NNSA) and the Department of Energy for activities that support the President's nonproliferation and international security policies, goals and objectives, as well as those activities mandated by statute. The program provides technical expertise and leadership for NNSA and the Department in interagency, bilateral, and multilateral fora involved in nonproliferation and international security matters.

The five key program objectives are to (1) secure nuclear materials, technology and expertise; (2) limit the production and use of weapons-usable fissile materials; (3) promote transparent nuclear reductions; (4) strengthen nonproliferation regimes; and (5) control sensitive exports. The major functional areas of the program include Nonproliferation Policy, International Safeguards, Export Control, Treaties and Agreements, and Russian Transition Initiatives.

Nonproliferation Policy

Nonproliferation Policy programs include fuel cycle activities, efforts to support global legal regimes, regional nonproliferation initiatives, and projects that promote warhead dismantlement and fissile material transparency.

Fuel Cycle Activities encompass policy analysis of fuel cycle technology development and policy implementation. Fuel cycle projects assist in the formulation of policy to minimize the use of weapons-usable materials in civil fuel cycle activities. The Proliferation Resistant Fuel Cycle Technology (PFRCT) policy initiative strengthens the nonproliferation regime through comparative analysis of existing and proposed nuclear fuel cycle technologies. The initiative reduces the long-term threat to U.S. national security by providing sophisticated analytical tools to evaluate proliferation resistance, thereby helping to steer fuel cycle technology development. The Reduced Enrichment for Research and Test Reactors (RERTR) program prevents proliferation of nuclear weapons by minimizing and possibly eliminating the use of HEU in civil nuclear programs worldwide. The RERTR program develops the technologies needed to substitute LEU for HEU in research and test reactors–which use nearly all of the HEU in civil programs–without significant penalties in experiment performance, economic, or safety aspects of the reactors. The Russian Foreign Research Reactor Fuel Return (RFR) initiative prevents proliferation of nuclear weapons by repatriating to Russia civil HEU fuel from Russian-supplied research reactors in 16 countries. Many of these research reactors are located in regions of proliferation concern. This program reduces the threat to U.S. national security by removing the HEU fuel and assisting in converting operating reactors to LEU fuel. Additionally, the U.S.-Republic of Kazakhstan Agreement for the Disposition of Spent Fuel from the BN-350 Fast Breeder Reactor at Aktau, Kazakhstan prevents proliferation of nuclear weapons by securing the nearly three tons of weapons-grade plutonium in the BN-350 spent fuel–enough material for hundreds of nuclear weapons.

Under this cooperative program, the spent fuel assemblies have been stabilized, packaged in canisters with an adequate radiation barrier, and placed under IAEA safeguards. The program also provides physical protection to secure the material in the BN-350 spent fuel pond and non-weapons-related employment for Kazakhstan nuclear technical experts.

DOE/NNSA promotes *Global Regimes* by participating in U.S. Government policymaking and negotiations regarding various arms control and nonproliferation regimes including the Nuclear Nonproliferation Treaty (NPT), the Biological Weapons Convention (BWC), the Chemical Weapons Convention (CWC), testing limit treaties, the Fissile Material Cutoff Treaty (FMCT), and bilateral peaceful nuclear cooperation agreements. The program provides policy and technical expertise on such treaties and ensures that their negotiation and implementation meet U.S. national security and foreign policy objectives and can be implemented at DOE/NNSA National Laboratories and other facilities. The program also implements bilateral peaceful nuclear cooperation agreements according to Section 123 of the Atomic Energy Act by providing and receiving reports on nuclear material subject to nonproliferation obligations under the agreements.

Regional Nonproliferation programs apply policy, intelligence, and technical capabilities to support U.S. Government regional security objectives, with a primary focus on preventing the proliferation of weapons of mass destruction. The regions of primary focus are the Middle East, South Asia, Northeast Asia, Central Asia, and the Caucasus. The program participates in U.S. Government policymaking and diplomacy, manages programs with the DOE/NNSA National Laboratories and non-governmental organizations (NGOs), and collaborates internationally on technical solutions to regional security problems. The regional security program provides funding for Sandia National Laboratory's Cooperative Monitoring Center. The Democratic Peoples' Republic of Korea (DPRK) Spent Fuel Canning program supports the disposition of weapons-grade plutonium-bearing spent fuel in stabilization canisters under continuous IAEA monitoring, under the U.S.-DPRK Agreed Framework. This program reverses proliferation and reduces the immediate threat to U.S. national security posed by plutonium stored at frozen DPRK nuclear weapons material production facilities.

The *Warhead Dismantlement and Fissile Materials Transparency* program comprehensively evaluates the impact of a warhead monitoring regime on the DOE/NNSA nuclear weapons complex to ensure that the U.S. requirement to maintain a safe, secure, and reliable nuclear weapons stockpile is not adversely impacted and that no classified information is revealed. This program develops and implements technical measures that can be applied at Russian facilities to provide confidence that Russian nuclear weapons are being dismantled and that excess weapons-grade fissile materials–including those removed from dismantled Russian nuclear weapons–are not used for weapons purposes. This program also reduces stockpiles of Russian weapons-grade fissile material processes and the potential for accident, theft, or diversion by increasing the safety and security of Russian warheads. This is performed through a government-to-government agreement between DOE and Russia to develop technologies and information exchange to increase the safety and security of

fissile material processes. Finally, the program redirects the work of current and former Russian nuclear scientists, obtains access to Russian scientific and technical information, and increases the transparency of the Russian nuclear weapons complex.

International Safeguards

The International Safeguards program supports IAEA safeguards, pursues efforts to promote international cooperation, supports DPRK safeguards pursuant to the U.S.-DPRK Agreed Framework, and works for sustainability of safeguard and security systems in the NIS/Baltics.

IAEA Safeguards and Nonproliferation Policy Support. The International Safeguards program provides policy and technical leadership to strengthen the nuclear nonproliferation regime, particularly with respect to global nuclear material security. These efforts help the IAEA to detect clandestine nuclear activities and safeguard declared nuclear material. The program addresses new approaches to safeguards, such as environmental sampling and remote monitoring. The International Safeguards program also provides policy and technical support to implement IAEA inspection of U.S. excess materials at DOE/NNSA sites under bilateral and trilateral (with Russia and the IAEA) arrangements. The physical protection program ensures that ll countries possessing U.S.-origin nuclear material are adequately protecting this material against theft, sabotage, and nuclear smuggling. The program also manages and operates the Information Tracking and Analysis (ITA) system, which tracks and analyzes foreign nuclear activity to satisfy statutory requirements and international obligations.

International Cooperation. The International Safeguards program promotes the application of nuclear technology for peaceful purposes through bilateral "Sister Laboratory" arrangements and IAEA technical assistance programs. The program supports the planning and preparations for the Nuclear Nonproliferation Treaty (NPT) Review Conferences. The program negotiates and implements agreements for safeguards cooperation that govern the transfer of technologies to other countries, regions, and international organizations. Technologies include strengthened safeguards measures to support adoption of the IAEA Additional Protocol for regional organizations and nation states, such as Argentina, Australia, Brazil, the Brazilian-Argentine Agency for Nuclear Material Control and Accountancy (ABACC), China, EURATOM, France, Japan, South Africa, and South Korea.

The DPRK Safeguards program provides urgent verification support to the U.S.-DPRK Agreed Framework. This framework led to a freeze on North Korean nuclear reactor and reprocessing operations. DPRK Safeguards develops the technical means for verification to support Department of State negotiations with North Korea.

Sustainability of Safeguards and Security Systems in the NIS/Baltics - DOE/NNSA reduces the threat of nuclear proliferation and nuclear terrorism by improving the security and accountability of weapons-usable nuclear material in Ukraine, Kazakhstan, Uzbekistan, Belarus, Latvia, Lithuania, and

Georgia. This work is performed under the IAEA in the NIS/Baltics and does not incorporate program activities in Russia. Scientists and engineers from the National Laboratories collaborate with their counterparts in the NIS/Baltics and with private sector specialists to develop appropriate systems and procedures to sustain the security of the protected nuclear material for the foreseeable future. The Sustainability program conducts independent systems evaluations by both U.S. and IAEA specialists. The program performs site surveys annually and notes deficiencies for remediation. Overall, the program ensures long-term sustainability of these systems by developing national infrastructures and a culture of international cooperation.

Export Controls

The mission of Export Control is to regulate American nuclear-related exports and support the development of effective nuclear export control systems in other countries, including Russia and the NIS.

Export Control Operations include licensing and multilateral operations. DOE/NNSA is responsible for authorizing the export of U.S. nuclear technology, such as blue prints, process information, or engineering services.

Licensing Operations provide advice and recommendations on licenses for nuclear facilities and materials, as well as dual-use items and munitions that could have use in the development of nuclear weapons or nuclear weapons materials. The Export Control program works with the Department of Commerce to maintain the "Nuclear Referral List", which identifies dual-use items requiring special attention, such as special metals, high-speed cameras, and sensitive electronic equipment. It reviews proposed exports based on a technical review of the item, as well as a review of the stated end-use and end-user of the export. The program also supports a range of activities to ensure that nuclear-related equipment and materials are disposed of without risk of proliferation, to review foreign visitors and assignees to DOE/NNSA labs and sites for export control concerns, and to address the problem of "deemed exports", i.e., the possible transfer of technology through exchanges with foreign visitors in the United States.

Multilateral Activities include support and technical assistance to groups such as the Nuclear Suppliers Group and the Zanagger Committee, both of which formulate internationally-agreed upon definitions of nuclear materials and commodities and export control practices. Multilateral activities ensure that the U.S. Government export control regulations meet multilateral standards and that other regime members' nuclear supply policies are consistent with multilateral obligations. The program also provides technical support to regime members and engages in outreach activities with supplier and transit states to stress the importance of compliance to multilateral standards of conduct.

The Export Control program also supports *Russia and the NIS Cooperation* to prevent illicit nuclear

exports. The program goals is to establish competent export control authorities, develop constituencies for export control, improve government-supplier communication, and nurture an export control culture. The goal is achieved by implementing licensing systems and integrating technical expertise into the licensing process, promoting supplier awareness and compliance with internal control processes, and improving export control enforcement through tools, equipment, and training.

Treaties and Agreements

The Treaties and Agreements sub-program supports implementation of bilateral or multilateral Presidentially-directed or congressionally-mandated nonproliferation and international security initiatives, agreements and treaties. In addition, it provides for unexpected, unplanned responses to requirements of an immediate nature based on unanticipated U.S. national security needs, as well as preparations to meet new transparency or verification requirements arising out of ongoing activities that are consistent with U.S. national policy and security requirements, without compromising proliferation-sensitive information. The sub-program also provides for the development of new technologies such as dual-use metal analyzers and test isotope production laboratory waste verification tools. Finally, the sub-program conducts on site reviews and facilitates meetings for review of findings, and it conducts reactor calculation and plutonium production assessments.

Russian Transition Initiatives

Russian Transition Initiatives programs include the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI) in Russia and the Newly Independent States.

Initiatives for Proliferation Prevention - IPP reduces the global nuclear danger of proliferation of technologies and expertise by engaging NIS WMD experts in cooperative projects involving the ten major DOE/NNSA National Laboratories and U.S. industry. IPP is a classic "brain drain" program that engages former Soviet weapon scientists, engineers, and technicians in non-weapons-related projects and motivates participation in proliferation prevention activities at institutes across the NIS–in Russia, Ukraine, Kazakhstan, and Belarus–in applied research projects with high commercial potential. IPP facilitates continued access to NIS facilities and establishes self-sustaining commercial entities that will support future independent commercial projects. This mechanism ensures an exit strategy for the U.S. Government. Cooperative, cost-sharing projects are aimed at establishing long-term commercial employment for key former Soviet weapons scientists, engineers, and technicians.

Nuclear Cities Initiative – NCI is designed to reduce the size of the weapons complex in the Russian nuclear cities. NCI removes functions and equipment from the weapons sites within the closed cities, reduces the physical footprint, and helps to create sustainable, alternative non-weapons work outside the nuclear institutes. NCI contributes to core U.S. nonproliferation and national security goals in direct

and concrete ways by assisting in transparent and irreversible nuclear weapons complex reduction in Russia. NCI works closely with other U.S. Government programs and Russian partners, as well as private sector partners, to convert weapons facilities, develop commercial infrastructure and business partnerships, and enable self-sustaining non-weapons commercial enterprises.

FY 2003 highlights are: (1) continue repatriation to Russia of fresh and spent HEU research reactor fuel from Russian supplied reactors and participate in two fact-finding missions to evaluate fuel inventory and conditions at six additional sites; (2) develop and negotiate at least two lab-to-lab contracts with Russia to provide access to technologies; which could support U.S. counter-terrorism efforts; (3) continue development of confidence building measures that potentially could be used to confirm nuclear warhead and fissile material reductions in Russia; (4) expand bilateral physical protection visits, physical protection training, and the IAEA's International Physical Protection Advisory Service (IPPAS) to help protect WMD facilities around the world against terrorist attack and sabotage; (5) work with U.S. Customs personnel to familiarize them with nuclear equipment, materials, and technology, and to improve real-time analysis of suspect shipments; (6) expand nuclear export control enforcement training to improve other countries' border controls, especially in high-traffic transit states; (7) respond to nonproliferation requirements of an immediate nature based on unanticipated U.S. national security needs; (8) accelerate several Russian technology development efforts that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives; and (9) enhance nonproliferation efforts in the Russian nuclear cities.

International Nuclear Materials Protection and Cooperation (INMP&C)

INMP&C reduces the threat to the U.S. national security posed by unsecured Russian Nuclear weapons and weapons-usable material. Currently, NNSA has identified 95 sites which may require security upgrades. These sites are grouped into three categories: 53 Navy Complex sites, 11 MinAtom complex sites, and 31 Civilian Complex sites (18 in Russia and 13 in the Newly Independent States). Forty two of the Navy sites are Russian Navy nuclear warhead storage sites containing approximately 4,000 warheads, the remaining fifty three sites contain approximately 603 metric tons (MTs) of weapons-usable material–enough for approximately 41,000 nuclear devices. By the end of FY 2003, the materials protection, control and accounting program (MPC&A) will have completed site-wide comprehensive upgrades at 53 of 95 sites and installed comprehensive security upgrades on roughly 60% of the 4,000 nuclear warheads and 26% of the 603 Mts of nuclear material. Program work is carried out through an interlocking set of activities including securing at-risk material, reducing stocks of material by consolidating it into fewer buildings and converting excess HEU into less proliferation attractive LEU. This program also is implementing an exit strategy whose purpose it is to foster Russian development of indigenous capabilities and commitments to protect its own sensitive material in the long term. The program enhances the detection of nuclear smuggling by installing radiation detection equipment at strategic transit and border crossing locations and provides assessment and tracking of

nuclear smuggling and nuclear threat cases.

The installation of security upgrades occurs in a phased approach. Rapid upgrades include items such as baseline item inventories, locks, delay blocks, steel cages, limiting access, and hardening windows. Comprehensive upgrades include rapid upgrades plus items such as detection systems, closed-circuit television monitoring and assessment systems, material measurement equipment and computerized accounting systems.

NNSA estimates that there is approximately 603 Mts of weapons attractive nuclear material (10% at Navy sites, 84% at MinAtom Weapons Complex sites, and 6% at Civilian sites), enough for approximately 41,000 nuclear devices. By the end of FY 2003, NNSA plans to have begun MPC&A upgrades on about 90% of this material. In addition, the MPC&A program estimates that there are approximately 4,000 warheads located at the 42 Russian Navy nuclear warhead storage sites in need of security upgrades. NNSA began MPC&A upgrades on all of these warheads by the end of FY 2001.

Navy Complex

DOE has currently identified 53 Navy sites, 11 Russian Navy Fuel Storage sites and 42 Russian Navy nuclear warhead storage sites. These sites account for approximately 60 MTs of highly attractive weapons-usable material and about 4,000 at-risk RF Navy nuclear warheads.

In FY 2003, MPC&A rapid upgrades will be completed on all of ~60 MTs of weapons usable nuclear material at 11 sites and on all of the estimated 4,000 Russian Navy nuclear warheads at 42 sites. Comprehensive upgrades will be completed on the final 2% of the ~60 MTs of weapons usable nuclear material at 11 sites.

In FY 2003, comprehensive upgrades will be completed on an additional 20% of the estimated 4,000 Russian Navy nuclear warheads and at an additional 7 nuclear warhead sites and one material site-Kurchatov (increasing the total amount of warheads under comprehensive upgrades to 60% and the total number of sites where comprehensive upgrades have been completed to 24, 13 nuclear warhead sites and 11 fuel sites). Figure 7 shows the number of Navy sites with completed comprehensive upgrades.

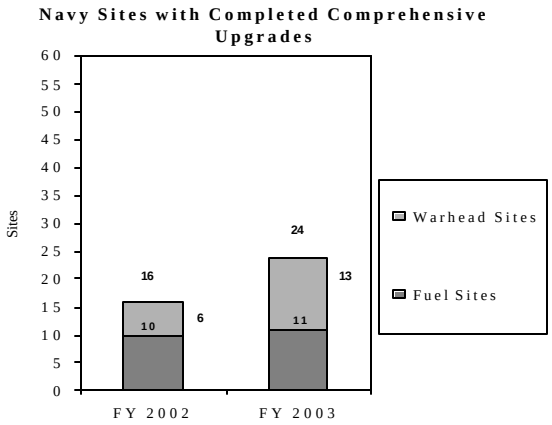


Figure 7

MinAtom Weapons Complex

The MinAtom Weapons Complex consists of 11 closed cities (many larger than the District of Columbia), which account for approximately 508 MTs of nuclear material. Figure 8 shows the amount of material at MinAtom Weapons sites under rapid and comprehensive MPC&A upgrades.

In FY 2003, MPC&A upgrades will continue on the ~508 MTs of weapons usable nuclear material at 11 sites.

In FY 2003, rapid upgrades will be completed on an additional 9% of weapons-usable nuclear material and comprehensive upgrades will be completed on an additional 6% of weapons-usable nuclear material, increasing the total amount of nuclear material under rapid upgrades to 40% and under comprehensive upgrades to 12%.

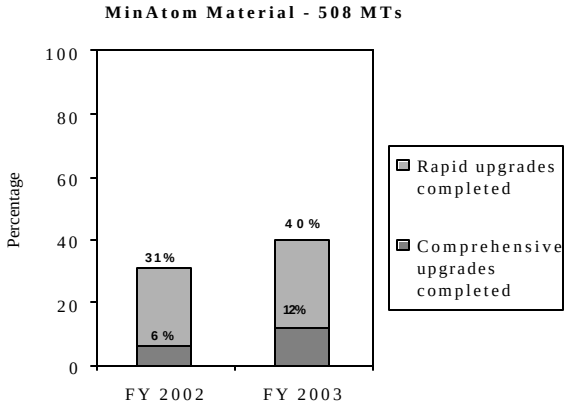
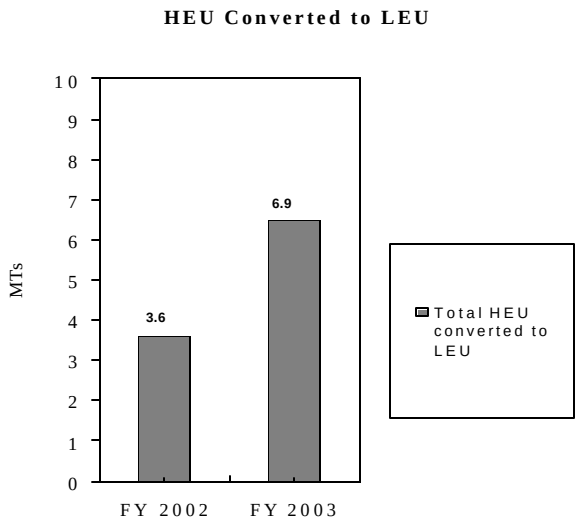


Figure 8

Civilian Sites

The Civilian Complex consists of 31 sites (18 Russian and 13 Newly Independent States) containing approximately 35 MTs of weapons-usable nuclear material. Sustainability support will be provided at the Russian sites where upgrades are completed. In FY 1998, responsibility for sustainability support at the 13 NIS sites where upgrades were completed was transferred to NNSA's International Safeguards program.

This program also consolidates HEU and plutonium in fewer buildings at fewer sites, reducing the number of potential theft targets. In addition, HEU is converted to LEU, which reduces its attractiveness to would-be proliferators. By 2010, approximately Mts of HEU will be converted to LEU and 55 buildings will be cleared of al material. Figure 9 summarizes HEU to be converted to LEU.



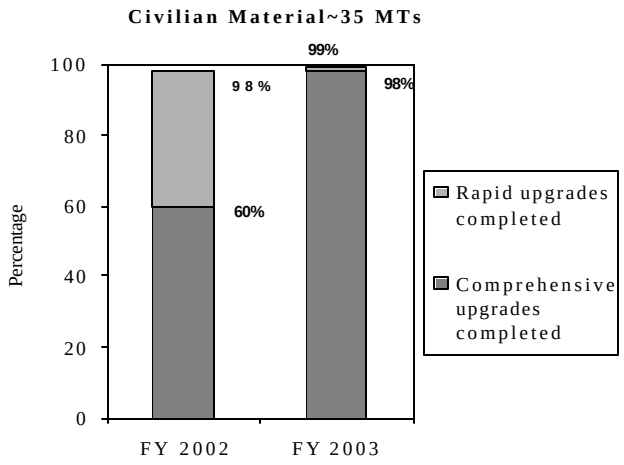


Figure 9

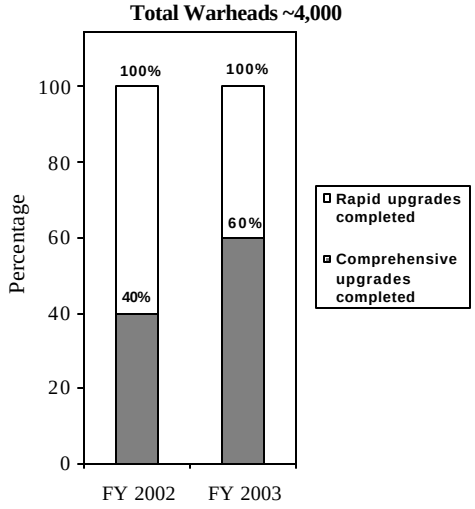
Figure 10

Beginning in FY 2002, the Material Consolidation and Conversion and Civilian Sites sub-element will begin a new initiative to identify and pursue actions that can be taken to reduce the threat of a Radiological Dispersion Device (RDD) event against the national security of the United States. Following the completion of an initial assessment in FY 2002 to determine the viability, threat and probable impact of a RDD, this program will begin installing equipment that can detect nuclear materials and methods to enhance source security of target or vulnerable candidate RDD materials.

In FY 2003, comprehensive upgrades will be completed at IPPE, Lytkarino and Luch bringing the total number of completed sites to 27 of 31 (14 Russian and all 13 non-Russian).

In FY 2003, rapid upgrades will be completed on an additional 1% of weapons-usable material and comprehensive upgrades will be completed on an additional 38% of weapons-usable material, increasing the total amount of nuclear material under rapid upgrades to 99% and under comprehensive upgrades to 98%. FY 2003 will also support conversion of an additional 2.9 MTs of HEU, increasing the total HEU converted to 6.5 MTs. Figure 10 shows the material and upgrades at the Civilian sites.

In FY 2003, the RDD program will install equipment that can secure and/or detect radiological materials which can be used with explosives to contaminate a given area. Figures 11, 12, and 13 summarize the total sites identified for possible upgrades and the amount of warheads and material estimated to be contained at these sites respectively.



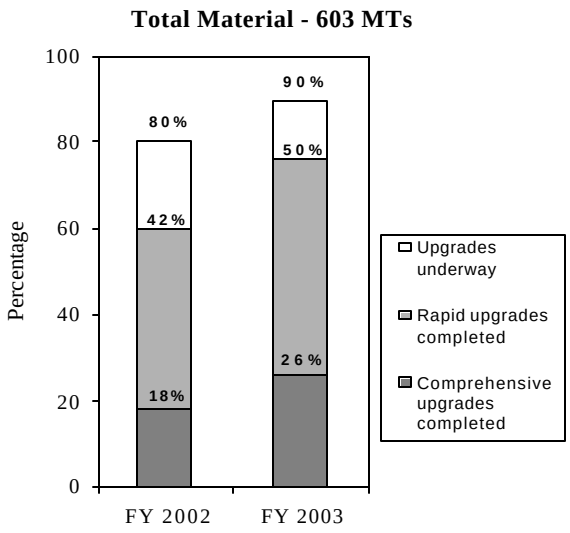


Figure 11

Figure 12

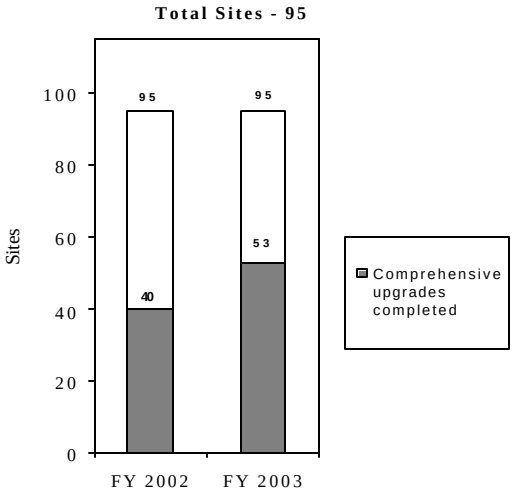


Figure 13

National Programs and Sustainability

National Programs and Sustainability enables the MPC&A program to implement an exit strategy by helping the RF establish and implement national and other infrastructure components. These components are necessary to create an environment in which effective and full ownership of MPC&A systems can be transitioned to the Russians where they will operate and sustain them for the long-term. The National Program establishes the requirement for MPC&A systems through development of technically sound, internally consistent regulatory requirements that are suited to Russian conditions and are effectively enforced and empowers sites to operate systems by establishing training and education programs that develop, maintain, and sustain a cadre of Russian MPC&A professionals. Finally, the National Program addresses the ability to securely transport special nuclear material in the RF within and between sites.

In FY 2002, the MPC&A program will begin the MPC&A Operations Monitoring Project to install unattended monitoring systems that will allow Russian and U.S. Government officials to ensure Russian sites continue to operate installed MPC&A systems on an ongoing basis. This project is in direct response to a General Accounting Office (GAO) recommendation to develop a system, in cooperation with the Russian government, to monitor, on a long-term basis, the security systems installed at Russian sites to ensure that they continue to detect, delay and respond to attempts to steal nuclear materials. These MPC&A monitoring systems will be installed at sites that have both ongoing and completed MPC&A upgrades.

In FY 2003, an additional 70 trucks and 9 railcars will be hardened, and an additional 84 secure transportation overpacks will be provided (increasing the total to 233 trucks, 51 railcars, and 339 overpacks) establishing a secure means of transporting proliferation attractive materials both within and between Russian nuclear sites.

Assessment, Detection and Cooperation

The MPC&A Emergency Cooperation and the International Nuclear Safety and Cooperation programs share common stakeholders and program participants. In order to take advantage of the opportunities for economies of scale, such as formulation and implementation efforts which are available due to this commonality, the MPC&A Emergency Cooperation program is combined with and budgeted for in the International Nuclear Safety and Cooperation program beginning in FY 2003.

Pursuant to the Conference Report accompanying the FY 2002 Energy and Water Development Appropriations bill, funding for the Second Line of Defense (SLD) sub-element was transferred from the Nonproliferation and International Security program (formerly Arms Control) to the MPC&A program under the Assessment, Detection and Cooperation sub-element.

With the two changes noted above, the Assessment, Detection and Cooperation activity will consist of the SLD and Nuclear Assessment programs.

The Second Line of Defense program will continue to strengthen Russia's overall capability to prevent the illegal transfer of nuclear materials, equipment, and technology to would-be proliferators. SLD will equip Russia's most vulnerable border sites with nuclear detection equipment.

Nuclear Assessment program will continue to be responsible for the rapid assessment and database tracking of approximately 80 cases of nuclear smuggling each year, and for providing a one-hour initial assessment and a four-hour final assessment of nuclear threat.

In FY 2003, the Second Line of Defense program will install radiation detection equipment at 21 additional strategic transit and border sites (18 Russian and 3 Ukraine) to detect and deter illicit trafficking in nuclear materials, increasing the total sites with completed installations to 42 (38 Russian and 4 Ukraine).

Provide assessment and database tracking of approximately 80 illicit trafficking in nuclear material cases; provide nuclear threat assessments in approximately 7 cases; provide an annual report on program activities and special topical reports as needed.

Fissile Materials Disposition

The Office Fissile Materials Disposition (OFMD) is responsible for disposing of inventories of surplus, U.S. weapons-usable plutonium and HEU, as well as providing technical support for, and implementation of, efforts to obtain reciprocal disposition of Russian surplus weapon-grade plutonium.

NNSA's Fissile Material Disposition program covers activities in both the U.S. and Russia to dispose of weapons-usable fissile material such as enriched uranium and plutonium. The 2003 budget supports the first year of a newly-revised program for plutonium disposition. Beyond 2003, the Administration is committed to providing the resources necessary to fully support this new plan.

U.S. Surplus Plutonium Disposition

Disposing of U.S. surplus plutonium enables DOE to meet compliance agreements associated with the clean up and shut down of former nuclear weapons complex sites, honors commitments to South Carolina to provide a pathway out of the Savannah River Site (SRS) for surplus plutonium shipped there from other states, and avoids billions of dollars in long-term storage costs. At the same time, disposing of surplus plutonium in a reciprocal effort provides an opportunity to work with Russia on disposing of surplus weapon-grade Russian plutonium.

In September 2000, the U.S. and Russia signed the U.S.-Russia Plutonium Management and Disposition Agreement which commits each country to dispose of 34 MTs of weapon-grade plutonium (68 MT total) in rough parallel.

A recent Administration review of nonproliferation programs with Russia has been aimed at making the U.S. and Russian plutonium disposition programs less costly and more effective. As a result, the NNSA has developed a revised disposition program that relies primarily on the irradiation of mixed oxide (MOX) fuel to dispose of surplus plutonium. Approximately 6 metric tons of plutonium previously destined for immobilization will now be processed in an enhanced MOX Fuel Fabrication Facility. The cost to complete disposition under the revised U.S. approach is $3.8 billion over approximately 20 years (in FY 2001 dollars)–a savings of nearly $2 billion from the earlier plan. In addition, peak year funding is reduced by half a billion dollars and the time necessary to dispose of the agreed amount of plutonium is shortened by three years. Equally important for domestic clean-up objectives, the revised strategy provides a pathway out of the Savannah River Site for plutonium shipped there for disposition, saves billions of dollars in storage costs, and facilitates the closure of DOE's former Nuclear Weapons Complex sites.

Pathway for Disposing of Surplus Weapon-Grade Plutonium

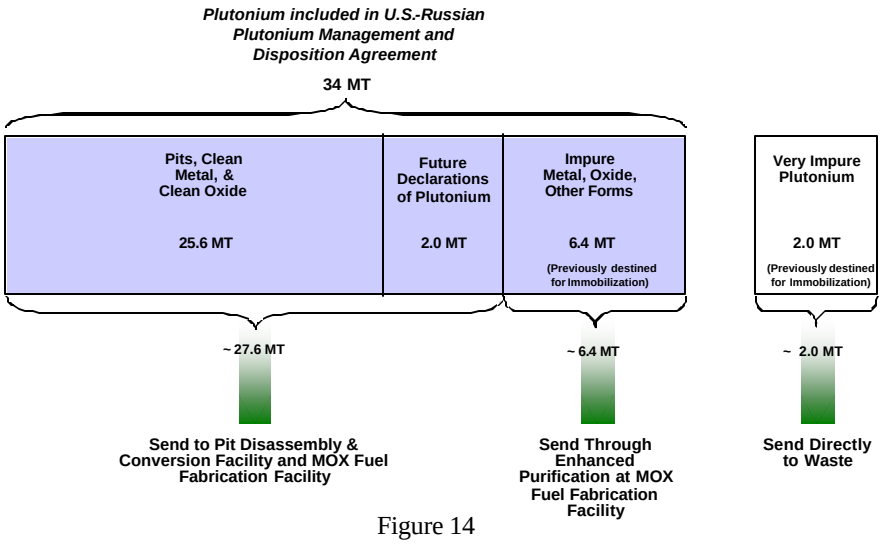


Figure 14

The Department of Energy will proceed with the appropriate environmental analyses necessary to implement the revised U.S. plutonium disposition program and work with Russia on ways to improve the Russian program.

In FY 2003, the program will complete Title II (detailed) design of the MOX Fuel Fabrication Facility. The program will also continue limited production mode testing and technology demonstrations and continue Title II (detailed) design of the Pit Disassembly and Conversion Facility (PDCF). PDCF budget increased substantially from FY 2002 due to the increase in the design cost created by the schedule extension and change in the scope of work.

U.S. Surplus Highly Enriched Uranium Disposition

Disposing of surplus U.S. HEU supports U.S. policy which calls for reducing stockpiles of surplus weapons-usable fissile materials. DOE will make 174 MT(s) of HEU non-weapons usable within 20 years, mostly by blending it down to low-enriched uranium (LEU) for peaceful use as commercial reactor fuel, or sometimes by disposal as waste. Current plans continue transferring 50 MT of surplus HEU from the Y-12 Plant to the United States Enrichment Corporation Inc. (USEC) through FY 2005. This material will be down-blended to LEU fuel which will be sold to commercial utilities. The program

will blend down and transfer an additional 33 MT of off-specification HEU to the Tennessee Valley Authority (TVA) between FY 2003 and 2007 for use in TVA reactors. Planning for the disposition of additional quantities of surplus HEU is ongoing. Figure 15 shows the uranium disposition paths.

In FY 2003, the program will continue to ship surplus HEU from the Y-12 Plant to USEC and complete capital improvements and begin processing and shipping operations at the Savannah River Site and Y-12 to support the down-blending of off-specification HEU. The FY 2003 funding mainly supports increased efforts associated with the Off-Specification HEU Blend Down project.

U.S. Surplus HEU Disposition Paths

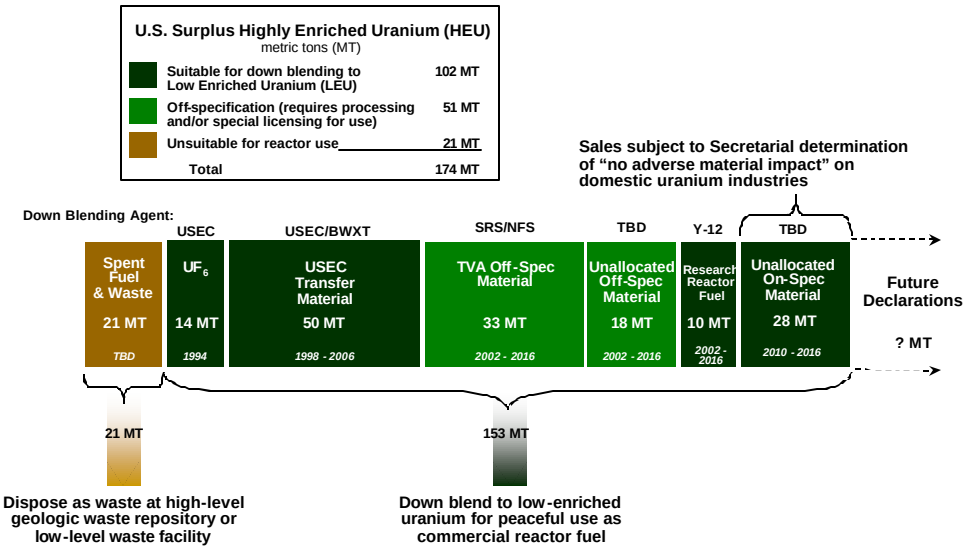


Figure 15

Supporting Activities

In FY 2003, the program will continue to store surplus plutonium and HEU and continue procuring a new plutonium pit shipping container.

Russian Surplus Plutonium Disposition

The U.S.-Russia Plutonium Management and Disposition Agreement defines detailed strategies for implementing disposition activities in both the U.S. and Russia, and it specifies the technological approach and facilities to be constructed in each country. The Agreement also calls for financial commitments for a substantial portion of the Russian Plutonium Disposition program from the U.S. and the international community.

DOE has been cooperating with Russia to lay the technical groundwork for the Russian surplus plutonium disposition program. Efforts include technology development in the areas of plutonium conversion and nondestructive assay, and irradiation of MOX fuel in fast and thermal reactors. In addition, DOE is working with Russian institutes and private industry to develop gas turbine-modular helium reactor (GT-MHR) technology as an option to supplement Russia's existing reactor capacity to dispose of surplus weapon-grade plutonium.

In FY 2003, the program will continue the design of industrial-scale plutonium conversion and MOX facilities, continue VVER-1000/BN-600 reactor work, and assist Russia in developing licensing regulations. Other efforts include continuing the design of the GT-MHR. Many of these activities are funded by prior-year balances.

Future Years Nuclear Security Program

Five-year budget estimates are required for Defense Nuclear Nonproliferation by section 6523 of the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106-65) as amended. The Office of Defense Nuclear Nonproliferation's Future Years program for FY 2003 through FY 2008 is located at Table 3.

For more information about Defense Nuclear Nonproliferation, visit our website (www.nn.doe.gov).

Table 1

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Defense Nuclear Nonproliferation					
Nonproliferation and Verification Research and Development					
Operation and Maintenance	222,758	208,500	78,000	286,500	283,407
Construction	16,963	35,806	0	35,806	0
Total R&D	239,721	244,306	78,000	322,306	283,407
Nonproliferation and International Security	95,904	75,741	0	75,741	92,668
International Nuclear Materials Protection & Coop	170,452	173,000	118,900	291,900	233,077
Russian Transition Initiatives	50,759	42,000	15,000	57,000	39,334
Highly Enriched Uranium (HEU) Transparency	14,592	13,950	0	13,950	17,229
International Nuclear Safety and Cooperation:					
Nuclear Safety and Cooperation (DOE)	4,180	2,600	6,100	8,700	10,576
Soviet Designed Reactor Safety (DOE)	16,401	7,400	5,000	12,400	4,000
Soviet Designed Reactor Safety (DOS	46,500	0	0	0	0
Elimination of Weapons-Grade	0	0	0	0	49,339
Total, International Nuclear Safety and	67,081	10,000	11,100	21,100	63,915
U.S .Fissile Materials Disposition					
Operation and Maintenance:					
Plutonium Disposition	86,246	82,225	0	82,225	95,000
HEU Disposition	14,177	26,000	0	26,000	75,000

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Supporting Activities	16,440	26,864	0	26,864	24,000
Total, O&M	116,863	135,089	0	135,089	194,000
Construction:					
Pit Disassembly and Conv Facility (99-D-141)	19,956	11,000	0	11,000	33,000
Immob. and Assoc. Process Fac. (01-D-142)	2,993	0	0	0	0
MOX Fuel Fabrication Facility (99-D-143)	25,943	65,993	0	65,993	93,000
HEU Off-Spec Blend -Down Project (01-D-	20,886	29,340	0	29,340	30,000
Total, Construction	69,778	106,333	0	106,333	156,000
Total, U.S. Disposition	186,641	241,422	0	241,422	350,000
Russian Surplus Materials Disposition	39,507	61,000	0	61,000	98,000
Total, Fissile Materials	226,148	302,422	0	302,422	448,000
Use of Prior Year Balances	-526	-57,833	0	-57,833	-64,000
Total, Defense Nuclear Nonproliferation	864,131	803,586	223,000[1]	1,026,586	1,113,630

[1]Includes $223 million from FY 2002 emergency supplemental funding contained in Public Law 101-117.

Table 2

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
ALBUQUERQUE OPERATIONS OFFICE					
Albuquerque Operations Office					
Nonproliferation and Verification R&D	2,780	1,722	0	-1,722	-100.0%
Russian Transition Initiatives	310	570	460	-110	-19.3%
Nonproliferation and International Security	0	310	220	-90	-29.0%
International Nuclear Materials Protection and Cooperation	4,759	3,204	3,214	10	0.3%
Fissile Materials Disposition	80	1,960	0	-1,960	-100.0%
Subtotal, Albuquerque Operations Office .	7,929	7,766	3,894	-3,872	-49.9%
Nonproliferation and National Security Center					
Nonproliferation and Verification R&D	16,963	35,806	0	-35,806	-100.0%
Los Alamos National Laboratory					
Nonproliferation and Verification R&D	60,558	89,616	94,115	4,499	5.0%
International Nuclear Safety and Cooperation	25	35	50	15	42.9%
Russian Transition Initiatives	8,660	8,550	6,687	-1,863	-21.8%
HEU Transparency Implementation . .	1,200	1,400	2,200	800	57.1%
Nonproliferation and International Security	9,762	6,776	10,889	4,113	60.7%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
International Nuclear Materials Protection and Cooperation	9,417	22,915	15,244	-7,671	-33.5%
Fissile Materials Disposition	31,850	40,485	33,060	-7,425	-18.3%
Total, Los Alamos National Laboratory	121,472	169,777	162,245	-7,532	-4.4%
Sandia National Laboratory					
Nonproliferation and Verification R&D	66,760	77,374	78,940	1,566	2.0%
International Nuclear Safety and Cooperation	40	0	50	50	100.0%
Russian Transition Initiatives	4,735	5,130	3,721	-1,409	100.0%
HEU Transparency Implementation	2,000	1,665	2,065	400	24.0%
Nonproliferation and International Security	16,077	13,426	16,244	2,818	21.0%
International Nuclear Materials Protection and Cooperation	44,273	53,721	47,117	-6,604	-12.3%
Fissile Materials Disposition	815	1,350	160	-1,190	-88.1%
Total, Sandia National Laboratory	134,700	152,666	148,297	-4,369	-2.9%
Pantex Plant					
Nonproliferation and Verification R&D	50	0	0	0	0.0%
International Nuclear Materials Protection and Cooperation	319	653	615	-38	-5.8%
Nonproliferation and International Security	30	200	120	-80	-40.0%
Fissile Materials Disposition	5,692	7,805	8,640	835	10.7%
Total, Pantex Plant	6,091	8,658	9,375	717	8.3%
Kansas City Plant					
Nonproliferation and Verification R&D	325	0	0	0	0.0%
Nonproliferation and International Security	0	1,005	450	-555	0.0%
Russian Transition Initiatives	3,270	3,420	2,382	-1,038	-30.4%
Total, Kansas City Plant	3,595	4,425	2,832	-1,593	-36.0%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Nonproliferation and National Security Institute					
Nonproliferation and Verification R&D	125	225	400	175	77.8%
National Renewable Energy Laboratory					
Nonproliferation and International Security	1,240	485	962	477	98.4%
Russian Transition Initiatives	1,240	1,140	788	-352	-30.9%
Total, National Renewable Energy Lab	2,480	1,625	1,750	125	7.7%
Total, Albuquerque Operations Office	293,355	380,948	328,793	-52,155	-13.7%
CHICAGO OPERATIONS OFFICE					
Chicago Operations Office					
Nonproliferation and Verification R&D	465	0	0	0	0.0%
Argonne National Laboratory					
Nonproliferation and Verification R&D	2,629	4,480	4,480	0	0.0%
International Nuclear Safety and Cooperation	9,600	4,600	4,876	276	6.0%
Russian Transition Initiatives	1,370	1,710	1,180	-530	-31.0%
HEU Transparency Implementation	700	800	800	0	0.0%
Nonproliferation and International Security	13,907	9,892	10,695	803	8.1%
International Nuclear Materials Protection and Cooperation	1,548	3,527	1,526	-2,001	-56.7%
Fissile Materials Disposition	919	75	0	-75	-100.0%
Total, Argonne National Laboratory	30,673	25,084	23,557	-1,527	-6.1%
Brookhaven National Laboratory					
Nonproliferation and Verification R&D	673	1,121	1,121	0	0.0%
International Nuclear Safety and Cooperation	500	500	500	0	0.0%
Russian Transition Initiatives	1,330	1,690	1,200	-490	-29.0%
HEU Transparency Implementation	27	25	25	0	0.0%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Nonproliferation and International Security	910	600	798	198	33.0%
International Nuclear Materials Protection and Cooperation	29,741	65,613	49,100	-16,513	-25.2%
Total, Brookhaven National Laboratory	33,181	69,549	52,744	-16,805	-24.2%
New Brunswick Laboratory					
HEU Transparency Implementation	450	450	450	0	0.0%
Nonproliferation and International Security	0	285	290	5	1.8%
International Nuclear Materials Protection and Cooperation	75	70	70	0	0.0%
Total, New Brunswick Laboratory	525	805	810	5	0.6%
Ames Laboratory					
Nonproliferation and Verification R&D	492	180	0	-180	-100.0%
Environmental Measurements Laboratory					
Nonproliferation and Verification R&D	175	300	700	400	133.3%
MOX Fuel Fabrication Facility (DCS)					
Fissile Materials Disposition	25,943	65,693	93,000	27,307	41.6%
MOX Fuel Fabrication and Irradiation Facility (DCS)					
Fissile Materials Disposition	20,548	25,700	43,500	17,800	69.3%
Pit Disassembly and Conversion Facility					
Fissile Materials Disposition	12,249	7,000	33,000	26,000	371.4%
Total, Chicago Operations Office	124,251	194,311	247,311	53,000	27.3%
IDAHO OPERATIONS OFFICE					
Idaho Operations Office					
Nonproliferation and Verification R&D	735	600	1,000	400	66.7%
International Nuclear Safety and Cooperation	0	900	0	-900	-100.0%
Total, Idaho Operations Office	735	1,500	1,000	-500	-33.3%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Idaho National Engineering and Environmental Laboratory					
Nonproliferation and Verification R&D	1,491	1,280	530	-750	-58.6%
International Nuclear Safety and Cooperation	1,900	0	900	900	0.0%
Russian Transition Initiatives	1,100	1,152	725	-427	0.0%
Nonproliferation and International Security	100	237	604	367	154.9%
International Nuclear Materials Protection and Cooperation	0	12	0	-12	-100.0%
Total, Idaho National Engineering and Environmental Laboratory	4,591	2,681	2,759	78	2.9%
Total, Idaho Operations Office	5,326	4,181	3,759	-422	-10.1%
NATIONAL ENERGY TECH LABORATORY (NETL)					
Fissile Materials Disposition	3,690	3,940	4,500	560	14.2%
NEVADA OPERATIONS OFFICE					
Nevada Operations Office					
Nonproliferation and Verification R&D	100	0	0	0	0.0%
Nonproliferation and International Security	197	157	162	5	3.2%
International Nuclear Materials Protection and Cooperation	1,000	3,110	2,412	-698	-22.4%
Fissile Materials Disposition	299	0	0	0	0.0%
Total, Nevada Operations Office	1,596	3,267	2,574	-693	-21.2%
Remote Sensing Laboratory					
Nonproliferation and Verification R&D	4,376	4,265	4,000	-265	-6.2%
International Nuclear Safety and Cooperation	400	75	250	175	233.3%
HEU Transparency Implementation	375	375	375	0	0.0%
Total, Remote Sensing Laboratory	5,151	4,715	4,625	-90	-1.9%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Total, Nevada Operations Office	6,747	7,982	7,199	-783	-9.8%
OAKLAND OPERATIONS OFFICE					
Oakland Operations Office					
Nonproliferation and Verification R&D	5,252	3,361	6,008	2,647	78.8%
HEU Transparency Implementation	750	600	1,600	1,000	166.7%
Nonproliferation and International Security	11,147	3,178	3,265	87	2.7%
Fissile Materials Disposition	9,766	2,200	900	-1,300	-59.1%
Total, Oakland Operations Office	26,915	9,339	11,773	2,434	26.1%
Lawrence Berkeley National Laboratory					
Nonproliferation and Verification R&D	2,549	2,390	1,990	-400	-16.7%
Russian Transition Initiatives	1,241	1,164	893	-271	-23.3%
Nonproliferation and International Security	80	541	928	387	71.5%
Total, Lawrence Berkeley National Laboratory	3,870	4,095	3,811	-284	-6.9%
Lawrence Livermore National Laboratory					
Nonproliferation and Verification R&D	42,618	68,053	60,378	-7,675	-11.3%
International Nuclear Safety and Cooperation	125	150	200	50	33.3%
Russian Transition Initiatives	10,491	11,970	8,261	-3,709	-31.0%
HEU Transparency Implementation	6,000	5,800	5,800	0	0.0%
Nonproliferation and International Security	10,028	9,076	1,013	-8,063	-88.8%
International Nuclear Materials Protection and Cooperation	38,040	43,159	33,650	-9,509	-22.0%
Fissile Materials Disposition	17,766	1,747	2,500	753	43.1%
Total, Lawrence Livermore National Laboratory	125,068	139,955	111,802	-28,153	-20.1%
Atomic Energy of Canada, Ltd.					
Fissile Materials Disposition	665	3,750	1,000	-2,750	-73.3%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Total, Oakland Operations Office	156,518	157,139	128,386	-28,753	-18.3%
OAK RIDGE OPERATIONS OFFICE					
Oak Ridge Operations Office					
International Nuclear Materials Protection and Cooperation	371	315	316	1	0.3%
Fissile Materials Disposition	12	0	0	0	0.0%
Total, Oak Ridge Operations Office	383	315	316	1	0.3%
Y-12 Plant					
Nonproliferation and Verification R&D	599	0	0	0	0.0%
HEU Transparency Implementation . .	3,000	2,770	3,879	1,109	40.0%
Fissile Materials Disposition	10,620	12,236	54,000	41,764	341.3%
Total, Y-12 Plant	14,219	15,006	57,879	42,873	285.7%
Portsmouth					
HEU Transparency Implementation . .	60	35	35	0	0.0%
Oak Ridge National Laboratory					
Nonproliferation and Verification R&D	7,557	6,089	5,589	-500	-8.2%
Nonproliferation and International Security	6,657	6,422	7,123	701	100.0%
Russian Transition Initiatives	3,585	3,990	2,753	-1,237	1.0%
International Nuclear Materials Protection and Cooperation	25,916	41,793	32,110	-9,683	-23.2%
Fissile Materials Disposition	13,953	11,150	27,800	16,650	149.3%
Total, Oak Ridge National Laboratory . . .	57,668	69,444	75,375	5,931	8.5%
Oak Ridge Institute for Science and Technology					
Nonproliferation and Verification R&D	50	60	60	0	0.0%
Total, Oak Ridge Operations Office	72,380	84,860	133,665	48,805	57.5%
RICHLAND OPERATIONS OFFICE					
Pacific Northwest National Laboratory					

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Nonproliferation and Verification R&D	18,542	16,508	15,408	-1,100	-6.7%
International Nuclear Safety and Cooperation	53,671	14,040	56,364	42,324	301.5%
Russian Transition Initiatives	5,280	5,700	3,934	-1,766	-31.0%
HEU Transparency Implementation	30	30	0	-30	-100.0%
Nonproliferation and International Security	7,732	4,875	7,590	2,715	55.7%
International Nuclear Materials Protection and Cooperation	14,893	53,292	47,352	-5,940	-11.1%
Fissile Materials Disposition	2,658	2,534	8,000	5,466	215.7%
Total, Pacific Northwest National Laboratory	102,806	96,979	138,648	41,669	43.0%
RUSSIAN FEDERATION					
Fissile Materials Disposition	12,851	42,000	64,000	22,000	52.4%
SAVANNAH RIVER OPERATIONS OFFICE					
Savannah River Operations Office					
Nonproliferation and International Security	5,065	5,619	5,856	237	4.2%
Russian Transition Initiatives	540	570	395	-175	-30.7%
International Nuclear Materials Protection and Cooperation	100	406	351	-55	-13.5%
Fissile Materials Disposition	3,131	5,300	0	-5,300	-100.0%
Total, Savannah River Operations Office	8,836	11,895	6,602	-5,293	-44.5%
Savannah River Technical Center					
Nonproliferation and Verification R&D	2,157	4,515	4,015	-500	-11.1%
Westinghouse Electric					
Fissile Materials Disposition	48,451	59,729	68,000	8,271	13.8%
Total, Savannah River Operations Office	59,444	76,139	78,617	2,478	3.3%
WASHINGTON HEADQUARTERS					
Nonproliferation and Verification R&D	1,700	4,361	4,673	312	7.2%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
International Nuclear Safety and Cooperation	820	800	725	-75	-9.4%
Russian Transition Initiatives	7,607	10,244	5,955	-4,289	-41.9%
Nonproliferation and International Security	12,972	12,657	25,459	12,802	101.1%
International Nuclear Materials Protection and Cooperation	0	110	0	-110	-100.0%
Fissile Materials Disposition	3,141	7,768	5,940	-1,828	-23.5%
Total, Washington Headquarters	26,240	35,940	42,752	6,812	19.0%
ALL OTHER SITES					
Fissile Materials Disposition	1,049	0	0	0	0.0%
Subtotal, Defense Nuclear Nonproliferation	864,657	1,084,419	1,177,630	93,211	8.6%
Prior Year Balances	-526	-57,833	-64,000	-6,167	10.7%
TOTAL, DEFENSE NUCLEAR NONPROLIFERATION	864,131	1,026,586	1,113,630	87,044	8.5%

Table 3

Future-Years Nuclear Security Program

(dollars in thousands)

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Defense Nuclear Nonproliferation					
Nonproliferation and Verification R&D	283,407	289,358	295,435	301,639	307,974
Nonproliferation and International Security	92,668	94,614	96,601	98,630	100,701
International Nuclear Materials Protection and Cooperation	233,077	238,176	243,178	248,284	253,498
Russian Transition Initiatives	39,334	40,160	41,003	41,864	42,744
HEU Transparency Implementation	17,229	17,591	17,960	18,337	18,722

(dollars in thousands)

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
International Nuclear Safety and Cooperation					
Soviet Designed Reactor Safety (DOE)	4,000	0	0	0	0
Nuclear Safety and Cooperation (DOE)	10,576	14,882	15,195	15,514	15,839
Elimination of Weapons-Grade Pu Production[2]	49,339	50,374	51,431	52,512	53,615
Total, International Nuclear Safety and Cooperation	63,915	65,256	66,626	68,026	69,454
Fissile Materials Disposition[3]					
U.S. Fissile Materials Disposition					
Operation and Maintenance:					
Plutonium Disposition	94,400	339,200	393,196	399,219	404,907
HEU Disposition	75,000	0	0	0	0
Support Activities	24,600	0	0	0	0
Total, Operation and Maintenance	194,000	339,200	393,196	399,219	404,907
Russian Plutonium Disposition . . .	98,000	93,645	0	0	0
Construction:					
Pit Disassembly and Conversion Facility	33,000	0	0	0	0
MOX Fuel Fabrication Facility	93,000	0	0	0	0

[2]Outyears for Russian Pu Reactor Replacement reflects estimates as actual budget authority will be transferred from DoD consistent with this program effort.

[3]NNSA's Fissile Materials Disposition program covers activities in both the U.S. and Russia to dispose of weapons usable fissile material such as enriched uranium and plutonium. The 2003 budget supports the first year of a newly-revised program for plutonium disposition. Beyond 2003, the Administration is committed to providing the resources to fully support this new plan.

(dollars in thousands)

	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
HEU Off-Spec Blend-Down Project	30,000	0	0	0	0
Total, Construction	156,000	0	0	0	0
Total, Fissile Materials	448,000	432,845	393,196	399,219	404,907
Subtotal, Defense Nuclear Nonproliferation	1,177,630	1,178,000	1,153,999	1,175,999	1,198,000
Prior Year Balances	-64,000	-45,000	0	0	0
Total, Defense Nuclear Nonproliferation	1,113,630	1,133,000	1,153,999	1,175,999	1,198,000

U.S. Department of Energy
FY 2003 Congressional Budget

Appropriation Authorizations
(dollars in thousands)

Activity	Title of Authorizing Legislation	Last Year of Authorization	Authorization Level	Appropriation Level
Defense Nuclear Nonproliferation	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101 (2)	FY 2002	$776,886	$1,026,586
Nonproliferation and Verification R&D	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101(2)A	FY 2002	244,306	322,306
International Nuclear Safety	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101(2)E	FY 2002	10,000	20,000
HEU Transparency	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101(2)D	FY 2002	13,950	13,950
Arms Control	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101(2)B	FY 2002	117,741	132,741
International Materials Protection, Control and Accounting	National Defense Authorization Act for FY 2002. P.L. 107-107, Section 3101(2)C	FY 2002	143,800	293,000

Fissile Materials Control and Disposition	National Defense Authorization Act for FY 2002, P.L. 107-107, Section 3101(2)F	FY 2002	289,089	302,422

Nonproliferation and Verification Research and Development

Program Mission

The Nonproliferation and Verification Research and Development (R&D) Program conducts applied research, development, testing, and evaluation—and leverages the work of others—to produce technologies that lead to prototype demonstrations and resultant detection systems. These systems strengthen the United States ability to prevent attacks as well as respond to current and projected threats to national security and world peace posed by the diversion of special nuclear material and the proliferation of nuclear, chemical, and biological weapons. Developed technologies are made available to a wide range of government users including the Department of Defense (DoD) and the Intelligence Community. R&D activities are divided into four program areas: proliferation detection, nuclear explosion monitoring, chemical and biological national security, and supporting activities.

Beginning in FY 2002 and continuing into FY 2003, the Nonproliferation and Verification R&D Program is expanding its technical focus in response to the September 11th terrorist attack. Under guidance from the Office of Management and Budget (OMB), the National Nuclear Security Administration (NNSA) Administrator has reviewed the R&D portfolio for direct near term application of R&D products that could be fielded within two years or less. In addition, supplemental funding was provided to expand these R&D products into operational tools to be used by first responders in government agencies. There are three examples: 1) transfer mature R&D products immediately to operational venues; 2) accelerate remote unattended sensors to national collection programs; and 3) work with other agencies to fill in the technology gaps for sensor systems to interdict and mitigate terrorist attacks.

The Nonproliferation and Verification R&D Program provides tools to enhance U.S. national security through needs-driven R&D. The emphasis is on developing the requisite technologies to detect and deter nuclear proliferation, to meet U.S. nuclear explosion monitoring goals, and to better prepare for, and respond to, domestic nuclear radiologic, chemical, and biological attacks. The objectives of the program are to:

- Develop and demonstrate technologies needed to remotely detect the early stages of a proliferant nation's nuclear weapons program.
- Develop, demonstrate, and deliver technologies to detect, locate, identify, and characterize nuclear explosions underground, underwater, in the atmosphere, and in space. Delivery of these R&D products to U.S. monitoring agencies enhances the U.S. nuclear explosion monitoring capability.
- Develop and improve national capability to identify the origins of nuclear materials, to monitor global fissile material production, to monitor Russian nuclear warhead dismantlement and cooperative threat reduction programs, to counter nuclear smuggling, and to enhance homeland security.
- Develop, demonstrate, and deliver, in partnership with the DoD and other agencies, chemical and biological detection and related technologies and systems that improve the national ability to detect and to minimize the consequences of the use of chemical or biological agents.
- Transition advanced technical capabilities to other government agencies and appropriate users.

Program Strategic Performance Goal

NS2-1: Enhance the capability to detect weapons of mass destruction (WMD), including nuclear, chemical, and biological systems.

Performance Indicators

Proliferation Detection

Enabling Technologies

Develop new methodologies to detect fissile materials at greater distances beyond current capability for applications ranging from international fissile material control to domestic response to smuggled nuclear material. Leading candidates will be tested and evaluated.

Develop detection concepts based on technical advancements in microtechnology for use in prototype systems to prepare for FY 2004 field-testing to evaluate quantitative and qualitative improvements.

Develop new cost effective radiation detection materials.

Complete accelerated program begun in second half of FY 2002 to develop new fiber optics technology to communicate large amounts of data. This will enable various new sensor and data transfer concepts awaiting this breakthrough.

Conduct field tests to determine existence and strength of certain new signatures associated with WMD threat observables predicted by FY02 study efforts in a previously unexplored detection regime.

Conduct precise spectral measurements on the next set of precursor and byproduct chemical species associated with WMD processes, and incorporate these library reference measurements into the NNSA maintained database for use by national defense and civil spectroscopy programs.

Integrated Systems

Develop alternative methods and technologies to monitor confidence building measures to support the dismantlement of nuclear weapons and removal of excess special nuclear materials from the nuclear weapon inventories in the U.S. and Russia.

Test and evaluate a demonstration/prototype wide area nuclear materials search or tracking system to support homeland security applications.

Partner with other federal agencies who monitor maritime traffic to develop and test concepts to interdict nuclear materials in transit.

Conduct advanced phase field testing of next generation airborne hyperspectral search and characterization instrument, and begin collaborations for end user deployment with homeland security first response organizations.

Build an integrated sensor system to detect trace quantities of threat chemicals with revolutionary new quantum cascade diode laser technology.

Demonstrations

- Complete final studies and reports on the nonproliferation technologies developed and evaluated through the Multispectral Thermal Imager satellite project. Continue operation of the satellite as long as significant science and engineering value can be obtained from the system, then conduct final phase destructive testing.
- Demonstrate a beta version of a systems model to support decisions on technology insertion to counter terrorist threats using maritime transportation.
- Transfer to other agencies improved methods to collect and analyze debris and other environmental samples that will indicate foreign fissile material nuclear production.
- Conduct field test of unattended detection system to provide early warning of the presence of a radiological dispersal device.
- Demonstrate a modified commercial inspection system to detect fissile materials in cargo containers.
- Demonstrate a new handheld technology based upon microtechnology to detect chemicals of interest related to nuclear weapon production.
- In collaboration with end-user organizations, conduct a utility demonstration of new synthetic aperture radar technology developed from FY 2000 to FY 2002.

Nuclear Explosion Monitoring

Satellite-Based Systems

- Complete satellite sensor and payload integration of the first operational nuclear explosion detection payload for the Global Positioning System (GPS) Block IIF satellites.

Ground-Based Systems

- Integrate data from newly installed seismic stations and integrate other analytical techniques into the operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center (AFTAC).

Chemical and Biological National Security

Technology Development Initiatives

- Develop and demonstrate hand-portable chemical and biological detectors to provide real-time detection to increase situational awareness during crises.
- Develop and demonstrate modeling and simulation capabilities to enable the accurate prediction of the effects from chemical and biological attacks in urban areas to guide preparation and response efforts, including providing “rule of thumb” guidance to first responders.
- Provide the underpinning biological information necessary for biological detection that will support analyses for attribution and event reconstruction purposes, and will aid other agencies in the development of medical and public health countermeasures. This effort includes providing primers for biological threat agents to the CDC Laboratory Response Network.

Develop and demonstrate chemical and biological decontamination and restoration techniques for use in civilian settings.

Domestic Demonstration and Application Programs

Demonstrate integrated chemical and biological detection, identification, and warning systems for use domestically for high-risk areas or conditions.

Transition technologies and systems, such as a biological agent environmental monitoring capability, microbial forensics capabilities, and access to hazard predictions, to appropriate users.

Performance Standards

Blue: Significantly exceed: Develop new methodologies to detect fissile materials at greater distances beyond current capability for applications ranging from international fissile material control to domestic response to detecting smuggled nuclear material. Demonstrate prototype commercial cargo inspection system to detect fissile materials and high explosives. Complete experiments of a prototype unmanned aerial vehicle based lidar system, and initiate a project that utilizes an advanced laser diode technology to implement revolutionary remote sensing techniques. Initiate integration of data from newly installed seismic stations into operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center. Transition environmental monitoring biological agent detection capability to a response organization, and demonstrate fixed system to protect complex, key infrastructure. Provide more than twenty primers to CDC.

Green: Meet all planned targets/milestones: Develop new methodologies to detect fissile materials at greater distances beyond current capability for applications ranging from international fissile material control to domestic response to detecting smuggled nuclear material. Demonstrate prototype commercial cargo inspection system to detect fissile materials. Complete experiments of a prototype unmanned aerial vehicle based lidar system, and initiate a project that utilizes an advanced laser diode technology to implement revolutionary remote sensing techniques. Initiate integration of data from newly installed seismic stations into operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center. Transition environmental monitoring biological agent detection capability to a response organization, and demonstrate fixed system to protect complex, key infrastructure. Provide additional twenty primers to CDC.

Yellow: Meet all critical targets/milestones: Demonstrate prototype commercial cargo inspection system to detect fissile materials. Complete experiments of a prototype unmanned aerial vehicle based lidar system, and initiate a project that utilizes an advanced laser diode technology to implement revolutionary remote sensing techniques. Initiate integration of data from newly installed seismic stations into operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center. Transition environmental monitoring biological agent detection capability to a response organization, and demonstrate fixed system to protect complex, key infrastructure. Provide additional ten primers to CDC.

Red: Below expectations: Demonstrate prototype commercial cargo inspection system to detect fissile materials. Complete experiments of a prototype unmanned aerial vehicle based lidar system, and initiate a project that utilizes an advanced laser diode technology to implement revolutionary remote sensing techniques. Initiate integration of data from newly installed seismic stations into operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center. Transition environmental monitoring biological agent detection capability to a response organization, and demonstrate fixed system to protect complex, key infrastructure. Provide additional ten primers to CDC.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
Tested and evaluated a real-time field analytical sampling system; completed a joint plan on technology development for domestic security. (NS4-1)	Complete the selection of candidate technologies to detect fissile material at distances greater than current capability. (NS2-1)	Develop new methodologies to detect fissile materials at greater distances beyond current capability for applications ranging from international fissile material control to domestic response to detecting smuggled nuclear material. Leading candidates will be tested and evaluated. (NS2-1) Demonstrate prototype commercial cargo inspection system to detect fissile materials. (NS2-1)
Demonstrated and evaluated the proliferation detection capabilities of the Multispectral Thermal Imager small satellite launched in FY 2000. (NS4-1)	Conduct one flight test of a new airborne radar and two flight tests of LIDAR technology for measuring obscured or concealed nonproliferation activities. (NS2-1)	Complete and conduct experiments of a prototype unmanned aerial vehicle based lidar system, and initiate a project that utilizes an advanced laser diode technology to implement revolutionary remote sensing techniques. (NS2-1)
Began physical construction of the Nonproliferation and International Security Center (NISC) at LANL. (NS4-1)	Complete physical construction for the NISC at LANL. (NS2-1)	
Conducted Critical Design Reviews for two new-generation nuclear explosion monitoring sensors for future satellite deployment. (NS4-1)	Deliver to the U.S. National Data Center an operational database to improve ground-based nuclear explosion monitoring, with calibration data sets for Asia, the Middle East, North Africa and the Former Soviet Union. (NS2-1)	Initiate integration of data from newly installed seismic stations into operational regional seismic knowledge base at the U.S. Air Force Technical Applications Center. (NS2-1)
Demonstrated systems to protect key infrastructure and special events from chemical and biological attacks. (NS4-1)	Deploy prototype biological agent detection system, for enhanced public health response at Winter Olympic Games. (NS2-1)	Transfer environmental monitoring biological agent detection capability to a response organization, and demonstrate fixed system to protect complex, key infrastructure. (NS2-1)
Provided two primers for biological threat agents to CDC Laboratory Response Network (LRN)	Provided twenty additional primers to CDC. (NS2-1)	Provide additional twenty primers to CDC. (NS2-1).

Significant Accomplishments and Program Shifts

Proliferation Detection

Enabling Technologies

- Initiate research into long range stand-off detection technologies for special nuclear materials, and complete the testing of a stand-off HEU Detector to counter the threat from terrorism.
- Reprioritized the effort to measure reference chemical spectra ensuring chemicals associated with broader range of national security threats are collected and cataloged so that systems being developed for nonproliferation missions are also useful against terrorism and domestic threats.
- Reassess the measurable signatures and observables of current high-priority threats, including reassessment of signal strengths, uniqueness, and overall value of each measurement for detecting, distinguishing, and characterizing threat activities. This will focus future technology development priorities.

Integrated Systems

- Complete the demonstration of an urban unattended sensor network to interdict nuclear materials in transit.
- Initiate a partnership with U.S. Coast Guard and U. S. Customs Service to develop a national technology strategy to interdict nuclear/explosives/miscellaneous terrorist threats.
- Increase scope of remote sensing technologies to address dual use applications in homeland security and incident response in addition to original focus of proliferation detection and characterization. Fundamental technologies are relevant to both mission areas, now explicit tasks are being undertaken to ensure capabilities are applied to homeland security.

Demonstrations

- Develop a test/evaluation criteria low cost radiation detectors to support domestic consequence management.
- Develop a commercial prototype sampler/analyzer to detect nuclear weapon material production and began the technology transfer to the user.
- Completed an advanced prototype ultraviolet LIDAR sensor and conducted flight tests.
- Completed the technology transfer of a prototype wide band radiofrequency system for testing by a user.
- Used experimental data from the Multispectral Thermal Imager (MTI) satellite to assess utility of nonproliferation remote sensing technologies. Validated MTI achieved original program technical goals for radiometric accuracy and took advantage of system upsets to develop and test new radiometric correction methods. Issued final reports on these technologies and worked with national security organizations to ensure MTI results reduce government's risk during the acquisition of future national capabilities. Applied MTI's capabilities in support of various environmental and other crises.
- Conduct the first research flight tests of a revolutionary new airborne synthetic aperture radar (SAR) for higher spatial resolution imaging of concealed or obscured objects, accelerated the engineering refinement

and utility demonstration phase of this SAR system to enable faster operational introduction of this technology.

Nuclear Explosion Monitoring

Satellite-Based Systems

Continued successful operation of the first two new-generation NNSA nuclear detonation detection sensors, launched by the U.S. Air Force in January 2001 aboard a GPS satellite.

Ground-Based Systems

Provide AFTAC scientifically and statistically valid methods for combining regional and teleseismic analyses for operational use.

Operationalize location, magnitude and discrimination analysis procedures for seismic data.

Calibrate existing and newly installed seismic stations for operational use by the regional seismic knowledge base at the U.S. Air Force Technical Applications Center.

Chemical and Biological National Security

Technology Development Initiatives

Provide primers for twenty additional biological threat agents to the Centers for Disease Control and Prevention's (CDCP) Laboratory Response Network for validation and distribution within the network.

Conducted field demonstrations of an autonomous biological detection system to benchmark performance and improve practicality.

Analyzed results of a multi-scale field experiment with the DOE Office of Science and DOD in order to validate and refine chemical and biological agent transport models within the urban environment.

Domestic Demonstration and Application Programs

Deployed a system utilizing environmental sampling and DNA analysis to monitor for early detection of a threat biological agent release at the Winter Olympic Games.

Constructed a prototype system to provide access to chemical hazard prediction capabilities to local and responder authorities.

Prepared for multiple-station system demonstration of a chemical detection and response tool in the Washington Metro.

Supporting Activities

Nonproliferation and International Security Center

Initiated physical construction.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments[a]	FY 2002 Comparable Appropriation	FY 2003 Request
Nonproliferation and Verification R&D					
Proliferation Detection	105,726	89,100	35,000	124,100	121,500
Nuclear Explosion Monitoring	72,309	74,000	0	74,000	89,395
Chemical and Biological National Security	39,574	42,200	43,000	85,200	69,000
Supporting Activities	5,149	3,200	0	3,200	3,512
Subtotal, Nonproliferation and Verification R&D	222,758	208,500	78,000	286,500	283,407
Construction	16,963	35,806	0	35,806	0
Use of Prior Year Balances	(72)	0	0	0	0
Total, Nonproliferation and Verification R&D	239,649	244,306	78,000	322,306	283,407

Public Law Authorization:

Public Law 95-91, "Department of Energy Organization Act"

Public Law 103-62, “Government Performance Results Act of 1993"

Public Law 107-107, “National Defense Authorization Act FY 2002"

[a] Includes $78,000,000 from FY 2002 emergency supplemental funding contained in Public Law 107-117

Funding by Site

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Albuquerque Operations Office	2,780	1,722	0	-1,722	-100.0%
Kansas City Plant	325	0	0	0	0.0%
Los Alamos National Laboratory	60,558	89,616	93,815	4,199	4.7%
Nonproliferation and International Security Center	16,963	35,806	0	-35,806	-100.0%
Nonproliferation and National Security Institute	125	225	400	175	77.8%
Pantex	50	0	0	0	0.0%
Sandia National Laboratory	66,760	77,374	78,940	1,566	2.0%
Total, Albuquerque Operations Office	147,561	204,743	173,155	-31,588	-15.4%
Chicago Operations Office					
Chicago Operations Office	465	0	0	0	0.0%
Ames Laboratory	492	180	0	0	0.0%
Argonne National Laboratory	2,629	4,480	4,480	0	0.0%
Brookhaven National Laboratory	673	1,121	1,121	0	0.0%
Environmental Measurements Laboratory	175	300	700	400	133.3%
Total, Chicago Operations Office	4,434	6,081	6,301	220	3.6%
Idaho Operations Office					
Idaho Operations Office	735	600	1,000	400	66.7%
Idaho National Eng. & Env. Laboratory	1,491	1,280	530	-750	-58.6%
Total, Idaho Operations Office	2,226	1,880	1,530	-350	-18.6%
Nevada Operations Office					
Nevada Operations Office	100	0	0	0	0.0%
Remote Sensing Test & Evaluation Center	4,376	4,265	4,300	35	0.8%
Total, Nevada Operations Office	4,476	4,265	4,300	35	0.8%
Oakland Operations Office					
Oakland Operations Office	5,252	3,361	6,008	2,647	78.8%
Lawrence Berkeley National Laboratory	2,549	2,390	1,990	-400	-16.7%
Lawrence Livermore National Laboratory	42,618	68,053	60,378	-7,675	-11.3%
Total, Oakland Operations Office	50,419	73,804	68,376	-5,428	-7.4%
Oak Ridge Operations Office					
Oak Ridge Institute for Science and Education	50	60	60	0	0.0%
Oak Ridge National Laboratory	7,557	6,089	5,589	-500	-8.2%
Oak Ridge Y-12 Plant	599	0	0	0	100.0%
Total, Oak Ridge Operations Office	8,206	6,149	5,649	-500	-8.1%

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Richland Operations Office					
Pacific Northwest Laboratory	18,542	16,508	15,408	-1,100	-6.7%
Savannah River Operations Office					
Savannah River Technology Center	2,157	4,515	4,015	-500	-11.1%
NNSA Washington Headquarters	1,700	4,361	4,673	312	7.2%
		0	0	0	
Subtotal, Nonproliferation and Verification R&D	239,721	322,306	283,407	-38,899	-12.1%
Use of Prior-Year Balances	-72	0	0	0	0.0%
Total, Nonproliferation and Verification R&D . . .	239,649	322,306	283,407	-38,899	-12.1%

Site Description

Argonne National Laboratory

Argonne National Laboratory plays a key role in the development and implementation of modeling and simulation capabilities to predict the dispersal of chemical and biological agents in subway systems.

Brookhaven National Laboratory

Brookhaven National Laboratory will develop biological foundation and analysis technologies for countering biological terrorism.

Idaho National Engineering and Environmental Laboratory

The Idaho National Engineering and Environmental Laboratory will develop counter nuclear smuggling detection technologies using accelerator systems for U.S. International Border.

Lawrence Berkeley National Laboratory

Lawrence Berkeley National Laboratory (LBNL) will be a participant in the interlaboratory effort to develop a room temperature high resolution gamma spectrometer based on cadmium zinc telluride (CZT) materials and will develop an improve neutron generator for field application. LBNL is also a key component of our chem-bio modeling and simulation program to predict the transport of chemical and biological agents inside of buildings and contributes to the development of chemical and biological detection technology.

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) will develop: specific geographical regional models to improve U.S. technical capability and confidence to locate and identify seismic events to support nuclear explosion monitoring assessments; gamma ray imaging technology for nonproliferation applications; advanced technologies to search for and locate special nuclear material in terrorist scenarios; forensics methods for law enforcement which will improve the U.S. capability to investigate the threat of WMD; and will develop technology system concepts to reduce the threat from terrorist activities introduced through maritime environments.

LLNL will have a key role in the development of chemical and biological agent transport modeling capabilities for prediction in urban areas. LLNL also supports development of DNA assays and diagnostics for bioagent identification and forensic analysis. LLNL will develop an autonomous pathogen detection system and decontamination formulations, and will participate in the development and demonstration of an environmental monitoring early warning system for biological agents. LLNL will conduct research in the areas of miniaturized

chemical detectors by using advanced micromachining techniques, novel biochemical transducer mechanisms, and by developing more efficient multi-sensor data processing algorithms.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) will provide the U.S. Air Force Technical Application Center with improved analytic tools and sensors for discriminating small earthquakes and industrial activities from banned nuclear explosions. LANL begins delivering next generation electromagnetic pulse sensors and continues developing next generation radiation sensors for satellite-based nuclear explosion monitoring systems. The laboratory will investigate remote unattended methods and handheld radiation detection systems to support the national homeland security program. The laboratory will continue to maintain and improve the analytical laboratory methods which are the foundation for U.S. programs to monitor global nuclear weapon material production and weapon testing. LANL will continue developing innovative algorithms and specialized processors to process voluminous quantities of remote sensing data into the specific information required by decision makers. The world-class radiometric calibration facility and expertise developed at LANL, as part of the multispectral thermal imaging small satellite program, will be used in ongoing data analysis from the satellite which is now in orbit as well as for other spectral programs.

LANL has an important role in the development of a biological detection and early warning system. LANL plays a large role in developing the DNA signatures, assays, and the necessary supporting biological information for bioagent detection and identification. In addition, LANL will investigate decontamination technologies and advance development of chemical and biological agent transport modeling capabilities for prediction in urban areas.

Oak Ridge National Laboratory

Oak Ridge National Laboratory (ORNL) will conduct research to support homeland security against the nuclear threat from nuclear weapons and radiological disposal devices. ORNL will provide leading-edge research into candidate materials which could replace exiting nuclear detectors used for gamma spectroscopy and neutron detection. ORNL will continue investigation of small portable mass spectroscopy units and the application of micro-fluidics systems for “lab-on-a-chip” concepts. ORNL will investigate new sensor concepts to detect and provide early warning of the presence of nuclear materials in the environment. In addition to supporting the accessibility of biological background information, ORNL will continue to develop systems for detection of biological and chemical warfare agents.

Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory (PNNL) will continue the development of laboratory methods and hand-held detection technologies in support of strategic arms control policies and National Security applications. The laboratory will pursue concepts to detect at long range special nuclear materials and to detect with confidence HEU at greater distances than current capabilities. The laboratory will support efforts to detect

and characterize signatures from nuclear explosion monitoring systems. The laboratory will be a strong participant in the development of advanced forensics methods that are necessary to identify the origin of smuggled nuclear material. PNNL will provide collaborative statistical support to other DOE National Laboratories conducting research and development for the Nuclear Explosion Monitoring program. Areas of research include discrimination algorithms to support geographical regional models; and overall statistical assessments to increase confidence in monitoring systems. PNNL will continue developing a world class library of infrared absorption spectra, to be made available to NNSA and other federal government remote sensing programs. PNNL will develop a universal sample preparation system for biological detectors. PNNL also plans, conducts, and analyzes data from very large scale field experiments such as URBAN 2000.

Remote Sensing Test and Evaluation Center

The Remote Sensing Test and Evaluation Center which includes the Remote Sensing Laboratory, the HAZMAT Spill Center, and the Special Technologies Laboratory. The Remote Sensing Laboratory provides integration and flight services for unique research sensors that require airborne testing and data collections to further scientific understanding. The HAZMAT Spill Center on the Nevada Test Site supports field testing of effluent detection sensors for the Nonproliferation and Verification R&D program. In addition, Bechtel Nevada provides for facility maintenance, equipment upgrades needed to support sensor testing, and system calibration. The HAZMAT Spill Center also supports user-sponsored spill tests for both government and industry; provides spill test results to Departmental elements, other government agencies, industry and the general public for use in hazards mitigation and emergency responder training programs.

Sandia National Laboratories

The Sandia National Laboratories (SNL) will develop, demonstrate, and validate improvements to existing and planned information system technologies to provide capabilities for highly automated, high confidence data processing and analysis in support of nuclear explosion monitoring. SNL will support the U.S. satellite-based program to detect nuclear detonations by providing systems engineering, the optical sensors, and the on-orbit processing technologies. In partnership with homeland security organizations, the laboratory will develop nuclear detection systems to interdict smuggled nuclear materials in transit across U.S. borders and overseas. SNL will continue development of advanced Synthetic Aperture Radars and analysis methods for mapping and the detection of proliferation events. SNL will continue development of an ultraviolet system for remote detection of effluents. SNL will continue operation of the multispectral thermal imager satellite. SNL will continue developing the "micro ChemLab" an effort that implements many analytical chemistry functions on a chip. This technology will bring the power of an analytical laboratory down to a hand-held format for application to chemical agent and biological toxin detection. In addition, SNL will continue development of environmentally friendly CBW decontamination foams, and epidemiological tools to discern natural from manmade disease outbreaks. Sandia will conduct research into dissemination characteristics of biological and chemical hazards. SNL plays an important role in developing and demonstrating a chemical/biological detection and response system for fixed infrastructure, including subways and airports.

Savannah River Technology Center

The Savannah River Technology Center (SRTC) will provide ground-based monitoring systems to analyze data collected by the multispectral thermal imager satellite in order to validate atmospheric and facility models based on ground-truth information. SRTC will support development of methods to exploit environmental sampling and provide advisory services for testing of new concepts to detect undeclared nuclear reprocessing.

NNSA Headquarters and DOE/NNSA Operations Offices

NNSA Headquarters and DOE/NNSA Operations Offices including Albuquerque, Chicago, Idaho, Nevada, and Oakland provide oversight and support for interagency agreements, university grants, small business contracts, and other procurement competitions.

All Other Sites

The Office of Nonproliferation Research and Engineering occasionally uses other DOE laboratories and facilities including the Environmental Measurements Laboratory, and the Oak Ridge Institute for Science and Education, Kansas City Plant, Nonproliferation and National Security Institute, Pantex, Ames, Y-12 Plant for research and support activities.

Proliferation Detection

Mission Supporting Goals and Objectives

The Proliferation Detection Program mission is to develop and demonstrate innovative proliferation detection technologies and advanced data analysis to detect proliferation of weapons of mass destruction worldwide. The program has expanded its R&D focus to include advanced sensor technology to support homeland security organizations.

The goal in this program area is to develop and demonstrate technologies to inhibit nuclear materials diversion, identify and characterize nuclear weapon activities in known and emerging states, counter nuclear smuggling, and verify nuclear arms reduction. Specific objectives include development of improved radiation detection technologies, hyper and multi-spectral imaging systems, synthetic aperture radar, laser based remote detection systems, and advanced methods to improve field and laboratory materials analysis.

A roadmapping process and external merit review are used to improve the selection process and will improve the technical products. The program has characterized its R&D into three phases: Enabling Technologies; Integrated Systems; and Demonstrations. R&D sponsored by the Proliferation Detection Program is based on collective user community needs as well as specific agency requirements. Strategic R&D investments will pursue high risk concepts as a means to "push" the technology envelope for users. This results in a steady level of user involvement and system requirements development. The program nurtures enabling technology to expand the existing collection construct. Successful technical approaches are continued with user participants sharing the system performance in an integrated concept. The final step is a full demonstration of prototype system with performance measures established by the user.

The program supports multi-laboratory and joint interagency projects that are comprehensive scientific end-to-end research and development efforts that:

- Examine and assess the nature of global proliferation and apply known weapon production phenomena to assess remotely observable signatures.
- Conduct modeling and testing to understand the fate and transport (environmental effects) on chemical and radioactive effluents, and other emissions from proliferation-related processes.
- Develop and test sensor systems in partnership with operational users to remotely detect and characterize proliferation activities.
- Develop techniques to interpret the data and produce meaningful information.
- Develop technology partnerships to commercialize or transfer successful technology to users.
- Respond to crisis and critical technology needs as required.

These activities are closely coordinated with other government agencies to support test and evaluation of new concepts and prototype systems. In FY 2003, there will be an increase in testing programs to evaluate R&D products as replacement systems that can significantly advance the nation's nuclear proliferation detection

capability. There will be an inclusion of terrorist scenarios and growing demands for new technology to interdict terrorism before it reaches our shores. Performance tests will be conducted on microtechnology-based systems and passive optical systems that can detect chemical species associated with fissile material production and nuclear fission. In addition, field-testing will begin on new algorithms to exploit synthetic aperture radar imaging and other physical detection methods.

Funding Schedule

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Enabling Technologies	45,624	56,728	60,128	3,400	6.0%
Integrated Systems	32,101	34,581	34,581	0	0.0%
Demonstrations	28,001	32,791	26,791	-6,000	-18.3%
Total, Proliferation Detection	105,726	124,100	121,500	-2,600	-2.1%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Proliferation Detection

The Proliferation Detection program develops and demonstrates innovative remote sensing and ground-based technologies to improve the detection, characterization, and analysis of foreign nuclear weapon programs, global nuclear materials production and to detect the early stages of an emerging nuclear weapon programs or non-compliance with international treaties and agreements. The program areas focus on: remote effluent and physical attribute detection, radiation detection, and nuclear material analysis technologies. The goal is to maintain US leadership in deterring nuclear proliferation by early detection and assessment of emerging threats including terrorist use of WMD and known or declared nuclear weapon proliferants. The R&D program is comprised of enabling technology, integrated products and systems, and demonstrations of concepts to support technology transfer to U.S. Government (USG) users. The R&D is guided by roadmapping that identified needs, gaps, and requirements from the nonproliferation community for revolutionary improvement to current USG systems.

#	**Enabling Technologies**	45,624	56,728	60,128

Applied research on innovative concepts to advance the USG capability to counter the threat from nuclear weapon proliferation. The science and technology is coordinated with other agencies to ensure that the R&D will enhance future national investments in monitoring and analysis. R&D will continue on detector materials, data and system control software, and engineering methods to improve operational applications. Technologies exploiting advanced data management methods and evolving technologies from astrophysics, detection, hyperspectral imaging, optical trapping, and use of superconducting materials are examples that may contribute significant results or revolutionary improvements to current systems are a high priority. R&D on alternative solutions to national level homeland security problems will also be a priority. The program will advance the state of knowledge and retain the scientific skills of the technical base for nonproliferation and arms control communities. *The FY 2003 increase of $3,400,000 will be used to expand nuclear material analysis performance, the user involvement in the operational challenges for microtechnology based detectors fielded against proliferation activities and on focused R&D for long range detection of special nuclear material. In addition remote sensing technologies have been refocused to address dual use applications in homeland security and incident response while maintaining the original focus of proliferation detection and characterization, which was begun in FY 2002.*

#	**Integrated Systems**	32,101	34,581	34,581

Scientifically sound concepts that support high priority needs will be developed into engineered prototypes for evaluation and testing. The program will model and predict performance of test concepts and systems guided by needs or requirements from the defense, intelligence, homeland security, and the nonproliferation

communities. Detection and analysis concepts to improve system operational life, onboard analytical capability and reduced cost of operation will be pursued. These prototypes will be extensively tested under laboratory conditions to evaluate and model the performance of a total system. The goal is to strengthen the user partnership to improve the system performance envelope to replace or augment existing capability. The technical goal is to integrate user/operational conditions with leading edge scientific discovery into a working concept for future field testing. *Total funding for integrated systems remains constant from FY 2002 to FY 2003, increases to explore promising new technologies in areas prioritized by threat studies are offset by commensurate decreases in other technologies that have been developed to a point of transition. Additional emphasis will be given to synthetic aperture radar systems, sensor technology for in-field measurement, unattended radiation detection concepts to counter the radiologic dispersal device threat, and exploitation of maritime traffic models to support technology development for homeland security.*

#	**Demonstrations**	28,001	32,791	26,791

Field tests and demonstrations in partnership with users is the critical phase before technology transition. The program will test and evaluate under realistic conditions, integrated systems that are strong candidates for technology transition. Modeling will be conducted to ensure system performance is documented. Testing will be engineered to identify the operational characteristics and likely performance for an operational system. A test program will ensure that peer review and evaluation is unbiased and follows well-defined criteria and user specifications. In FY 2003 a wide area radiation search system is scheduled to be tested. There will be technology transfer goals established during the demonstration development process. *The FY 2003 decrease of $6,000,000 reflects the completion of system fabrication for an advanced detection system in a UAV and the technology transfer of a prototype wide band RF system for testing by a user. The program will demonstrate radiation detection concepts to support requirements for wide area tracking and interdiction of special nuclear material and will expand its nuclear material analysis partnership with DoD to strengthen the DOE laboratory analytical capability, and to determine origin and source of radiological dispersal device and fissile materials.*

Total, Proliferation Detection	105,726	124,100	121,500

Nuclear Explosion Monitoring

Mission Supporting Goals and Objectives

The goals of the Nuclear Explosion Monitoring Research and Engineering (NEM R&E) program are to develop and field sensors and algorithms for detecting, locating, identifying, and characterizing nuclear explosions when they occur in the atmosphere, in space, underground, or underwater; transition technology and provide operational support for U.S. national nuclear explosion monitoring agencies, primarily the Air Force Technical Applications Center (AFTAC) in partnership with the United States Geological Survey and other government agencies in keeping with national requirements.

The NEM R&E program is founded on national vetted requirements and remains one of the NNSA's most important nonproliferation initiatives. The national need for worldwide cognizance of nuclear explosions is now as important as ever in this time of high nuclear proliferation concern.

The satellite-based portion of this program is shifting focus over the next five years to developing and demonstrating in space a new generation of high-sensitivity optical, electromagnetic-pulse, and x-ray sensors for GPS Block IIF satellites. Over the 40 years of this program, well over one hundred DOE satellite payloads have been launched, using U.S. Air Force and National Aeronautics and Space Administration boosters.

The ground-based systems part of the NEM R&E program focuses on integration of research and engineering products, such as calibration data for seismic, radionuclide, hydroacoustic, and infrasound stations, as well as other information products which enable nuclear explosion monitoring agencies to perform their operational missions. The current program builds on a long history of successful deliveries of state-of-the-art products in all monitoring technologies, such as the previously developed R&D 100 award winning radionuclide detector systems, a modern infrasound prototype, and the Knowledge Base configuring large data sets of monitoring information into useful electronic form for operational use. The Knowledge Base project combines U.S. teleseismic monitoring capability with regional monitoring to enable detection of very low yield events that might arise from proliferant nation efforts.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Satellite-Based Systems	48,699	54,489	69,235	14,746	27.1%
Ground-Based Systems	23,610	19,511	20,160	649	3.3%
Total, Nuclear Explosion Monitoring,	72,309	74,000	89,395	15,395	20.8%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Nuclear Explosion Monitoring

The NEM R&E program develops essentially all of the enabling technologies, operational hardware and software, and expertise for the U.S. to remotely detect, locate, identify, characterize, and attribute nuclear detonations. This program supporting U.S. nuclear explosion monitoring agencies is guided by nationally vetted requirements.

 # Satellite-Based Systems 48,699 54,489 69,235

This program provides satellite sensors for monitoring nuclear explosions in the Earth's atmosphere and in near-Earth space. Proliferation detection, treaty monitoring, and military goals are supported. Specific activities include flight instrumentation design, fabrication, and testing. The equipment is used on U.S. Air Force Global Positioning System (GPS) and Defense Support Program (DSP) satellites under the auspices of the Air Force Space Command and Space and Missile Systems Center. In addition, this program includes the weapons phenomenology work required to define the mission technical parameters; instrument development work necessary to respond to changing mission requirements, technological opportunity, or current system technical obsolescence; and on-orbit validation experiments, when required for technical risk reduction. *The FY 2003 increase of $14,746,000 reflects the combination of an increase and a decrease. The increase is due to the transfer of $15,335,000 in budget authority from the DoD to NNSA for space instrument fabrication and payload integration for electromagnetic pulse (EMP) sensors. This transfer was recommended by the Deputy Assistant Secretary of Defense (C3ISR/Space) National Review of the U.S. Nuclear Detonation Detection System. Although EMP sensor production has in the past been funded through the DoD because of a military specific mission application, the National Review concluded that the significantly enhanced all-mission capability inherent in this sensor system warranted managing it the same as all other NNSA satellite-based nuclear detonation monitoring instruments. The outyear transfer of funding from DoD to DOE/NNSA for this sensor system is: FY 2004 $15,022,000; FY 2005 $15,557,000; FY 2006 $16,747,000; and FY 2007 $16,986,000. The decrease of $589,000 is a shift to the ground-based monitoring program, and is accommodated by winding down the data analysis activities pertaining to the Fast On-orbit Recording of Transient Events space experiment.*

 # Ground-Based Systems 23,610 19,511 20,160

NNSA has a memorandum of understanding with AFTAC to provide integrated state-of-the-art engineered systems for nuclear explosion monitoring. The ground-based systems program delivers classified, focused, applied research and engineering products, including an integrated knowledge base, to AFTAC with appropriate testing, demonstration, and technical support for the U.S. National Data Center and US Atomic Energy Detection System. The NNSA integration function will be supplemented with products from new ground-based research opportunities from a new open federal and non-federal competition. In FY 2002 the NNSA provided funding to the National Science Foundation (NSF) which administers the Incorporated Research Institutions for Seismology PASSCAL Instrument Center to

purchase seismic equipment. The FY 2003 budget request is not planned to support further equipment purchases. This will provide money for new research opportunities through the open federal and non-federal competition. *The FY 2003 shift from satellite-based systems of $589,000 plus an increase of $60,000 would also become part of the new competition.*

Total, Nuclear Explosion Monitoring	72,309	74,000	89,395

Chemical and Biological National Security

Mission Supporting Goals and Objectives

The mission of the Chemical and Biological National Security Program (CBNP) is to develop, demonstrate and deliver technologies and systems that will lead to major improvements in the U.S. capability to prepare for and respond to chemical or biological attacks. The specific objectives of the CBNP are:

- Develop and demonstrate chemical and biological detection, identification, and warning systems for use domestically for high-risk areas or conditions.
- Develop and demonstrate hand-portable chemical and biological detectors to provide real-time detection to increase situational awareness during crises.
- Develop and demonstrate modeling and simulation capabilities to enable the accurate prediction of the effects from chemical and biological attacks in urban areas to guide preparation and response efforts.
- Develop and demonstrate chemical and biological decontamination and restoration techniques for use in civilian settings.
- Provide the supporting biological information necessary for biological detection that will support analyses for attribution and event reconstruction purposes, and will aid other agencies in the development of medical and public health countermeasures.

With Congressional direction the NNSA has taken on the challenge of responding to the threat of chemical and biological attacks against civilians due to: both the urgency of addressing this threat and existing vulnerabilities and the vast capabilities resident at the NNSA and DOE national laboratories. As a result of investments to date, CBNP-developed technologies were at the forefront of the response to the autumn 2001 anthrax incidents.

The program is designed to ensure complementarity with the programs of other federal agencies through both formal and informal coordination. The program is differentiated by its focus on the development of robust capabilities in a systems context specifically targeted at the domestic threat, and by seeking to provide major capability advances in the three to five year time frame.

The program is primarily focused on the development of systems for detection, identification, and warning of a chemical or biological attack due to the central role of these functions in an overall response system. In the short-term, Domestic Demonstration and Applications Programs (DDAPs) feature technology currently or soon to be available, while longer-term R&D within Technology Development Initiatives leads to enhanced capability. DDAPs address specific applications and involve close interaction with Federal and local planners and responders. The goal of these programs is to demonstrate a complete system, integrating technologies developed by NNSA as well as others, and in turn provide guidance to the R&D efforts through the development of system architectures considering infrastructure, operations, and technology.

Technology Development Initiatives are research and development activities for high-payoff enabling technologies suitable for initial use in three to five years. Currently, development is underway in four areas:

detection, modeling and prediction, decontamination, and biological foundations. The main emphasis is on biological detection and the supporting research performed in the biological foundations area.

In FY 2003, the program will continue accelerated development of much-needed chemical and biological counter-terrorism technologies (such as detectors, assays, and predictive models) to deliver these technologies rapidly to users throughout the counter-terrorism community. DDAP development and transition will also continue.

Funding Schedule

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Technology Development Initiatives	30,274	46,047	45,000	-1,047	-2.3%
Domestic Demonstration and Application Programs	9,300	39,153	24,000	-15,153	-38.7%
Total, Chemical and Biological National Security	39,574	85,200	69,000	-16,200	-19.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Chemical and Biological National Security

The CBNP program focuses emerging science and technology on the challenging threat of chemical and biological attack against U.S. civilian populations. NNSA is the primary agency focusing on and developing non-medical technical solutions for the domestic preparedness problem.

#	**Technology Development Initiatives**	30,274	46,047	46,047

In FY 2003 development of advanced technologies to respond to chemical and biological threats will be continued. Four initiatives are currently supported with the emphasis on biological detection: (1) rapid and low false-alarm chemical and biological detection technologies, (2) predictive chemical and biological plume transport models suitable for planning and response to attacks in urban areas, (3) decontamination and restoration technologies for urban areas, and (4) development of the supporting biological sciences necessary for biological detection, including detection of engineered organisms and for attribution purposes, and for aiding other agencies (e.g. DOD) in the development of medical countermeasures. Detectors will be

rapidly developed, tested, and fielded. Predictive models will be refined, integrated, and made available to additional users.

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
# **Domestic Demonstration and Application Programs (DDAPs)**	9,300	39,153	22,953

In FY 2003 these programs will rapidly demonstrate the utility of systems for specific applications. Development of system architectures is central to these initiatives; architectures consider the role of infrastructure, operations and technology in responding to the threat, and guide the integration of multiple technologies into an overall system. Two DDAPs, emphasizing detection and early warning are currently underway to demonstrate both deployable early warning systems for biological detection at special events and fixed response systems for critical infrastructure like subways and airports. Another DDAP aims to bring microbial forensics capabilities to law enforcement and public health users, while a fourth DDAP is prototyping an architecture to provide local governments with operational access to state-of-the-art hazard prediction. *The FY 2003 decrease of $16,200,000 reflects the completion of the basis demonstration and development of a more rapidly transportable system. A main effort in FY 2003 will be the multi-station prototype demonstration of a chemical detection and response system in the Washington Metro, including the subsequent transition of the system concept and results for application by operators of other subway systems.*.

Total, Chemical and Biological National Security	39,574	85,200	69,000

Supporting Activities

Mission Supporting Goals and Objectives

Supporting activities includes crosscutting costs of the Office of Nonproliferation Research and Engineering such as the Planning, Outreach, and Publication Activities.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Planning, Outreach, and Publication Activities	5,149	3,200	3,512	312	9.8%
Total, Supporting Activities	5,149	3,200	3,512	312	9.8%

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Supporting Activities			
Supporting activities includes crosscutting costs of the Office of Nonproliferation Research and Engineering.			
# Planning, Outreach, and Publication Activities	5,149	3,200	3,512
These activities provide for strategic initiatives such as technology roadmapping, outyear planning, and nonproliferation analysis and studies. Publication activities enhance communications between the technologists in the DOE community, policymakers, and the general public through vehicles such as the Arms Control and Nonproliferation Technologies Newsletter. *The FY 2003 increase of $312,000 will increase support for nonproliferation studies and analysis and roadmapping conducted with other agency personnel by the program.*			
Total, Supporting Activities	5,149	3,200	3,512

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2002 vs. FY 2003 ($000)
# Proliferation Detection	
• Enabling Technology: The FY 2003 increase of $3,400,000 will be used to expand nuclear material analysis performance testing, evaluation of microtechnology based detectors against known signatures from proliferation activities, and field testing of concepts for long range detection of special nuclear material. Advanced research on hyperspectral data analysis techniques and tools to detect chemical effluents at greater distances; fate and transport calculations to model effluent dispersal characteristics; basic radiation detection research onto cadmium zinc telluride will be reduced to expand the exploration of alternative radiation sensors for low cost application..	3,400
• Demonstrations: The FY 2003 decrease of $6,000,000 reflects the completion of system fabrication of an advanced detection system in a UAV and the technology transfer of a prototype wide band RF system for testing by a user. The program will demonstrate unattended radiation detection concepts to support requirements for urban tracking detection and interdiction of special nuclear material and expand its nuclear material analysis initiative to strengthen the DOE laboratory analytical capability to determine origin and source radioactive/fissile materials.	-6,000
Total, Proliferation Detection	-2,600
# **Nuclear Explosion Monitoring**	
• Satellite-Based Systems: A FY 2003 increase of $15,335,000 is due to the transfer of funding from DoD to NNSA for space instrument fabrication and payload integration for enhanced electromagnetic pulse sensors for GPS satellites for the U.S. Nuclear Detonation Detection System. A FY 2003 decrease of $589,000 is due to winding down the data analysis activities pertaining to the Fast On-orbit Recording of Transient Events space experiment	14,746
• Ground-Based Systems: The increase of $649,000 over FY 2002 will be combined with other dollars to begin a new open federal and non-federal competition.	649
Total, Nuclear Explosion Monitoring	15,395

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2002 vs. FY 2003 ($000)
# Chemical and Biological National Security	
• Domestic Demonstration and Application Programs: The FY 2003 decrease of $16,200,000 results from the completion of the basis demonstration and development of a more rapidly transportable system.	-16,200
Total, Chemical and Biological National Security	-16,200
# Supporting Activities	
• Planning, Outreach and Publication Activities: The FY 2003 increase of $312,000 will increase support for nonproliferation studies and analysis conducted by the program	312
Total, Supporting Activities	312
# NISC - construction funding completed	-35,806
Total Funding Change, Nonproliferation and Verification R&D	-38,899

Nonproliferation and International Security

Program Mission

The mission of the Office of Nonproliferation and International Security is to detect, prevent and reverse the proliferation of weapons of mass destruction (WMD) materials, technology and expertise. It is the focal point within the National Nuclear Security Administration (NNSA) and the Department of Energy for activities that support the President's nonproliferation and international security policies, goals and objectives, as well as those activities mandated by statute. The program provides technical expertise and leadership for NNSA and the Department in interagency, bilateral and multilateral fora involved in nonproliferation and international security matters. The major functional areas of the program include Nonproliferation Policy, International Safeguards, Export Control, and Treaties and Agreements.

Program Strategic Performance Goals

NS2-2 - Prevent and reverse proliferation of weapons of mass destruction.

Performance Indicators

Promote improved global knowledge of nonproliferation norms through expanded engagement, including with foreign partners, on export controls, safeguards and other nonproliferation matters.

Develop and implement innovative solutions for nonproliferation and arms control issues as a member of the U.S. Government Interagency process.

Develop and implement transparency measures to assure that international agreements are being complied with and that nuclear materials are secure.

Expand new cooperative science and technology efforts with foreign countries and international organizations for nonproliferation, monitoring, verification, and confidence building measures.

Develop, promote and implement innovative approaches to address international and regional security.

Performance Standards

Blue: *Significantly exceed*: participate in two fact-finding missions to evaluate fuel inventory and conditions at six potential sites; develop and negotiate at least two lab-to-lab contracts with Russia to provide access to technologies, which could support U.S. counter-terrorism efforts.

Green: *Meet all planned targets/milestones*: participate in at least one fact-finding missions to evaluate fuel inventory and conditions at several potential sites for repatriation to Russia of fresh and spent

nuclear fuel and; develop and negotiate at one lab-to-lab contract with Russia to provide access to technologies, which could support U.S. counter-terrorism efforts.

Yellow: *Meet all critical targets/milestones*: participate in one fact-finding missions to evaluate fuel inventory and conditions at potential sites for repatriation to Russia of fresh and spent nuclear fuel; and initiate the development of confidence building measures that could potentially be used to confirm nuclear warhead and fissile material reductions in Russia.

Red: *Below expectation*: participate (information exchange) in the evaluation fuel inventory and conditions at potential sites of fact-finding missions that are conducted for repatriation to Russia of fresh and spent nuclear fuel; and initiate the development of two lab-to-lab contracts to be negotiated with Russia to provide access to technologies, which could support U.S. counter-terrorism efforts.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
Completed three fact finding mission to potential sites and continued negotiation on program modalities for the Russian Fuel Return (NS4-3).	Reach informal agreement on spent fuel management cost and pilot shipment site for the Russian Fuel Return program and scheduled to begin repatriation to Russia of fresh and spent nuclear fuel.(NS2-2)	Initiate repatriation to Russia of 500 fresh and spent nuclear fuel assembles and participate in two fact-finding missions to evaluate fuel inventory and conditions at six potential sites.(NS2-2)
Continued work on security, safeguards, and the ultimate long-term disposition of plutonium-bearing spent fuel at the BN-350 reactor in Kazakhstan. (NS4-3)	Complete canning of nuclear spent fuel at the BN-350 reactor in Kazakhstan.(NS2-2)	Secure a contract with cask manufacturer and begin cask fabrication.(NS2-2)
No previous measure	Secure a Russian commitment to discuss counter-terrorism cooperation under the Warhead Safety and Security Exchange (WSSX) Agreement. (NS2-2)	Develop and negotiate at least two lab-to-lab contracts with Russia to provide access to technologies, which could support U.S. counter-terrorism efforts.(NS2-2)
Prepared U.S. facilities for transparent nuclear warhead reductions and assisted Russian technical experts to develop methods and techniques for reciprocal activities.(NS4-3)	Conduct the first Plutonium Storage monitoring visit in Russia under the Plutonium Production Reactor Agreement.(NS2-2)	Demonstrate three Russian transparency technologies developed under lab-to-lab interactions.(NS2-2)

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
Implemented nine bilateral agreements for safeguards cooperation and seven "sister lab" arrangements for peaceful nuclear application; entered into two new safeguards cooperation agreements. (NS4-3)	Sign bilateral agreements with the United Kingdom, Brazil and the Republic of Korea on safeguards cooperation at the IAEA General Conference.(NS2-2)	Conduct four bilateral physical protection visits, physical protection training, and the IAEA's International Physical Protection Advisory Service (IPPAS) to help protect WMD facilities around the world against terrorist attack and sabotage.(NS2-2)
No previous measure	Demonstrate two technologies – a digital camera for real-time analysis of suspect shipments and a materials analyzer to identify high-purity metals and dual-use items – to U.S. Customs that could enhance the inspection and determination process on export-controlled commodities.(NS2-2)	Develop and implement two training projects with U.S. Customs to train Customs personnel on the nuclear fuel cycle, nuclear dual-use commodities, and improved techniques of real-time analysis of suspect nuclear commodity trafficking. (NS2-2)
No previous measure	Participate in executive meetings and a workshop in the United Arab Emirates (UAE) on transit control of dual-use commodities.(NS2-2)	Conduct at least one nuclear export control enforcement training to improve other countries' border controls, especially in high-traffic transit states.(NS2-2)

Significant Accomplishments

Nonproliferation and International Security

- Completed canning of nuclear spent fuel at the BN-350 reactor in Kazakhstan.
- Secured all North Korea's spent nuclear fuel safely under IAEA safeguards.
- Secured a Russian commitment to discuss counter-terrorism cooperation under the Warhead Safety and Security Exchange Agreement and received over 50 Russian counter-terrorism proposals for U.S. consideration.
- Reached preliminary agreement on spent fuel management cost and pilot shipment site for the Russian Fuel Return program.

Reached agreement with MinAtom on the path forward for the Blend Down Monitoring System implementation.

Commenced MPC&A work in Uzbekistan.

Formulated proposals to combat biological weapons through the Biological Weapons Convention (BWC).

Signed bilateral agreements with the United Kingdom, Brazil and the Republic of Korea on safeguards cooperation at the IAEA General Conference and negotiated implementation of agreements for peaceful nuclear cooperation with Australia, Canada, and Switzerland.

Hosted successful Nuclear Suppliers Group plenary in Aspen, Colorado.

Trained and conducted dialogues on nonproliferation and cooperative monitoring with officials and experts from a wide range of countries in the Mideast and South, Central, and East Asia.

Participated in executive meetings and a workshop in the United Arab Emirates (UAE) on transit control of dual-use commodities.

Contributed results of timely intelligence on Pakistani political stability and nuclear security in South Asia to the United States Government (USG) policy formulation.

Participated in seminars in Japan, Peru, Kazakhstan, and South Africa in support of the International Atomic Energy Agency's (IAEA) rollout for the Additional Protocol.

Demonstrated two technologies – a digital camera for real-time analysis of suspect shipments and a materials analyzer to identify high-purity metals and dual-use items – to U.S. Customs that could enhance the inspection and determination process on export-controlled commodities.

Funding Profile

(dollars in thousands)

	FY 2001 [a] Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Nonproliferation and International Security					
Nonproliferation Policy	64,329	45,239	0	45,239	55,004
International Safeguards	16,739	16,739	0	16,739	18,752
Export Control	11,701	10,628	0	10,628	15,519
Treaties and Agreements	3,135	3,135	0	3,135	3,393
Total, Nonproliferation and International Security	95,904	75,741	0	75,741	92,668
Use of Prior-Year Balances	-166	-7,500	0	-7,500	0

	(dollars in thousands)				
Total, Nonproliferation and International Security	95,738	68,241	0	68,241	92,668

Public Law Authorization:
Public Law 95-91, "Department of Energy Organization Act"
Public Law 103-62, "Government Performance Results Act of 1993"
Public Law 107-107, "National Defense Authorization Act FY 2002"

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[a] Reflects comparability adjustment of $1,925,000 to reflect the transfer of the Second Line of Defense program to the International Materials Protection, Control and Accounting.

Funding by Site

(dollars in thousands)

	FY 2001 [a]	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	9,762	6,776	10,889	4,113	61%
Pantex	30	200	120	-80	-40%
Kansas City Plant	0	1,005	450	-555	-55%
National Renewable Energy Laboratory	1,240	485	962	477	98%
Sandia National Laboratory	16,077	13,426	16,244	2,818	21%
Albuquerque Operations Office	0	310	220	-90	-29%
Total, Albuquerque Operations Office	27,109	22,202	28,885	6,683	30%
Chicago Operations Office					
Argonne National Laboratory	13,907	9,892	10,695	803	8%
Brookhaven National Laboratory	910	600	798	198	33%
New Brunswick Laboratory	0	285	290	5	2%
Total, Chicago Operations Office	14,817	10,777	11,783	1,006	9%
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	100	237	604	367	155%
Nevada Operations Office	197	157	162	5	3%
Oakland Operations Office					
Lawrence Berkeley National Laboratory	80	541	928	387	72%
Lawrence Livermore National Laboratory	10,028	9,076	1,013	-8,063	-89%
Oakland Operations Office	11,147	3,178	3,265	87	3%
Total, Oakland Operations Office	21,255	12,795	5,206	-7,589	-59%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	6,657	6,422	7,123	701	11%
Richland Operations Office					
Pacific Northwest National Laboratory	7,732	4,875	7,590	2,715	56%
Savannah River Operations Office	5,065	5,619	5,856	237	4%
Washington Headquarters	12,972	12,657	25,459	12,802	101%
Subtotal, Nonproliferation and International Security	95,904	75,741	92,668	16,927	22%
Use of Prior-Year Balances	-166	-7,500	0	7,500	
Total, Nonproliferation and International Security	95,738	68,241	92,668	24,427	36%

[a] Reflects comparability adjustment of $1,925,000 to reflect the transfer of the Second Line of Defense program to the International Materials Protection, Control and Accounting.

Site Description

Albuquerque Operations Office

The Albuquerque Operations Office (AL) provides technical support for monitoring treaties and agreements, and spent fuel activities in Kazakhstan and North Korea.

Argonne National Laboratory

Argonne National Laboratory (ANL) assists Nonproliferation Policy by providing technical support to Fuel Cycle Analysis, Reduced Enrichment Research and Test Reactor (RERTR) program, Russian Fuel Return (RFR), and Kazakhstan Spent Fuel Activities. For Export Control ANL supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of the Proliferation Information Network System, the Department's classified export control information system. Provides specialized expertise in the control of nuclear reactor-related technology, preparing analyses to revise international nuclear export control lists and assess export control impacts for the development of advanced fuel cycle technologies. Serves as country coordinator for export control assistance program with Ukraine and assists in other international cooperation efforts. Assists in developing the DOE Headquarters Nuclear Nonproliferation Seminar, designed to educate U.S. and international nonproliferation officers on the fundamentals of nuclear weapons proliferation.

Brookhaven National Laboratory

Brookhaven National Laboratory (BNL) assists Nonproliferation Policy by providing technical support to Warhead Dismantlement and Fissile Material Transparency. BNL assists International Safeguards efforts by supporting policy and analysis necessary to strengthened safeguards nonproliferation regimes. BNL also provides technical support related to safeguards and verification of fissile material processing.

Idaho National Engineering and Environmental Laboratory

The Idaho National Engineering and Environmental Laboratory (INEEL) provides technical support for export control activities.

Lawrence Livermore National Laboratory

The Lawrence Livermore National Laboratory (LLNL) assists Nonproliferation Policy by providing technical support to Fuel Cycle Analysis, Global Regimes, Regional Security, and Warhead Dismantlement and Fissile Material Transparency. LLNL support export control operations by providing unique technical support in the areas of nuclear-related dual-use export license evaluation; multilateral negotiation within the Nuclear Supplies Group (NSG) training and assistance to potential nuclear supplies on export controls, with special emphasis on Russia and the Southern Tier States. LLNL provides support to ongoing negotiations for the implementation of agreements and treaties, by providing technical support related to safeguards and verification of fissile material

processing; and supports negotiations for the implementation of transparent nuclear reductions to confirm that Russian nuclear weapons are being dismantled and the excess fissile materials removed are not reused for military purposes. Provides regional expertise and analyzes nuclear proliferant activity in South Asia, the Middle East and Northeast Asia. Provides International Safeguards technical support to ongoing negotiations and implementation of agreements and treaties related to safeguards and verification of fissile material processing. For Export Control LLNL supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Conducts end-use and end-user analysis of contracts under the Iraq Oil-for-Food program. Supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of Proliferation Information Network System, the Department's classified export information system. Prepares analyses of regional proliferation trends affecting U.S. export controls and international export control regimes. Provides specialized expertise in the control of nuclear-related technology, preparing analyses to improve international nuclear export control lists and support U.S export control diplomacy. Also, supports the DOE Headquarters Nuclear Nonproliferation Seminar and conducts a classified seminar focused on nuclear weapons issues. Serves as country coordinator for export control assistance program with Russia and assists in other international export control efforts.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) assists Nonproliferation Policy by providing technical support to Global Regimes, Kazakhstan Spent Fuel Activities, Regional Security, and Warhead Dismantlement and Fissile Material Transparency. LANL assists International Safeguards efforts by enhancing transparency, specifically focusing on the Mayak Fissile Material Storage Facility, in the development of radiation signatures. LANL also provides technical support to the U.S.-Russia-IAEA Joint Working Group. The laboratory further supports implementation of IAEA safeguards at DOE/NNSA facilities and assists the IAEA in developing integrated safeguards technologies and the Integrated Safeguards Evaluation Methodology. LANL strengthens nuclear safeguards in Asia and the Pacific Rim countries by supporting technical exchanges on international safeguards with Israel and other countries, and by participating in "sister lab" arrangements. It also provides support to the IAEA for development and implementation of environmental sampling, unattended non-destructive assay systems, and remote monitoring systems. LANL provides technical support, including development of verification capabilities, to support the U.S.-DPRK Agreed Framework. For Export Control, LANL supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel. Leads development, operation, and maintenance of the Proliferation Information Network System, the Department's classified export license database. Supports the DOE Headquarters Nonproliferation Seminar and a classified seminar at LANL and the Nevada Test Site on nuclear dual-use and weaponization technologies. Provides specialized expertise in the control of nuclear-related dual-use technology, preparing analyses to improve

international nuclear export control lists and support U.S export control diplomacy. Also, develops and maintains the Nuclear Suppliers Group Information Sharing System, the primary secure electronic link among members, allowing for timely sharing of license denial notifications. Serves as country coordinator for export control assistance program with Kazakhstan and assists in other international cooperation efforts. LANL supports spent fuel activities in Kazakhstan, and, in close coordination with the IAEA, designing and fabricating the nuclear material measurement accounting and monitoring equipment required to safeguard material inventories during packaging, transportation, and storage operations. LANL further provides support to international material, control and accounting upgrades and sustainability through training, project management, and technical evaluation and review.

Nevada Operations Office

The Nevada Operations Office (NVO) assists Nonproliferation Policy by providing technical support to Global Regimes. NVO provides technical support to promote transparent nuclear reductions by supporting the U.S. negotiation on nuclear testing and verification efforts.

Oakland Operations Office

Oakland Operations Office assists Nonproliferation Policy by providing technical support to Global Regimes and Regional Security. Oakland Operations Office supports International Safeguards efforts by managing the Information Tracking And Analysis (ITA) system, which tracks and analyzes foreign nuclear activity. Administers program grants for nonproliferation Export Control projects carried out by non-governmental organizations.

Y-12 National Security Complex and Oak Ridge National Laboratory

Y-12 National Security Complex (Y-12/BWXT) and Oak Ridge National Laboratory (ORNL) support Nonproliferation Policy by providing technical support to Fuel Cycle Analysis, Russian Fuel Return (RFR), and Warhead Dismantlement and Fissile Material Transparency. Supports International Safeguards efforts by providing technical assistance for the implementation of IAEA safeguards at DOE/NNSA facilities. The facility also provides expertise on various arms control and nonproliferation agreements and treaties. Y-12/BWXT and ORNL further provide technical support to the Subcommittee on Technical Programs and Cooperation and the U.S.-Russia-IAEA Working Group on the Trilateral Initiative. The facility provides further technical support related to safeguards and verification measures and uranium enrichment processes and facilities, and supports work with Russia to negotiate and implement transparent nuclear reductions. It also supports DOE/NNSA's safeguards cooperation agreements with key organizations in South America, Europe, and Asia by assisting in developing, evaluating and implementing advanced safeguards technology at foreign nuclear facilities. Y-12/BWXT and ORNL further provide technical support, including development of verification capabilities, to meet the terms of the U.S.-DPRK Agreed Framework. Supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of the Proliferation

Information Network System, Department's classified export information database. Provides specialized expertise in the control of nuclear reactor-related technology, preparing analyses to revise U.S. and international nuclear export control lists, study the export control implications of the development of advanced fuel cycle technologies, track global machine tool supply trends, and support export control assistance programs in Russia, the NIS, and other countries. Supports the DOE Headquarters Nonproliferation Seminar and hosts classified seminars on nuclear material production and high- risk property management. ORNL provides support to international material protection, control, and accounting upgrades and sustainability for the program of Sustainability of Safeguards and Security in the NIS/Baltics.

Pacific Northwest National Laboratory

Pacific Northwest National Laboratory (PNNL) assists Nonproliferation Policy by providing technical support to Fuel Cycle Analysis, Global Regimes, Regional Security, Kazakhstan and DPRK Spent Fuel Activities, and Warhead Dismantlement and Fissile Material Transparency. PNNL supports International Safeguards efforts by providing support for implementation of IAEA safeguards at DOE/NNSA facilities. PNNL also promotes effective safeguarding of nuclear materials through bilateral safeguards agreements with Argentina, Brazil, EURATOM, South Korea, and Japan. PNNL provides technical support, including development of verification capabilities, for the U.S.-DPRK Agreed Framework. Supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of Proliferation Information Network System, Department's classified export information system. Provides specialized expertise in the control of nuclear-related technology, preparing analyses to improve international nuclear export control lists and support U.S export control diplomacy. Develops export control recommendations related to special nuclear material production and other areas of specialized expertise, tracks the impact of nuclear industry globalization on international export controls, and supports export control assistance programs with Russia, the NIS, and others. In addition, provides outreach activities to the academic, State government, and private sector to support NNSA goals of nuclear nonproliferation and global security through the Pacific Northwest Center for Global Security.

Pantex

The Pantex Plant assists Nonproliferation Policy by providing technical support to the Warhead Dismantlement and Fissile Material Transparency Program. Pantex supports policy and analysis work involving U.S.-Russian negotiation and implementation of transparent nuclear reductions to confirm that Russian nuclear weapons are being dismantled and the excess fissile materials removed are not reused for military purposes. Supports a project to prevent the inadvertent transfer of parts and components from dismantled nuclear weapons for Export Control program.

Sandia National Laboratory

The Sandia National Laboratory (SNL) assists Nonproliferation Policy by providing technical support to Fuel Cycle Analysis, Global Regimes, Regional Security, Kazakhstan Spent Fuel Activities, and Warhead Dismantlement and Fissile Material Transparency. SNL provides export control technical support in the areas of nuclear-related dual-use export licensing evaluations; multilateral negotiation within the NSG; training and assistance to potential nuclear suppliers on export controls; supports spent fuel activities in North Korea to minimize corrosion of spent fuel and to maintain the integrity of the storage canisters prior to the spent fuel's ultimate disposition, in accordance with the 1994 U.S.-DPRK Agreed Framework. SNL supports spent fuel activities in Kazakhstan by procuring the physical security system upgrades at the BN-350 breeder reactor facility. Provides leadership and support to international use of cooperative monitoring as an approach to reduce regional tensions; provides technical expertise in the areas of inspections, data surety and authentication; supports the U.S. negotiations on nuclear testing limitations and verification efforts. Improves IAEA effectiveness and efficiency in detecting clandestine nuclear activities and safeguarding declared nuclear material by providing technical support to IAEA and UNMOVIC inspections, assisting NNSA when it leads U.S. interagency physical protection visits; participating in International Physical Protection Advisory Service (IPPAS). Provides assistance to the IAEA in implementing remote monitoring systems to strengthen nuclear safeguards. Supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of Proliferation Information Network System, the Department's classified export information system. Provides technical expertise in the control of nuclear-related technology, preparing analyses to improve international nuclear export control regimes and support U.S export control diplomacy. Develops export control recommendations related to nuclear weaponization, missile technology, and other areas of specialized expertise, and assists export control cooperation programs in Russia and other countries.

Savannah River Operations Office

The Savannah River Operations Office (SRS) assists Nonproliferation Policy by providing technical support through contracting to Kazakhstan and DPRK Spent Fuel Activities. SRS provides export control technical support in the areas of nuclear-related dual-use export license evaluations within its area of expertise (e.g., tritium production); technology security and nonproliferation domestic training; and export control and nonproliferation determinations for visits and assignments by foreign nationals. SRS supports spent fuel activities in North Korea by providing direct contract procurement support and managing the fuel canning site contractor to minimize corrosion of spent fuel and to maintain the integrity of the storage canisters prior to the spent fuels ultimate disposition, in accordance with the 1994 U.S.-DPRK Agreed Framework. Also supports spent fuel activities in Kazakhstan by providing on-site staff and expertise support through a contractual arrangement to manage the nuclear material packaging operations at the BN-350 reactor facility. Assists in the implementation of the U.S.-Russia agreement to shut down plutonium production reactors and monitor storage sites, and by providing staff support during monitoring visits to shutdown U. S. production reactors at the Savannah River Site. Supports statutory export licensing responsibilities, including technical review of nuclear technology subject to the Secretary of Energy's approval, as well as nuclear fuel and equipment, dual-use items, and munitions exports subject to approval by other U.S. agencies. Also, supports export control review

of nuclear-related software codes, visits and assignments by foreign nationals, and Department of Energy foreign travel, as well as development of the Proliferation Information Network System, the Department's classified export information system. Provides technical expertise in the control of nuclear-related dual-use technology, preparing analyses to improve international nuclear export control regimes and support U.S export control diplomacy. Develops export control recommendations in the areas of plutonium production and use, advanced fuel cycle technologies, and other areas of specialized expertise, and supports export control assistance to Russia, the NIS, and others. Also, hosts a classified nonproliferation seminar on the nuclear fuel cycle. Supports the development and verification techniques for excess fissile material storage and disposition options at the Savannah River Site.

Nonproliferation Policy

Mission Supporting Goals and Objectives

Nonproliferation Policy programs include fuel cycle activities, efforts to support global regimes, regional nonproliferation initiatives, and projects that promote warhead dismantlement and fissile material transparency.

Fuel Cycle Activities encompass policy analysis of fuel cycle technology development and policy implementation. Fuel cycle projects assist in the formulation of policy to minimize the use of weapons-usable materials in civil fuel cycle activities. The Proliferation Resistant Fuel Cycle Technology (PRFCT) policy initiative strengthens the nonproliferation regime through comparative analysis of existing and proposed nuclear fuel cycle technologies. The initiative reduces the long-term threat to U.S. national security by providing sophisticated analytical tools to evaluate proliferation resistance, thereby helping to steer fuel cycle technology development. The Reduced Enrichment for Research and Test Reactors (RERTR) program prevents proliferation of nuclear weapons by minimizing and possibly eliminating the use of highly enriched uranium (HEU) in civil nuclear programs worldwide. The RERTR program develops the technologies needed to substitute LEU for HEU in research and test reactors – which use nearly all of the HEU in civil programs – without significant penalties in experiment performance, economic, or safety aspects of the reactors. The Russian Foreign Research Reactor Fuel Return (RFR) initiative prevents proliferation of nuclear weapons by repatriating to Russia civil HEU fuel from Russian-supplied research reactors in various countries. Many of these research reactors are located in regions of proliferation concern. This program reduces the threat to U.S. national security by removing the HEU fuel and assisting operating reactors to convert to LEU fuel. Additionally, the U.S.-Republic of Kazakhstan Agreement for the Disposition of Spent Fuel from the BN-350 Fast Breeder Reactor at Aktau, Kazakhstan prevents proliferation of nuclear weapons by securing the nearly three tons of weapons-grade plutonium in the BN-350 spent fuel - enough material for hundreds of nuclear weapons. Under this cooperative program, the spent fuel assemblies have been stabilized, packaged in canisters with an adequate radiation barrier, and placed under IAEA safeguards. The program also provides physical protection to secure the material in the BN-350 spent fuel pond and non-weapons-related employment for Kazakhstani nuclear technical experts.

DOE/NNSA promotes *Global Regimes* by participating in U.S. Government policymaking and negotiations regarding various arms control and nonproliferation regimes including the Nuclear Nonproliferation Treaty (NPT), the Biological Weapons Convention (BWC), the Chemical Weapons Convention (CWC), nuclear testing and fissile material production limits; and bilateral peaceful nuclear cooperation agreements. The program provides policy and technical expertise on such treaties and agreements and ensures that their negotiation and implementation meet U.S. national security and foreign policy objectives and can be implemented at DOE/NNSA National Laboratories and other facilities. The program also negotiates and implements bilateral peaceful nuclear cooperation agreements in accordance with Section 123 of the Atomic Energy Act.

Regional Nonproliferation programs apply policy, intelligence, and technical capabilities to support U.S. Government regional security objectives, with a primary focus on preventing the proliferation of weapons of mass destruction. The regions of primary focus are the Middle East, South Asia, Northeast Asia, and Central Asia. The program participates in U.S. Government policymaking and diplomacy, manages programs with the DOE/NNSA National Laboratories and non-governmental organizations (NGOs), and collaborates internationally on technical solutions to regional security problems. Among the variety of activities, the regional security program also provides funding for Sandia National Laboratory Cooperative Monitoring Center. The Democratic Peoples' Republic of Korea (DPRK) Spent Fuel Canning program supports the disposition of weapons-grade plutonium-bearing spent fuel in stabilization canisters under continuous IAEA monitoring, under the U.S.-DPRK Agreed Framework. This program reverses proliferation and reduces the immediate threat to U.S. national security posed by plutonium stored at frozen DPRK nuclear weapons material production facilities.

The *Warhead Dismantlement and Fissile Material Transparency* program comprehensively evaluates the impact of potential warhead monitoring regimes on the DOE/NNSA and Russian nuclear weapons complexes while ensuring that the U.S. requirement to maintain a safe, secure, and reliable nuclear weapons stockpile is not adversely impacted and that no classified information is revealed. This program develops and implements technical measures that can be applied at Russian facilities to provide confidence about the Russian nuclear stockpile, that Russian nuclear weapons are being dismantled and that excess weapons-grade fissile materials are not used for weapons purposes. This program also reduces stockpiles of Russian weapons-grade fissile material and the potential for accident, theft, or diversion by increasing the safety and security of Russian warheads and their dismantlement. Finally, the program redirects the work of current and former Russian nuclear scientists, obtains access to Russian scientific and technical information on appropriate measures for confirming the dismantlement of nuclear weapons, and increases the transparency of the Russian nuclear weapons complex.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Fuel Cycle Activities	33,752	23,588	24,420	832	3.5%
Global Regime	4,201	4,201	4,285	84	2.0%
Regional Nonproliferation	16,876	9,950	10,149	199	2.0%
Warhead Dismantlement and Fissile Material Transparency	9,500	7,500	16,150	8,650	115.3%
Total, Nonproliferation Policy	64,329	45,239	55,004	9,765	21.6%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

- Continue repatriation to Russia of fresh and spent HEU research reactor fuel from Russian supplied reactors and participate in two fact-finding missions to evaluate fuel inventory and conditions at six additional sites.

- Continue worldwide effort to convert HEU-fueled research and test reactors to use LEU fuels and targets.

- Continue implementation of dry storage phase for BN-350 spent fuel disposition in Kazakhstan, including procurement of storage/transportation casks and equipment required to maintain security and support safeguards.

- Continue development of proliferation assessment/resistance analysis toolbox and begin cooperative efforts with ongoing DOE nuclear technology R&D programs to address proliferation resistance in new technologies.

- Participate in two field missions to North Korea to maintain status of spent fuel in Nyongbyon, develop plans to remove fuel from North Korea and dismantle related North Korean nuclear facilities.

- Utilize DOE/NNSA policymaking, analytical, and technical capabilities in support of international arms control and nonproliferation treaties and agreements for peaceful nuclear cooperation, including developing appropriate implementation strategies and preparing DOE/NNSA facilities to ensure compliance with treaties and agreements.

- Utilize DOE/NNSA policy, analytical and technical capabilities to strengthen security and reduce incentives for WMD in regions where proliferation has occurred or may be occurring, specifically South Asia, the Middle East, and East Asia.

- Continue development of confidence building measures that potentially could be used to confirm nuclear warhead and fissile material reductions in Russia.

- Develop and negotiate at least two lab-to-lab contracts with Russia to provide access to technologies, which would support U.S. counter-terrorism efforts.

- Develop policies and negotiate changes to the HEU Purchase Agreement to ensure full implementation of agreed transparency measures.

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
# Ensure effective implementation of the agreed monitoring activities in the U.S. and Russia under the Plutonium Production Reactor Agreement.			
Total, Nonproliferation Policy	64,329	45,239	55,004

Separated Civil Plutonium - In the FY 2001 Arms Control appropriation provided funds to construct a facility to store spent fuel from Russian civil nuclear power plants in exchange for a moratorium in Russia on the further separation of civil plutonium. This was an initiative started under the previous Administration, and negotiations were terminated on this initiative. *The decrease of $14,779,000 in FY 2002 reflects the decision to reprogram funds within the Nonproliferation and International Security Office.*

International Safeguards

Mission Supporting Goals and Objectives

The International Safeguards program supports International Atomic Energy Agency (IAEA) safeguards, pursues efforts to promote international cooperation, and supports Democratic Peoples' Republic of North Korea (DPRK) safeguards pursuant to the U.S.-DPRK Agreed Framework.

IAEA Safeguards and Nonproliferation Policy Support. The International Safeguards program provides policy and technical leadership to strengthen the nuclear nonproliferation regime, particularly with respect to global nuclear material security. These efforts help the IAEA to detect clandestine nuclear activities and safeguard declared nuclear material. The program addresses new approaches to safeguards, such as environmental sampling and remote monitoring. The International Safeguards program also provides policy and technical support to implement IAEA inspection of U.S. excess material at DOE/NNSA sites under bilateral and trilateral (with Russia and the IAEA) arrangements. The physical protection program ensures that all countries possessing U.S.-origin nuclear material are adequately protecting this material against theft, sabotage, and nuclear smuggling. The program also manages and operates the Information Tracking and Analysis (ITA) system, which tracks and analyzes foreign nuclear activity to satisfy statutory requirements and international obligations.

International Cooperation. The International Safeguards program promotes the application of nuclear technology for peaceful purposes through bilateral "Sister Laboratory" arrangements and IAEA technical assistance programs. The program supports the planning and preparations for the Nuclear Nonproliferation Treaty (NPT) Review Conferences. The program negotiates and implements agreements for safeguards cooperation that govern the transfer of technologies to other countries, regions, and international organizations. Technologies include strengthened safeguards measures to support adoption of the IAEA Additional Protocol for regional organizations and nation states, such as Argentina, Australia, Brazil, the Brazilian-Argentine Agency for Nuclear Material Control and Accountancy (ABACC), China, EURATOM, France, Japan, South Africa, and South Korea.

The *DPRK Safeguards* program provides urgent verification support to the U.S.-DPRK Agreed Framework. This framework led to a freeze on North Korean nuclear reactor and reprocessing operations. DPRK Safeguards develops the technical means for verification to support Department of State negotiations with North Korea.

Sustainability of Safeguards and Security Systems in the NIS/Baltics - DOE/NNSA reduces the threat of nuclear proliferation and nuclear terrorism by improving the security and accountability of weapons-usable nuclear material in Ukraine, Kazakhstan, Uzbekistan, Belarus, Latvia, Lithuania and Georgia. Scientists and engineers from the National Laboratories collaborate with their counterparts in the NIS/Baltics and with private

sector specialists to develop appropriate systems and procedures to sustain the security of the protected nuclear material for the foreseeable future. The Sustainability program conducts independent systems evaluations by both U.S. and IAEA specialists. The program performs site surveys annually and notes deficiencies for remediation. Overall, the program ensures long-term sustainability of these systems by developing national infrastructures and a culture of international cooperation.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
IAEA Safeguards and Nonproliferation Policy Support	8,249	8,249	9,893	1,644	19.9%
International Cooperation	4,808	4,808	5,104	296	6.2%
DPRK Safeguards	1,408	1,408	1,436	28	2.0%
Sustainability of Safeguards and Security Systems in the NIS/Baltics	2,274	2,274	2,319	45	2.0%
Total, International Safeguards	16,739	16,739	18,752	2,013	12.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

- Develop project plans or sign action sheets with three countries to improve the IAEA's application of international nuclear safeguards.

- Support Interagency decision-making on how to proceed with the Additional Protocol.

- Support development and implementation of the Trilateral Initiative, including development of verification tools with an information barrier to enable IAEA verification of excess weapons materials while still in classified form.

- Evaluate integrated safeguards approaches in conjunction with the IAEA to maintain safeguards and improve detection of clandestine activities for three different facility types.

- Conduct four technical exchanges between U.S. National Laboratories and foreign nuclear institutes.

- Engage IAEA and foreign partners on seven technical cooperation initiatives.

Pursue a policy development process that results in a clear decision regarding the recovery of Pu-244.

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
# Provide South Africa with an HEU drum scanner to ensure that proper safeguards are in place.			
# Provide the IAEA with technology and resources to respond to increasing requirements for safeguard plutonium reprocessing in Japan.			
# Support verification of the DPRK Agreed Framework.			
# Conduct on-site operational reviews in Kazakhstan, Ukraine, Latvia, and Uzbekistan.			
# Expand bilateral physical protection visits, physical protection training, and the IAEA's International Physical Protection Advisory Service (IPPAS) to help protect WMD facilities around the world against terrorist attack and sabotage.			
Total, International Safeguards	16,739	16,739	18,752

Export Control

Mission Supporting Goals and Objectives

The mission of Export Control is to regulate American nuclear-related exports and support the development of effective nuclear export control systems in other countries, including Russia and the NIS.

Export Control Operations include licensing and multilateral operations. DOE/NNSA is responsible for authorizing the export of U.S. nuclear technology, such as blue prints, process information, or engineering services. *Licensing Operations* provide advice and recommendations on licenses for nuclear facilities and materials, as well as dual-use items and munitions that could have use in the development of nuclear weapons or nuclear-weapons materials. The Export Control program works with the Department of Commerce to maintain the "Nuclear Referral List," which identifies dual-use items requiring special attention, such as special metals, high-speed cameras, and sensitive electronic equipment. It reviews proposed exports based on a technical review of the item, as well as a review of the stated end-use and end-user of the export. The program also supports a range of activities to ensure that nuclear-related equipment and materials are disposed of without risk of proliferation, to review foreign visitors and assignees to DOE/NNSA labs and sites for export control concerns, and to address the problem of "deemed exports," i.e. the possible transfer of technology through exchanges with foreign visitors in the United States.

Multilateral activities include support and technical assistance to groups such as the Nuclear Suppliers Group and the Zangger Committee, both of which formulate internationally-agreed upon definitions of nuclear materials and commodities and export control practices. Multilateral activities ensure that the U.S. Government export control regulations meet multilateral standards and that other regime members' nuclear supply policies are consistent with multilateral obligations. The program also provides technical support to regime members and engages in outreach activities with supplier and transit states to stress the importance of compliance to multilateral standards of conduct.

The Export Control program also supports *Russia and the NIS Cooperation* to prevent illicit nuclear exports. The program goal is to establish competent export control authorities, develop constituencies for export control, improve government-supplier communication, and nurture an export control culture. The goal is achieved by implementing licensing systems and integrating technical expertise into the licensing process, promoting supplier awareness and compliance with internal control processes, and improving export control enforcement through tools, equipment, training.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Export Control Operations	9,837	8,728	12,119	3,391	38.9%
Licensing Operations	6,895	6,128	8,300	2,172	35.4%
Multilateral	2,942	2,600	3,819	1,219	46.9%
Russia and NIS Cooperation	1,864	1,900	3,400	1,500	78.9%
Total, Export Control	11,701	10,628	15,519	4,891	46.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Conduct up to ten workshops for licensing, enforcement and industry representatives in emerging nuclear supplier and "transit" states in Eurasia, East and Southern Europe, the Middle East, East Asia, and South Asia.

Conduct up to three outreach workshops with new Nuclear Suppliers Group members, e.g., Latvia, Turkey, Slovenia, South Africa and Argentina.

Ensure that the Proliferation Information Network System (PINS) is viable and supports the DOE/NNSA export license processing system.

Continue to develop analytical tools which support implementation of export licensing review responsibilities under U.S. Legislation.

Engage foreign governments in developing the necessary infrastructure to ensure control over nuclear and nuclear-related dual-use equipment, material, and technology.

Work with U.S. Customs personnel to familiarize them with nuclear equipment, materials, and technology, and to improve real-time analysis of suspect shipments.

Expand nuclear export control enforcement training to improve other countries' border controls, especially in high-traffic transit states.

Total, Export Control	11,701	10,628	15,520

Treaties and Agreements

Mission Supporting Goals and Objectives

The Treaties and Agreements sub-program supports implementation of bilateral or multilateral, Presidentially-directed or Congressionally-mandated nonproliferation and international security initiatives, agreements and treaties. In addition, it provides for unexpected, unplanned responses to requirements of an immediate nature based on unanticipated U.S. national security needs, as well as preparations to meet new transparency or verification requirements arising out of ongoing activities that are consistent with U.S. national policy and security requirements, without compromising proliferation- sensitive information. The sub-program also provides for the development of new technologies such as dual-use metal analyzers and test isotope production laboratory waste verification tools. Finally, the sub-program conducts on site reviews and facilitates meetings for review of findings, and it conducts reactor calculation and plutonium production assessments.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	%
Treaties and Agreements	3,135	3,135	3,393	258	8.2%
Total, Treaties and Agreements	3,135	3,135	3,393	258	8.2%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

- Support activities related to specific agreements resulting from bilateral and multilateral opportunities to secure at-risk weapons-usable materials, and activities related to bilateral and trilateral excess fissile materials inspections.

- Support verification activities in other nations as needed.

- Respond to nonproliferation requirements of an immediate nature based on unanticipated U.S. national security needs.

Total, Treaties and Agreements	3,135	3,135	3,393

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2003 vs. FY 2002 ($000)
# Nonproliferation Policy	
• The increase in funding will improve security of nuclear materials, especially in Central Asia, and expand the nuclear weapon dismantlement and transparency program.	9,765
# **International Safeguards**	
• The increase in funding will expand physical protection assessments and improvements in countries with U.S.-origin nuclear material, international training in nuclear safeguards and physical protection, and U.S. support of IAEA programs to strengthen international safeguards and protection of nuclear materials and facilities worldwide to prevent theft or diversion of material, sabotage or acts of terror involving nuclear material or facilities.	2,013
# **Export Control**	
• The increase in funding will support the development of an analytical infrastructure and technical resources to support interagency (e.g. Customs, Commerce, Nuclear Regulator Commission, and Department of Defense) efforts to control nuclear and nuclear-related dual-use equipment, materials and technology as part of a broader USG nonproliferation and counter-terrorism effort. Funding will also support initiatives to engage foreign governments to apply nuclear export controls as an element in a broader campaign against nuclear terrorism.	4,891
# **Treaties and Agreements**	
• The increase will provide the necessary resources to respond to nonproliferation requirements of an immediate nature based on unanticipated U.S. national security needs	258
Total, Nonproliferation and International Security	16,927

International Nuclear Materials Protection and Cooperation

Program Mission

The International Nuclear Materials Protection and Cooperation (INMP&C) program secures Russian weapons and weapons-usable nuclear material by upgrading security at nuclear sites, consolidating material at Russian sites where installation of enhanced security systems have already been completed, and improving nuclear smuggling detection capabilities at border crossings.

To accomplish this mission, the INMP&C program (also referred to as materials, protection, control and accounting or MPC&A) plans to install physical security and accountancy upgrades appropriate for the level of material attractiveness and the threat of theft. Consolidate material into fewer buildings and at fewer sites and converting excess weapons-grade HEU to LEU to reduce the number of theft targets. Work with Russian MinAtom, Navy, and Gosatomnadzor (GAN) officials to foster the capabilities and commitment to sustain MPC&A improvements after U.S. cooperation ends. Provide assessment and tracking of nuclear smuggling and nuclear threat cases. And enhance the detection of nuclear smuggling by installing radiation detection equipment at strategic transit and border crossing locations.

Program Strategic Performance Goal

NS 2-3: Protect or eliminate weapons and weapons-usable nuclear materials or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

Performance Indicators

The performance measures and significant accomplishments of each individual MPC&A element represent part of the overall program's metrics. The NNSA has currently identified ninety-five nuclear sites which may require security upgrades (53 Navy, 11 MinAtom Weapons Complex, and 31 Civilian (18 Russian and 13 Non-Russian)). Forty two of these sites are Russian Navy nuclear warhead storage sites.

By the end of FY 2003, comprehensive upgrades will be completed at 53 of the 95 sites (24 Navy, 2 MinAtom Weapons Complex, and 27 Civilian sites (14 Russian and all 13 Non-Russian)).

Since the September 11 attacks, NNSA has identified aggressive steps to accelerate and expand its nuclear security cooperation. Last year NNSA also estimated it would take until 2010 to complete comprehensive upgrades at the 53 known weapons-usable nuclear materials sites with nine of these sites being completed after 2007. These timelines have been shortened because of the September 2001 signing of an access agreement and additional budgetary resources.

At this time, NNSA estimates that all 53 will be completed at least two years earlier by 2008 with only two sites being completed after 2007.

Last year, NNSA estimated it would take until 2008 to complete comprehensive upgrades at 42 Russian navy sites storing nuclear warheads.

NNSA now estimates this work can be completed years earlier, by 2006.

NNSA estimates that there is approximately 603 metric tons (MTs) of weapons attractive nuclear material (10% at Navy sites, 84% at MinAtom Weapons Complex sites, and 6% at Civilian sites), enough for approximately 41,000 nuclear devices.

By the end of FY 2003, NNSA plans to have begun MPC&A upgrades on about 90% of this material.

In addition, the MPC&A program estimates that there are approximately 4,000 warheads located at the 42 Russian Navy nuclear warhead storage sites in need of security upgrades.

NNSA began MPC&A upgrades on all of these warheads by the end of FY 2001.

After upgrades are begun, NNSA quickly works to install rapid MPC&A upgrades. Rapid upgrades include measures establishing controlled areas and limits on personnel access to nuclear material; implementing a "two-person" rule; conducting baseline item inventories; bricking up windows; hardening doors; installing locks, delay blocks and steel cages, implementing random guard patrols and improving alarm communications.

By the end of FY 2003, NNSA plans to have rapid upgrades completed on about 50% of the total 603 MTs and all of the 4,000 warheads at the 42 Russian Navy sites.

After rapid upgrades are completed, NNSA installs comprehensive MPC&A upgrades which include rapid upgrades plus hardening of facilities to allow relocation of guard forces closer to the target; installing interior and exterior detection systems, closed-circuit television (CCTV) monitoring and assessment systems; implementing electronic access control systems, central alarm monitoring stations, and radio communications enhancements and conducting material inventories using advanced measurement equipment and computerized accounting systems.

By the end of FY 2003, NNSA's plans to have completed comprehensive upgrades on about 26% of the 630 MTs and 60% of the 4,000 warheads. This is significant threat reduction.

Navy Complex

Complete MPC&A rapid upgrades on all of the ~60 MTs of weapons usable nuclear material at 11 sites and on all of the estimated 4,000 Russian Navy nuclear warheads at 42 sites.

Complete comprehensive upgrades on the final 2% of the ~60 MTs of weapons usable nuclear material at 11 sites.

Complete MPC&A comprehensive upgrades on an additional 20% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total amount of Russian Navy nuclear warheads under comprehensive upgrades to 60%).

Complete MPC&A comprehensive upgrades at an additional 7 nuclear warhead sites and one material site -Kurchatov (increasing the total number of sites where comprehensive upgrades have been completed to 24 (13 nuclear warhead sites and 11 fuel sites).

Complete one center for MPC&A personnel training, education and equipment support.

MinAtom Weapons Complex

Continue MPC&A upgrades on ~508 MTs of weapons usable nuclear material at 11 sites.

Install MPC&A rapid upgrades on an additional 9% of nuclear material (increasing the total amount of nuclear material under rapid upgrades to 40%).

Complete MPC&A comprehensive upgrades on an additional 6% of nuclear material (increasing the total amount of nuclear material under comprehensive upgrades to 12%).

Complete comprehensive MPC&A upgrades at K-45 and S-44, bringing the total number of completed sites to 2 of 11.

Material Consolidation and Conversion and Civilian Sites

Continue MPC&A upgrades on ~35 MTs of weapons usable nuclear material at 31 sites (18 Russian and 13 Non-Russian).

Install MPC&A rapid upgrades on an additional 1% of nuclear material (increasing the total amount of nuclear material under rapid upgrades to 99%).

Complete MPC&A comprehensive upgrades on an additional 38% of nuclear material (increasing the total amount of nuclear material under comprehensive upgrades to 98%).

Complete comprehensive MPC&A upgrades at IPPE, Lytkarino and Luch bringing the total number of completed sites to 27 of 31 (14 Russian and all 13 Non-Russian).

Eliminate an additional 2.9 MT of HEU by converting it to LEU (increasing the total HEU converted to 6.5 MT).

Clear an additional two buildings of all weapons-usable material consolidating it to other secured buildings (increasing the total number of buildings cleared to 24).

Continue implementation of the Radiological Dispersion Device (RDD) program by installing equipment that can secure and/or detect radiological materials which can be used with explosives to contaminate a given area.

National Programs and Sustainability

Harden an additional 70 trucks, 9 railcars and provide an additional 84 secure transportation overpacks (increasing the total to 233 trucks, 51 railcars and 339 overpacks) establishing a secure means of transporting proliferation attractive materials both within and between Russian nuclear sites.

Complete installation of an additional 30 MPC&A operations monitoring systems (increasing the total installed systems to 50) at sites that have both ongoing and completed MPC&A upgrades in order to ensure that security operations are conducted by the Russians.

- # Participate as observers in 18 additional Gosatomnadzor (GAN), MinAtom, or Ministry of Interior inspections/exercises of MPC&A systems installed at Russian nuclear sites to determine the level of compliance with MPC&A and Protective Force requirements (increasing the total U.S./Russian observed inspections to 55).
- # Enable an additional 40 Material Balance Areas (MBAs) at various Russian sites to report to the Russian Federal Information System (FIS), (increasing the total MBAs reporting to the FIS to 111).

Assessment, Detection and Cooperation

- # Install radiation detection equipment at 21 additional strategic transit and border sites (18 Russian and 3 Ukraine) to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 42 (38 Russian and 4 Ukraine)).
- # Continue training outreach with Russian and Ukrainian border enforcement officials.
- # Provide assessment and database tracking of approximately 80 illicit trafficking in nuclear material cases; provide nuclear threat assessments in approximately 7 cases; provide and annual report on program activities and special topical reports as needed.

Performance Standards

For "blue", "green" and "yellow" levels, performance must meet all parts of the standard.

Blue: Significantly exceed: the conversion of an additional 2.9 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium; the completion of comprehensive upgrades on 26% or more of the 630 MTs and 60% of the 4,000 warheads; and provide rapid force protective upgrades for 20 plus sites..

Green: Meet all planned targets/milestones: Convert an additional 2.4-2.9 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium; complete comprehensive upgrades on about 23-26% of the 630 MTs and 50-60% of the 4,000 warheads and provide rapid force protective upgrades for 18-20 sites.

Yellow: Meet all critical targets/milestones: Complete comprehensive upgrades on about 20-23% of the 630 MTs and 40-50% of the 4,000 warheads; convert an additional 1.9-2.4 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium and provide rapid force protective upgrades for 14-18 sites.

Red: Below expectations: Complete comprehensive upgrades on below 26% of the 630 MTs and below 40% of the 4,000 warheads and convert less than an additional 1.9 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium and provide rapid force protective upgrades for 13 or less sites.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
# Continue consolidation of weapons usable material into fewer buildings and fewer sites in Russia. Convert an additional 1.2 metric tons (MTs) of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium, increasing the total amount converted to 2.4 MTs thereby improving security and reducing overall cost (NS4-4).	# Continue consolidation of weapons usable material into fewer buildings and fewer sites in Russia. Convert an additional 1.2 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium, increasing the total amount converted to 3.6 MTs thereby improving security and reducing overall cost (NS2-3).	# Continue consolidation of weapons usable material into fewer buildings and fewer sites in Russia. Convert an additional 2.9 MTs of weapon-grade highly enriched uranium to non-weapons grade low enriched uranium, increasing the total amount converted to 6.5 MTs thereby improving security and reducing overall cost (NS2-3).
# Continue to install MPC&A upgrades on approximately 603 MTs of nuclear material at 53 Russian sites and approximately 4,000 warheads located at 42 Russian Navy nuclear storage sites. By the end of FY 2001, NNSA's plans to have completed comprehensive upgrades on about 15% of the 630 MTs and 18% of the 4,000 warheads (NS4-4).	# Continue to install MPC&A upgrades on approximately 603 MTs of nuclear material at 53 Russian sites and approximately 4,000 warheads located at 42 Russian Navy nuclear storage sites. By the end of FY 2002, NNSA's plans to have completed comprehensive upgrades on about 18% of the 630 MTs and 40% of the 4,000 warheads (NS2-3).	# Continue to install MPC&A upgrades on approximately 603 MTs of nuclear material at 53 Russian sites and approximately 4,000 warheads located at 42 Russian Navy nuclear storage sites. By the end of FY 2003, NNSA's plans to have completed comprehensive upgrades on about 26% of the 630 MTs and 60% of the 4,000 warheads (NS2-3).

Significant Accomplishments and Program Shifts

All non-Russian site upgrade work was completed in Kazakhstan, Ukraine, Belarus, Uzbekistan, Latvia, Georgia, and Lithuania in FY 1998 and responsibility for sustainability at the 13 nuclear sites in these countries transferred to the National Nuclear Security Administration's (NNSA) International Safeguards program.

Navy Complex

- # Continued MPC&A upgrades on the ~60MTs of weapons usable nuclear material at 11 sites and the estimated 4,000 at-risk Russian Navy nuclear warheads at 42 sites.
- # Completed installation of MPC&A rapid upgrades on all of the estimated 4,000 Russian Navy nuclear warheads.
- # Completed MPC&A comprehensive upgrades on 40% of the estimated 4,000 Russian Navy nuclear warheads.
- # Installed MPC&A rapid upgrades on all of the ~60 MTs of nuclear material.
- # Completed MPC&A comprehensive upgrades on 98% of the ~60 MTs of nuclear material.
- # Completed MPC&A comprehensive upgrades at 16 of the 53 sites, (6 of 42 nuclear warhead sites and 10 of 11 fuel storage sites.)

MinAtom Weapons Complex

- # Continued MPC&A upgrades on the ~508 MTs of weapons usable nuclear material at 11 sites.
- # Installed MPC&A rapid upgrades on 31% of the ~508 MTs of nuclear material.
- # Completed MPC&A comprehensive upgrades on 6% of the ~508 MTs of nuclear material.

Material Consolidation and Conversion and Civilian Sites

- # Continued MPC&A upgrades on the ~35 MTs of weapons usable nuclear material at 31 sites (18 Russian and 13 Non-Russian).
- # Installed MPC&A rapid upgrades on 98% of the 35 MTs of nuclear material.
- # Completed MPC&A comprehensive upgrades on 60% of the 35 MTs of nuclear material.
- # Completed MPC&A comprehensive upgrades at 24 sites (11 Russian and all 13 Non-Russian) of the 31 sites.
- # Eliminated 3.6 MTs of HEU by converting it to LEU.
- # Began a new initiative to identify and pursue actions to reduce the threat of a Radiological Dispersion Device (RDD) event against the national security of the United States. Completed an initial assessment to determine the viability, threat and probable impact of a RDD incident.

National Programs and Sustainability

- # Hardened 163 trucks and 42 rail cars, and provided 255 secure overpacks establishing secure transport of nuclear material.
- # Began full implementation of the MPC&A Operations Monitoring Project by installing unattended monitoring systems that will allow Russian and U.S. Government officials to ensure Russian sites continue to operate installed MPC&A systems on an ongoing basis. This project is in direct response to a GAO recommendation to develop a system, in cooperation with the Russian government, to monitor, on a long-

term basis, the security systems installed at Russian sites to ensure that they continue to detect, delay and respond to attempts to steal nuclear material. Completed installation of 20 MPC&A monitoring systems at sites that have both ongoing and completed MPC&A upgrades.

Participated as observers in 37 Gosatomnadzor (GAN), MinAtom, or Ministry of Interior inspections/exercises of MPC&A systems at Russian nuclear sites to determine the level of compliance with MPC&A and Protective Force requirements.

Enabled a total of 71 Material Balance Areas at various Russian sites to report to the Russian Federal Information System (FIS).

Assessment, Detection and Cooperation

The MPC&A International Emergency Cooperation sub-element and the International Nuclear Safety and Cooperation element share common stakeholders and program participants. In order to take advantage of the opportunities for economies of scale such as formulation and implementation efforts which are available due to this commonality, the MPC&A International Emergency Cooperation sub-element will be combined with and budgeted for in the International Nuclear Safety and Cooperation program beginning in FY 2003.

Pursuant to the Conference report accompanying the FY 2002 Energy and Water Development Appropriations bill, funding for the Second Line of Defense sub-element was transferred from the Nonproliferation and National Security program (formerly Arms Control) to the MPC&A program under the Assessment, Detection and Cooperation sub-element.

Installed radiation detection equipment at 21 strategic transit and border sites (20 Russian and 1 Ukraine) to detect and deter illicit trafficking in nuclear materials.

Provide introductory nuclear material detection and WMD recognition training for 24 Ukrainian border enforcement officials in conjunction with the Department of State and the U.S. Customs Service.

Initiate surveys of border sites in Kazakstan

Complete a review and prioritization of major transit/transhipment sites in countries other than Russia and the Newly Independent States

Revised program threat assessment to include radioactive materials suitable for radiation dispersal devices.

Provided ~80 illicit trafficking in nuclear material assessments. Provided in direct response to the September 11, 2001 attacks, ~20 special nuclear threat-related assessments to the law enforcement and intelligence community. Continued work on a special study involving Course of Action Analysis.

Accelerated and completed work on an overview study regarding Radiological Dispersal Devices.

Conducted training at the International Law Enforcement Academy, Budapest, Hungary.

Provided special event assessment support to the FY 2002 Salt Lake City Olympics.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
International Nuclear Materials Protection and Cooperation					
Navy Complex	72,816	41,000	24,000	65,000	55,800
MinAtom Weapons Complex	21,307	40,000	19,000	59,000	48,000
Material Consolidation and Conversion and Civilian Sites	35,571	44,000	34,000	78,000	65,000
National Programs and Sustainability	33,613	27,000	26,900	53,900	34,277
Assessment, Detection and Cooperation	7,145 [a]	21,000	15,000 [b]	36,000	30,000
Subtotal, International Nuclear Materials Protection and Cooperation	170,452	173,000	118,900 [c]	291,900	233,077
Use of Prior-Year Balances	-179	0	0	0	0
Total, International Nuclear Materials Protection and Cooperation	170,273	173,000	118,900	291,900	233,077

Public Law Authorization:

Public Law 95-91, "Department of Energy Organization Act"

Public Law 103-62, “Government Performance Results Act of 1993"

Public Law 106-398, “National Defense Authorization Act FY 2001"

Public Law 107-107, “National Defense Authorization Act FY 2002"

[a] Reflects comparability adjustment to reflect the transfer of Emergency Cooperation program to the International Nuclear Safety program ($-1,180) and the transfer of the Second Line of Defense program from Nonproliferation and International Security ($1,925).

[b] Reflects comparability adjustment to reflect the transfer of the Emergency Cooperation program to the International Nuclear Safety Program ($1,100).

[c] Includes $120,000 from FY 2002 emergency supplemental funding contained in Public Law 107-117.

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	9,417	22,915	15,244	-7,671	-33.5%
Pantex	319	653	615	-38	-5.8%
Sandia National Laboratory	44,273	53,721	47,117	-6,604	-12.3%
Albuquerque Operations Office	4,759	3,204	3,214	10	0.3%
Total, Albuquerque Operations Office	58,768	80,493	66,190	-14,303	-17.8%
Chicago Operations Office					
Argonne National Laboratory	1,548	3,527	1,526	-2,001	-56.7%
Brookhaven National Laboratory	29,741	65,613	49,100	-16,513	-25.2%
New Brunswick Laboratory	75	70	70	0	0.0%
Total, Chicago Operations Office	31,364	69,210	50,696	-18,514	-26.8%
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	0	12	0	-12	-100.0%
Nevada Operations Office					
Nevada Operations Office	1,000	3,110	2,412	-698	-22.4%
Oakland Operations Office					
Lawrence Livermore National Laboratory	38,040	43,159	33,650	-9,509	-22.0%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	25,916	41,793	32,110	-9,683	-23.2%
Oak Ridge Operations Office	371	315	316	1	0.3%
Total, Oak Ridge Operations Office	26,287	42,108	32,426	-9,682	-23.0%
Richland Operations Office					
Pacific Northwest National Laboratory	14,893	53,292	47,352	-5,940	-11.1%
Savannah River Operations Office	100	406	351	-55	-13.5%
Washington Headquarters	0	110	0	-110	-100.0%
Subtotal, International Nuclear Materials Protection and Cooperation	170,452	291,900	233,077	-58,823	-20.2%
Use of Prior-Year Balances	-179	0	0	0	0
Total, International Nuclear Materials Protection and Cooperation	170,273	291,900	233,077	-58,823	-20.2%

Site Description

Albuquerque Operations Office

The Albuquerque Operations Office provides technical support to the International Material Protection and Emergency Cooperation Program through their contract with the Wackenhut Services Incorporated (WSI)/Non-Proliferation and National Security Institute (NNSI). WSI has a world-wide subsidiary, Wackenhut International, that maintains offices in over 50 different countries. In Russia, there are three offices including Moscow and St. Petersburg and a total of 420 Wackenhut International employees. All are Russian citizens and their expertise ranges from administrative to physical security systems installation and maintenance. They are available through WSI/NNSI for in-country activities covering all aspects of physical security and assurance. Specifically, WSI/NNSI provides staff expertise for material conversion and consolidation and is active in all MPC&A training projects in Russia.

Argonne National Laboratory

Argonne National Laboratory (ANL) provides experience in export control, regulatory development, sustainability and the Russian national accounting system. In addition, ANL supports MPC&A upgrade activities at civilian sites and the RDD initiative.

Brookhaven National Laboratory

Brookhaven National Laboratory (BNL) provides experience in the design and implementation of MPC&A upgrades on Russian facilities by virtue of their actual work at such facilities and by their involvement with developing MPC&A approaches for such facilities as part of work for and at the IAEA. BNL provides experience in contracting with various Russian vendors, including government-run institutes, and contracts all of the downblending activities for material conversion and consolidation. BNL also provides extensive knowledge of the political and economic situation in Russia, leads vendor evaluation and development activities, and has supported development and delivery of MPC&A training courses. BNL is the lead laboratory which provides support for the MPC&A Operations Monitoring Project.

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) provides operational experience in nuclear material protection, control and accounting in combination with institutional expertise in nuclear energy, international and domestic safeguards, and the assessment of the proliferation impacts on U.S. national security of foreign nuclear energy programs. LLNL supports international MPC&A activities at several Navy, Civilian and MinAtom Weapons Complex sites. In addition, LLNL provides support to the nuclear assessment program. Major support activities include real-time assessments of nuclear black market transactions, field support for seizures of illicit nuclear materials, analysis of potential end-user motivations and acquisition paths, and providing NNSA courses on nuclear crime at various national and international law enforcement training venues. LLNL also provides support to Second Line of Defense initiatives.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) provides experience in the development and implementation of material control and accounting (MC&A) systems at the Russian MinAtom, and Civilian facilities. LANL supports GAN inspections through provision of necessary nondestructive assay equipment and infrastructure, and addresses MC&A issues in Russia to include equipment calibration, nuclear reference materials, and training. LANL also provides support to Second Line of Defense and RDD initiatives.

New Brunswick Laboratory

New Brunswick Laboratory (NBL) provides expertise in assessing analytical chemistry techniques and equipment needs in Russia. NBL also provides expertise in evaluating measurement standard needs in Russia and the establishment of indigenous reference material capability.

Oak Ridge National Laboratory

The Oak Ridge National Laboratory (ORNL) subject matter experts have unique working experience in the development of vulnerability assessments; the design and application of physical security and material control and accounting systems; performance assurance; sustainability; transportation; storage; and response force training for Navy, MinAtom, and Civilian sites. ORNL's experience in defense conversion, and the handling, processing and safeguarding of extremely large and varied inventories of enriched uranium and related materials, provides unique experience to the Material Conversion and Consolidation (MCC) efforts. In addition, ORNL provides expertise in the areas of transportation security, acceptance testing, performance assurance, inspection, maintenance, and procedures to the national programs. ORNL also provides support to Second Line of Defense initiatives.

Pacific Northwest National Laboratory

Pacific Northwest National Laboratory (PNNL) provides experience with physical security; MC&A systems, activities, and methodologies; nuclear material production/processing technology; nuclear material storage/facility operations; design, construction, operation and decommissioning of reactor type facilities; measurement/sensor development; counter terrorism/intelligence; containment and surveillance technology; tamper indicating device (TID) technology and application; and radiation measurement/detection systems. In addition, PNNL provides experience with regulatory structure and development; safeguards and security training and course development; international safeguards implementation; IAEA inspectors/inspections; information science technology; computer network security; network infrastructure/design; computer systems/software development; nuclear material transportation; physical protection; and protective forces. PNNL also supports the RDD initiative. In addition, provides outreach activities into the academic, State government, and private sector to support NNSA goals of nuclear nonproliferation and global security through the Pacific Northwest Center for Global Security.

Pantex

Pantex provides expertise in operation and maintenance of installed MPC&A systems at sites within the MinAtom Weapons Complex.

Sandia National Laboratory

Based on their extensive work for the NNSA, Department of Defense (DOD), and other federal agencies, Sandia National Laboratory (SNL) provides experience with the design and installation of physical protection systems. SNL has specific technical expertise in access delay systems; intrusion detection and assessment systems and associated display systems; access control systems; and vulnerability analysis procedures, processes and associated computer codes. SNL also provides expertise in advising Russian institutes and enterprises as they develop physical protection regulations and training programs. SNL also provides support to Second Line of Defense initiatives.

Savannah River Operations Office

Savannah River (SR) Operations Office provides monitors for down blending operations and technical support for the study of plutonium consolidation options. In addition, SR provides MC&A support specializing in plutonium chemistry for various civilian sites.

Navy Complex

Mission Supporting Goals and Objectives

The Navy Complex improves security of Russian Federation (RF) Navy weapons usable material by installing improved MPC&A systems at RF Navy nuclear warhead sites, RF Navy HEU fuel storage facilities (fresh and damaged fuel), and shipyards where nuclear materials are present. These activities comprise a total of 53 sites, 11 Russian Navy Fuel Storage sites and 42 Russian Navy nuclear warhead sites. These sites account for approximately 60 MTs of highly attractive weapons-usable nuclear materials and about 4,000 at-risk RF Navy nuclear warheads according to open source information. The Navy Complex has refined the process of working with the RF Navy which includes upgrades design driven by vulnerability assessments (VAs), a rapid upgrades phase that is sometimes completed within six months, a comprehensive upgrades phase and a sustainability program which assures the systems will remain effective after the installation of upgrades is complete.

Rapid upgrades may include barriers (hardened doors and windows) that enhance delay times at the target area, locks and keys for access control, upgrades for response force survivability, passive perimeter (as appropriate from VAs), and moveable barriers at entry point. Comprehensive upgrades may include hardening of facilities to allow relocation of guard forces closer to the target, interior and exterior detection systems, CCTV monitoring and assessment systems, electronic access control systems, and central alarm monitoring stations. Sustainability includes a testing and maintenance program, annual updates of VAs, training, and the development of regulatory requirements.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Nuclear Warhead Sites	63,853	61,856	47,300	-14,556	-23.5%
Navy Fuel Storage Sites	8,963	3,144	8,500	5,356	170.4%
Total, Navy Complex	72,816	65,000	55,800	-9,200	-14.2%

Detailed Program Justification

	(dollars in thousands)		
	FY 2001	FY 2002	FY 2003
Nuclear Warhead Storage Sites	63,853	61,856	47,300

Complete rapid MPC&A upgrades at all 42 RF Navy nuclear warhead sites and complete comprehensive upgrades at 7 additional nuclear warhead sites (total of 15). *Decrease due to the ability to place several large comprehensive upgrade contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which will result in the accelerated completion of comprehensive upgrades at the 29 remaining sites two years ahead of the previous schedule.*

Navy Fuel Storage Sites	8,963	3,144	8,500

Complete MPC&A comprehensive security upgrades at the Kurchatov Institute (this will finish comprehensive upgrades at all 11 Navy Fuel Storage Sites). Complete a regional technical center to integrate the sustainability activities for installed MPC&A upgrades at completed sites of the Northern fleet. Begin construction of the final two regional centers for sustainability activities for installed MPC&A upgrades at completed sites for the Pacific Fleet. *Increase due to the establishment of the first of three regional support centers for sustainability efforts to sites which have completed rapid MPC&A upgrades.*

Total, Navy Complex	72,816	65,000	55,800

MinAtom Weapons Complex

Mission Supporting Goals and Objectives

This program enhances U.S. national security by providing MPC&A upgrades to the RF MinAtom nuclear weapons, uranium enrichment, and material processing/storage sites. The MinAtom Weapons Complex, located in closed cities, consist of seven sites and four Enterprises of the Nuclear Weapons Complex (ENWC). These sites account for approximately 508 MTs of highly attractive weapons-usable nuclear materials. The goal of this joint cooperative program is to identify areas that handle highly attractive material and provide protection against both internal and external threat scenarios.

The approach, in the protection of special nuclear material, is to give highest priority to areas that contain the most desirable material in terms of material type, vulnerability, and quantity. The upgrades are implemented utilizing a strategy that focuses on improved security near the material. An access agreement signed in September 2001 has allowed for significant access and acceleration of security upgrades at these large facilities.

Following completion of site upgrades, MinAtom Weapons Complex site teams will continue sustainability efforts to ensure the long-term effectiveness of installed upgrades.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Materials Processing/Storage Sector	13,179	39,530	23,400	-16,130	-40.8%
Weapons Labs Sector	3,122	14,160	15,300	1,140	8.1%
Uranium Sector	5,006	5,310	9,300	3,990	75.1%
Total, MinAtom Weapons Complex	21,307	59,000	48,000	-11,000	-18.6%

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Materials Processing/Storage Sector	13,179	39,530	23,400

Provide MPC&A upgrades to Mayak, Tomsk-7, and Krasnoyarsk- 26. Upgrades at Mayak will focus on the RT-1 fuel reprocessing plant and several sensitive areas within Plant 20. Complete rapid physical protection upgrades at Mayak RT-1 reprocessing plant and start comprehensive physical protection and material control and accounting upgrades at Mayak Plant 20 once the final list of proliferation vulnerabilities have been identified and the MPC&A system designs are completed. At Tomsk-7, physical protection as well as material control and accounting comprehensive upgrades will continue at the Conversion Plant, Uranium Enrichment Plant, Radiochemical Plant, and the Chemical Metallurgical. Refurbishment of a storage facility to more securely protect Category I nuclear material is to be initiated in FY03. Upgrades at K-26 will concentrate on completing the construction of the new Plutonium storage facility, installing MPC&A upgrades in the new Plutonium Storage facility, completion of a central alarm station, and implementation of material accounting measurements to track the nuclear material inventory. *Decrease due to the ability to place several large comprehensive upgrade contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which will result in the accelerated completion of comprehensive upgrades for these 3 sites, 3 years ahead of the previous schedule*.

Weapons Labs Sector	3,122	14,160	15,300

Taking advantage of recently negotiated access and assurances procedures for the RTC and Site 8 at Chelyabinsk-70, comprehensive upgrades will continue to be implemented at these two locations. Other work includes completion of baseline inventories for all facilities as well as continuing a study for consolidating material within C-70 into a single storage facility. Regarding Arzamas-16, MPC&A upgrades at Guarded Area 6 will be completed and MPC&A upgrades for a new central storage area at the Scientific Zone will be initiated. Comprehensive upgrades will continue at the pilot ENWC site and rapid upgrades will be initiated at the second ENWC site. *Increase due to the fact that the MinAtom access agreement signed in September 2001 will have the largest impact on opening up and accelerating security upgrades at these six previously off-limit sites.*

Uranium Sector	5,006	5,310	9,300

Complete comprehensive upgrades at Krasnoyarsk-45 (June 2003) and Sverdlovsk-44 (Sept. 2003) which contain approximately 3.6MTs of weapons usable nuclear material. Begin transition to sustainability efforts. *Increase due to the acceleration of the effort to complete of MPC&A comprehensive upgrades at the two Uranium Sector sites and the transfer to sustainability work at these sites*.

Total, MinAtom Weapons Complex	21,307	59,000	48,000

Material Consolidation and Conversion and Civilian Sites

Mission Supporting Goals and Objectives

Material Consolidation and Conversion (MCC) reduces the complexity and the long-term costs of securing Russian weapons-usable nuclear material. The MCC project is designed to significantly reduce the proliferation risk associated with weapons-usable nuclear materials by consolidating excess, non-weapons highly enriched uranium and Pu into fewer, more secure locations. This decreases the number of attractive theft targets and the equipment and personnel costs associated with securing such material. MCC also converts weapons-usable HEU to LEU, which significantly reduces its attractiveness to would-be proliferators. By the end of FY 2010, it is planned that the MCC project will convert ~29 MTs of HEU to LEU and remove all proliferation concern material from 55 buildings.

At the Civilian Sites, project teams install MPC&A systems at 31 civilian nuclear sites (18 Russia and 13 Non-Russian). The civilian sites contain approximately 35 MTS of the most vulnerable, proliferation concern material. These facilities are located in densely populated areas throughout the RF and NIS and are considered to be the most likely target for proliferants seeking weapons usable material through either abrupt theft or protracted diversion. The basic MPC&A upgrade objective is to employ a cost-effective, graded approach with an initial focus on installing MPC&A upgrades on the most highly attractive nuclear material at each site. Rapid MPC&A upgrades are installed to mitigate the immediate risk of theft and diversion while longer term, more comprehensive MPC&A upgrades are designed, installed and placed into operation. Following completion of site upgrades, U.S. support continues to help foster site capabilities to operate and maintain installed security systems. This line item will cover sustainability support for the 18 Russian sites. As previously stated, since sustainability activities at the remaining sites are closely related to the mission, supporting goals and objectives of the International Safeguards program, sustainability support for the 13 Non-Russian sites were transferred in FY 1998 to the International Safeguards line item.

Beginning in FY 2002, the Material Consolidation and Conversion and Civilian Sites sub-element will begin a new initiative to identify and pursue actions that can be taken to reduce the threat of a Radiological Dispersion Device (RDD) event against the national security of the United States. Following the completion of an initial assessment in FY 2002 to determine the viability, threat and probable impact of a RDD device, this program will begin installing equipment that can detect nuclear materials and methods to enhance source security of target or vulnerable candidate RDD materials.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Material Conversion and Consolidation	20,662	31,293	27,000	-4,293	-13.7%
Large Fuel Sites	14,909	21,707	21,707	0	0.0%
Radiological Dispersion Devices	0	25,000	16,293	-8,707	-34.8%
Total, Material Consolidation and Conversion and Civilian Sites	35,571	78,000	65,000	-13,000	-16.7%

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Material Conversion and Consolidation	20,662	31,293	27,000

Continue to implement MPC&A strategy to simplify the nuclear security situation in Russia by consolidating material to fewer sites and fewer buildings, and converting much of this material to LEU, rendering it less attractive to would-be proliferators. *Decrease due to the ability to sign large conversion contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which resulted in an increase of .6 MTs of HEU converted to LEU during the second half of FY 2002 and FY 2003.*

Large Fuel Sites	14,909	21,707	21,707

Completed comprehensive MPC&A upgrades at the Institute of Physics and Power Engineering (IPPE), Lytkarino, and Luch bringing the total number of completed sites to 27 of 31 (14 Russian and all 13 Non-Russian) storing 35 MTs weapons-usable material. Continue upgrades at the remaining four sites which include the Novosibirsk Chemical Concentrates Plant, the Elektrostal Machine Building Plant, the all Russian Scientific Research Institute of Inorganic Materials (Bochvar), and the State Scientific Center - Research Institute of Atomic Reactors (Dimitrovgrad). Continue to provide support to fourteen commissioned Russian sites in the area of training, procedures, critical spare parts, and performance testing in order to ensure the sustainability of installed MPC&A upgrades.

Radiological Dispersion Devices	0	25,000	16,293

Install equipment that can secure and/or detect radiological materials which can be used with explosives to contaminate a given area. *Decrease due to program start-up costs incurred in FY 2002 which included the long-lead purchase of equipment which will be installed in early FY 2003.*

Total, Material Consolidation and Conversion and Civilian Sites	35,571	78,000	65,000

National Programs and Sustainability

Mission Supporting Goals and Objectives

National Programs and Sustainability enables the MPC&A program to implement an exit strategy by helping the RF establish and implement national and other infrastructure components. These components are necessary to create an environment in which effective and full ownership of MPC&A systems can be transitioned to the Russians where they will operate and sustain them for the long-term. Sustainability activities in the National Program are focused on generic cross cutting issues which are conducted at the national, regional, industry and site level as opposed to the sustainability activities conducted in the Navy, MinAtom and Material Consolidation and Conversion Programs which are focused on site specific needs.

The National Program establishes the requirement for MPC&A systems through development of technically sound, internally consistent regulatory requirements that are suited to Russian conditions and are effectively enforced. Reporting requirements are established as well, which ensure that accurate and complete nuclear material inventory data is provided to responsible governmental bodies in Russia through a jointly developed Russian national nuclear material information system.

The National Program also empowers sites to operate systems by establishing training and education programs that develop, maintain, and sustain a cadre of Russian MPC&A professionals. Development of a Russian network of experts to support successful equipment performance and accurate nuclear material measurements is also an objective of the National Program. Finally, the National Program addresses the ability to securely transport special nuclear material in the RF within and between sites.

During FY 2001, the MPC&A program conducted studies to establish a comprehensive exit strategy. To effectively implement this exit strategy, the MPC&A program restructured the National Program activities into three sectors to better reflect the levels of operational support needed by the Russian Federation. The three sectors are Federal Programs, Regional and Industry Infrastructure and Site-Level Operations. By coordinating National Program activities at these three level in Russia, there will also be a higher degree efficiency in achieving the MPC&A exit strategy.

In FY 2002, the MPC&A program will begin the MPC&A Operations Monitoring Project to install unattended monitoring systems that will allow Russian and U.S. Government officials to ensure Russian sites continue to operate installed MPC&A systems on an ongoing basis. This project is in direct response to a GAO recommendation to develop a system, in cooperation with the Russian government, to monitor, on a long-term basis, the security systems installed at Russian sites to ensure that they continue to detect, delay and respond to attempts to steal nuclear material. These MPC&A monitoring systems will be installed at sites that have both ongoing and completed MPC&A upgrades.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Federal Programs	9,632	6,650	6,650	0	0.0%
Regional and Industry Infrastructure	9,356	8,750	5,580	-3,170	-36.2%
Site Level Operations	14,625	18,500	13,290	-5,210	-28.2%
MPC&A Operations Monitoring Project	0	20,000	8,757	-11,243	-56.2%
Total, National Programs and Sustainability	33,613	53,900	34,277	-19,623	-36.4%

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Federal Programs	9,632	6,650	6,650

Assist the RF in establishing the necessary federal and agency level regulations, reporting requirements and oversight processes that set and review the parameters for an acceptable MPC&A system. This includes overarching federal regulations pertinent to all nuclear facilities, agency specific internal requirements, processes and procedures as well as external and internal compliance assurance processes.

Regional and Industry Infrastructure	9,356	8,750	5,580

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Create an infrastructure at industry and regional levels to help support and sustain upgraded MPC&A systems at sites. The infrastructure includes facilities and subject matter experts in areas of MC&A, Physical Protection (PP), and Protective Force (PF) training and methodological development; equipment testing, maintenance, repair, and metrology; nuclear reference standards and procedures to support material measurements; and higher education in the MPC&A field. Continue to establish regional technical support facilities to provide equipment repair, maintenance, calibration assistance, warranty service, spare parts inventories, and training for critical MPC&A systems and components. Improve infrastructure in Urals, Siberian and Central regions for training and technical support in areas of PP and PF. *Decrease due to the accelerated completion of Protection Force upgrades in FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which resulted in improved guard force response times and survivability at 18 MinAtom sites in Moscow, St. Petersburg, and Novosibirsk which MinAtom identified as most vulnerable.*

Site Level Operations	14,625	18,500	13,290

Assist the Russian sites in achieving long-term effective operation of their MPC&A systems through development of procedures, process analysis, system effectiveness evaluation, cost analysis, and performance testing. This also includes such as hardening railcars and trucks to provide additional protection for guards escorting material shipments. Harden 70 additional trucks, 9 additional Russian railcars and provide an additional 84 overpacks which significantly increases the security of the material and can be used for either trucks or railcars. *Decrease due to a decrease from FY 2002 levels from 80 to 70 in the number of trucks which are hardened, a decrease from 17 to 9 in the number of railcars which are hardened and a decrease from 122 to 84 in the number of overpacks produced.*

MPC&A Operations Monitoring Project	0	20,000	8,757

Install MPC&A monitoring systems at an additional 30 sites that have both ongoing and completed MPC&A upgrades. These highly reliable, tamper resistant monitoring systems will provide a method to ensure a high level of confidence to site, regional, and national authorities that nuclear material has not been stolen which will allow for an accelerated transfer of all MPC&A systems operations to the Russians. *Decrease due to program start-up costs in FY 2002 (from funds provided in the FY 2002 supplemental appropriation) including the long- lead purchase of equipment for installations of MPC&A monitoring systems in FY 2002 and FY 2003.*

Total, National Programs and Sustainability	33,613	53,900	34,277

Assessment, Detection and Cooperation

Mission Supporting Goals and Objectives

The Assessment, Detection and Cooperation program supports other Federal agencies, US Embassies, foreign governments, and international organizations in combating nuclear smuggling and nuclear terrorism. The Office responds to nuclear materials smuggling or trafficking incidents by providing a national capability to assess and track these incidents, and directly assists Russia and other nations by installing effective nuclear material border monitoring instrumentation at strategic locations and providing training on the use of this instrumentation.

The Second Line of Defense Program provides integrated, sustainable systems to minimize the risk of nuclear proliferation and terrorism. This risk reduction is accomplished through cooperative efforts with the Russian Federation and other key countries to strengthen the overall capability of enforcement officials to detect and deter illicit trafficking of nuclear material across international borders.

The Second Line of Defense (SLD) programmatic objectives are focused on the cooperative effort to minimize the risk of illicit trafficking of special nuclear materials (SNM) across Russian and other international borders. This is accomplished through the detection, location and identification of nuclear and nuclear related materials, the development of response procedures and capabilities, and the establishment of required infrastructure elements to support the control of these materials. Technical solutions are based on the innovative and systematic adaptation of commercially available technology in configurations useful for enforcement officials.

In order to deal with the threat of illicit trafficking in nuclear materials, SLD combines rapid deployment of radiation detection equipment to mitigate immediate threats, jointly developed training modules to foster long-term sustainability, and an integrated communications system to catalog alarms with photos of perpetrators. By taking a systems approach to the problem of border detection the equipment and training provided through the program will not only be more effective but is also tightly integrated into the local operation and therefore more likely to be utilized in the long-term.

The Nuclear Assessment Program (NAP) is comprised of three main elements: tracking and assessment of nuclear smuggling events worldwide; assessment of communicated nuclear threats; and technical assistance and training support.

This NNSA program provides real-time rapid and accurate assessments of nuclear-related information and is regularly used by such customers as the State Department, Federal Bureau of Investigation (FBI), the intelligence community and others. Under the tracking and assessment of nuclear smuggling activity, NAP provides real time assessment products to diplomatic, law enforcement, and the intelligence community, to assist in determining the seriousness of the reported event, and provide insight as to the appropriate actions that should be taken. Under the Communicated Threat Credibility Assessment activity, and through Memorandum of Understanding with the FBI, formal threat assessment products can be provided in 1-hour (draft) and 4-hour (final) time-spans. Upon request, on-scene assessment capability is provided to the FBI and others in support of "special event" (e.g., Olympics) activities. Products produced under both activities are distributed through a unique and highly secure

communications system specifically set-up to handle sensitive nuclear-related information. This system is used by DOE, FBI, and the intelligence community to facilitate distribution of NAP's assessment products.

NAP can assist in the analysis of seized nuclear material through precise nuclear-forensic scientific analysis. NAP also supports US training efforts at the International Law Enforcement Academy (ILEA) in Budapest, Hungary, and at other venues, both foreign and domestic. NAP conducts special studies, particularly in areas of nuclear terrorism and nuclear smuggling and provides other published materials (Monthly Nuclear Trafficking Report; Nuclear Terms Handbook) on a routine basis. For example, in FY 02, NAP produced an overview study on Radiological Dispersal Devices in an accelerated fashion and in direct response to the events of September 11, 2001.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Second Line of Defense	1,925	24,000	24,000	0	0.0%
Nuclear Assessment	5,220	12,000	6,000	-6,000	-50.0%
Total, Assessment, Detection, and Cooperation	7,145	36,000	30,000	-6,000	-16.7%

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Second Line of Defense	1,925	24,000	24,000
Continue program to detect and prevent proliferation through the installation of radiation detection equipment at 21 strategic transit and border sites in Russia and other countries.			
Nuclear Assessment	5,220	12,000	6,000
Operate the Nuclear Assessment Program to provide a capability for monitoring and assessing illicit nuclear material trafficking incidents and assessing communicated nuclear threats. Maintain a centralized data base containing trafficking, threat, and nonproliferation/terrorism information. *Decrease due to less nuclear terrorism assessment products when compared with the aftermath of September 11, 2001 workloads; the completion of several special studies related to the aftermath of September 11; and the completion of support provided to the Salt Lake City Olympics in FY 2002.*			
Total, Assessment, Detection and Cooperation	7,145	36,000	30,000

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2003 vs. FY 2002 ($000)
Navy Complex	
Decrease due to the ability to place several large comprehensive upgrade contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which will result in the accelerated completion of comprehensive upgrades at the 29 remaining sites two years ahead of the previous schedule.	-14,556
Increase due to the establishment of the first of three regional support centers for sustainability efforts to sites which have completed rapid MPC&A upgrades ..	5,356
Total Funding Change, Navy Complex	-9,200
MinAtom Weapons Complex	
Decrease due to the ability to place several large comprehensive upgrade contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which will result in the accelerated completion of comprehensive upgrades for these 3 sites, 3 years ahead of the previous schedule...	-16,130
Increase due to the fact that the MinAtom access agreement signed in September 2001 will have the largest impact on opening up and accelerating security upgrades at these six previously off-limit sites..	1,140
Increase due to the acceleration of the effort to complete of MPC&A comprehensive upgrades at the two Uranium Sector sites and the transfer to sustainability work at these sites. ..	3,990
Total Funding Change, MinAtom Weapons Complex	-11,000
Material Consolidation and Conversion and Civilian Sites	
Decrease due to the ability to sign large conversion contracts during FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which resulted in an increase of .6 MTs of HEU converted to LEU during the second half of FY 2002 and FY 2003. ..	-4,293
Decrease due to program start-up costs incurred in FY 2002 which included the long- lead purchase of equipment which will be installed in early FY 2003...	-8,707
Total Funding Change, Material Consolidation and Conversion and Civilian Sites	-13,000

	FY 2003 vs. FY 2002 ($000)
National Programs and Sustainability	
Decrease due to the accelerated completion of Protection Force upgrades in FY 2002 (from funds provided in the FY 2002 supplemental appropriation) which resulted in improved guard force response times and survivability at 18 MinAtom sites in Moscow, St. Petersburg, and Novosibirsk which MinAtom identified as most vulnerable.	-3,170
Decrease due to a decrease from FY 2002 levels 80 to 70 in the number of trucks which are hardened, a decrease from 17 to 9 in the number of railcars which are hardened and a decrease from 122 to 84 in the number of overpacks produced..	-5,210
Decrease due to the program start-up costs in FY 2002 (from funds provided in the FY 2002 supplemental appropriation) including the long lead purchase of equipment for installations of MPC&A monitoring systems in FY 2002 and FY 2003.	-11,243
Total Funding Change, National Programs and Sustainability	-19,623
Assessment, Detection and Cooperation	
Decrease due to less nuclear terrorism assessment products when compared with the aftermath of September 11, 2001 workloads; the completion of several special studies related to the aftermath of September 11; and the completion of support provided to the Salt Lake City Olympics in FY 2002	-6,000
Total Funding Change, Assessment, Detection and Cooperation	-6,000
Total Funding Change, International Nuclear Materials Protection and Cooperation	-58,823

Russian Transition Initiatives

Program Mission

The mission of the Russian Transition Initiatives is to counter the proliferation threat posed by "brain drain" from the weapons complex of the former Soviet Union, for which Russia is the primary heir. Neither states of proliferation concern nor sub-national groups, such as terrorist organizations, are able to pursue a weapons of mass destruction (WMD) program entirely on their own. They need fuel cycle technologies in order to get the fissile materials (or they need to buy or steal fissile materials), weapons design information and weapons assembly expertise. The Russian nuclear weapons complex, which is vastly oversized, decrepit, and starving for resources yet still dangerously capable of performing its core functions, is an obvious source for these needs. The Transition Initiatives program is comprised of two parts: the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI). Both programs work to address the threat the Russian/NIS weapons complex poses as a potential source of WMD materials and technology. NCI works to remove functions and equipment from the weapons complex; reduce the physical footprint; and create sustainable, non-weapons work within a functioning city economy. The mission of the IPP program is to provide meaningful, sustainable, non-weapons-related work for former Soviet WMD scientists, engineers, and technicians in the NIS through commercially viable market opportunities.

Program Strategic Performance Goals

NS2-3 -Protect or eliminate weapons and weapons-usable nuclear material or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

Performance Indicators

Engage WMD specialists in commercially-focused projects that help prevent adverse migration of WMD expertise, benefit the U.S. and Russian economies, and make use of non-U.S. Government funds.

Enhance nonproliferation efforts in the Russian nuclear cities.

Performance Standards

Blue: *Significantly exceed*: accelerate three Russian technology development efforts in the Russian nuclear cities that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.

Green: *Meet all planned targets/milestones*: accelerate at least one Russian technology development effort in the Russian nuclear cities that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.

Yellow: *Meet all critical targets/milestones*: accelerate one Russian technology development effort in the Russian nuclear cities that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.

Red: *Below expectation*: enhance nonproliferation efforts in one Russian nuclear city and development efforts that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
Engaged approximately 2,000 scientists, engineers and technicians at nuclear institutes in the NIS, and approximately 800 scientists, engineers and technicians, at NIS chemical/biological institutes in 40 projects to provide long-term commercial employment (NS4-3)	Sign Closure Agreement with Russia, which publicly commits MinAtom to cease nuclear weapons work at Avangard by 2003.(NS4-3) Attracted $50 million of venture capital funding for commercializing five Initiatives for Proliferation Prevention projects. (NS4-3)	Accelerate three Russian technology development efforts in the Russian nuclear cities that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.(NS2-3)

Significant Accomplishments

- Attracted $50 million of venture capital funding for commercializing five Initiatives for Proliferation Prevention projects.
- Signed Fresenius Joint Venture for work at the Avangard Technopark.
- Achieved a 15% reduction in the physical footprint of the Avangard nuclear weapons plant in Sarov.
- Signed Closure Agreement with Russia, which publicly commits MinAtom to cease nuclear weapons work at Avangard by 2003.
- Initialed NCI Access Arrangement with Russia.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Russian Transition Initiatives					
Initiative for Proliferation Prevention	24,143	36,000	0	36,000	22,586
Nuclear Cities Initiative	26,616	21,000	0	21,000	16,748
Total, Russian Transition Initiatives	50,759	57,000	0	57,000	39,334

Public Law Authorization:
Public Law 95-91, "Department of Energy Organization Act"
Public Law 103-62, "Government Performance Results Act of 1993"
Public Law 107-107, "National Defense Authorization Act FY 2002"

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	8,660	8,550	6,687	-1,863	-22%
Kansas City Plant	3,270	3,420	2,382	-1,038	-30%
National Renewable Energy Laboratory	1,240	1,140	788	-352	-31%
Sandia National Laboratory	4,735	5,130	3,721	-1,409	-27%
Albuquerque Operations Office	310	570	460	-110	-19%
Total, Albuquerque Operations Office	18,215	18,810	14,038	-4,772	-25%
Chicago Operations Office					
Argonne National Laboratory	1,370	1,710	1,180	-530	-31%
Brookhaven National Laboratory	1,330	1,690	1,200	-490	-29%
Total, Chicago Operations Office	2,700	3,400	2,380	-1,020	-60%
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	1,100	1,152	725	-427	-37%
Oakland Operations Office					
Lawrence Berkeley National Laboratory	1,241	1,164	893	-271	-23%
Lawrence Livermore National Laboratory	10,491	11,970	8,261	-3,709	-31%
Total, Oakland Operations Office	11,732	13,134	9,154	-3,980	-54%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	3,585	3,990	2,753	-1,237	-31%
Richland Operations Office					
Pacific Northwest National Laboratory	5,280	5,700	3,934	-1,766	-31%
Savannah River Operations Office	540	570	395	-175	-31%
Washington Headquarters	7,607	10,244	5,955	-4,289	-42%
Total, Russian Transition Initiatives	50,759	57,000	39,334	-17,666	-31%

Site Description

Albuquerque Operations Office
The Albuquerque Operations Office (AL) provides technical support for the Initiatives for Proliferation Prevention (IPP) program.

Idaho National Engineering and Environmental Laboratory
The Idaho National Engineering and Environmental Laboratory (INEEL) provides technical support for the IPP program and export control activities.

Kansas City Plant
The Kansas City Plant (KCP) provides technical support for the IPP and NCI programs.

Lawrence Berkeley National Laboratory
The Lawrence Berkeley National Laboratory (LBNL) provides technical support for the IPP program.

Los Alamos National Laboratory
Los Alamos National Laboratory (LANL) supports the IPP program, develops Sarov projects and provides project management of the Sarov Open Computing Center for NCI.

National Renewable Energy Laboratory
The National Renewable Energy Laboratory (NREL) provides technical support to the IPP program.

Y-12 National Security Complex and Oak Ridge National Laboratory
Y-12 National Security Complex (Y-12/BWXT) and Oak Ridge National Laboratory (ORNL) support the NCI through management of projects in Zheleznogorsk and leads the development efforts for physical protection equipment business in Snezhinsk.

Pacific Northwest National Laboratory
Pacific Northwest National Laboratory (PNNL) supports the NCI by providing technical assistance on Zheleznogorsk projects.

Sandia National Laboratory
The Sandia National Laboratory (SNL) provides technical support to the IPP and NCI programs.

Savannah River Operations Office

The Savannah River Operations Office (SRS) provides technical support to the IPP program. Develops and manages projects for NCI in the area of telemedicine in the nuclear cities, and provides business management training to the closed cities.

Russian Transition Initiatives

Mission Supporting Goals and Objectives

Russian Transition Initiatives programs include the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI) in Russia and the New Independent States.

Initiatives for Proliferation Prevention - IPP reduces the global nuclear danger of proliferation of technologies and expertise by engaging NIS WMD experts in cooperative projects involving the ten major DOE/NNSA National Laboratories and U.S. industry. IPP is a classic "brain drain" program that engages former Soviet weapon scientists, engineers, and technicians in non-weapons-related projects and motivates participation in proliferation prevention activities at institutes across the New Independent States (NIS) - in Russia, Ukraine, Kazakhstan, and Belarus - in applied research projects with high commercial potential. IPP facilitates continued access to NIS facilities and establishes self-sustaining commercial entities that will support future independent commercial projects. This mechanism ensures an exit strategy for the U.S. Government. Cooperative, cost-sharing projects are aimed at establishing long-term commercial employment for key former Soviet weapons scientists, engineers and technicians.

Nuclear Cities Initiative (NCI) - NCI is designed to reduce the size of the weapons complex in the Russian nuclear cities. NCI removes functions and equipment from the weapons sites within the closed cities, reduces the physical footprint, and helps to create sustainable, alternative non-weapons work outside the nuclear institutes. NCI contributes to core U.S. nonproliferation and national security goals in direct and concrete ways by assisting in transparent and irreversible nuclear weapons complex reduction in Russia. NCI works closely with other U.S. Government programs and Russian partners, as well as private sector partners, to convert weapons facilities, develop commercial infrastructure and business partnerships, and enable self-sustaining non-weapons commercial enterprises.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Initiatives for Proliferation Prevention	24,143	36,000	22,586	-13,414	-37.3%
Nuclear Cities Initiative	26,616	21,000	16,748	-4,252	-20.2%
Total, Russian Transition Initiatives	50,759	57,000	39,334	-17,666	-31.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

- # Accelerate several Russian technology development efforts that have clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives.

- # Attract new commercial partners, which will augment US Government funds with private sector contributions of one million dollars.

- # Engage 3,000 additional former Soviet weapons scientists, engineers and technicians.

- # Facilitate commercialization of at least two additional IPP projects through the U.S. Industry Coalition.

- # Begin work with 2-3 former Soviet weapons institutes that have not been previously engaged.

- # Reduce Avangard nuclear weapons assembly plant by 500,000 square feet including making available for commercial applications another 50,000 square feet of production floor space.

- # Participate in a Joint Steering Committee meeting with senior level DOE and Ministry of Atomic Energy officials for the Nuclear Cities Initiative.

- # Start-up projects to establish commercial ventures at former weapons production facilities (one or two in conjunction with downsizing of Russian assembly facilities, and one in either Ukraine (e.g., Yuzhnoe missile complex) or Kazakhstan (e.g., Ulba metallurgical complex).

Total, Russian Transition Initiatives	50,759	57,000	39,334

Explanation of Funding Changes from FY 2002 to FY 2003

#	The decrease in funding is due to the a $15 million emergency supplemental in FY 2002 to initiate the acceleration of the work to be performed in the nuclear city. The funding provided will enable acceleration of several Russian technology development efforts that have a clear counter-terrorism or terrorism response, the reduction of the foot print at one nuclear weapons assembly plant, and projects to establish commercial ventures.	-17,666

HEU Transparency Implementation

Program Mission

The Highly Enriched Uranium (HEU) Transparency Implementation Program (HEU-TIP) develops and implements mutually-agreeable transparency measures for the February 1993 HEU Purchase Agreement between the United States and the Russian Federation and helps provide overall confidence that the U.S. nuclear nonproliferation objectives are being met.

The Purchase Agreement, which has an estimated value of $12 billion, covers the purchase over 20 years of low enriched uranium (LEU) derived from 500 metric tons of HEU from dismantled Russian nuclear weapons - enough HEU to make approximately 20,000 nuclear devices using the International Atomic Energy Agency's (IAEA) definition of a significant quantity. Under the Agreement, conversion of the HEU components into LEU is performed in Russian facilities located in the "closed" Russian cities.

The purpose of the HEU TIP program is to put into place and implement transparency measures that permit the United States to have confidence that the four nuclear non-proliferation goals of the Agreement are achieved. The goals of the program are to have confidence that HEU is in fact: (1) extracted from dismantled nuclear weapons; (2) the same HEU is oxidized; (3) downblended to LEU; and (4) the LEU delivered to the U.S. is fabricated into fuel for commercial nuclear power reactors. The program also requires the U.S. to support comparable monitoring activities by the Russian Federation representatives at certain U.S. facilities. This program helps provide confidence that this weapons-grade material is being permanently processed into non-weapons material, which is of paramount importance to achieve stated U.S. national security goals and strategic nuclear non-proliferation objectives.

The HEU processing in Russia currently includes the following four Russian Federation Ministry of Atomic Energy (Minatom) facilities:

- The Mayak Production Association (MPA) in Ozersk and the Siberian Chemical Enterprise (SChE) in Seversk receive weapon components and process the HEU metal into purified HEU oxide for use in other facilities.
- SChE and the Electro Chemical Plant (ECP) in Zelenogorsk, then process the HEU oxide into uranium hexafluoride.
- SChE, ECP, and the Ural Electrochemical Integrated Plant (UEIP) in Novouralsk, dilute or down blend the HEU hexafluoride into LEU, in the assay specified by U.S. Enrichment Corp. (USEC).
- The LEU product is shipped to the USEC Portsmouth Gaseous Diffusion Plant in Piketon, OH for subsequent sale and shipment to U.S. commercial reactor fuel fabrication facilities.
- All of these facilities are involved in transparency operations under the HEU Purchase Agreement.

From initial delivery in 1995 through December 2001, a total of 141.3 metric tons of HEU were converted to LEU and delivered to USEC. This quantity of HEU represents enough material for approximately 5,650 nuclear devices! Transparency monitoring procedures and operations have been implemented and measuring equipment installed in Russia to assure that stated non-proliferation objectives associated with this material are

being achieved. A total of $2.500 billion has been provided to Minatom through 2001 for this material and they should receive about $475 million for each additional 30 metric tons of HEU converted to LEU and delivered to USEC. Minatom will also receive equivalent natural uranium feed material for the quantity of uranium in the LEU delivered to USEC.

The HEU-TIP also conducts the annual inventory verification visit to the Russian facility/facilities to confirm that the natural uranium feed material returned to Russia is stored and used in accordance with the March 1999 bilateral Agreement Concerning the Transfer of Source Material to the Russian Federation.

Program Strategic Performance Goals

NS2-3 Protect or eliminate weapons and weapons-usable nuclear material or infrastructure, and redirect excess foreign weapons expertise to civilian enterprises.

Performance Indicators:

The goal of the HEU TIP is to provide confidence that Russian LEU sold to the USEC is derived from HEU removed from dismantled Russian nuclear weapons. This is achieved through a combination of on-site monitoring visits to the uranium processing facilities; detailed analyses of nuclear material accountability records from each plant; and analysis of independent measurement results from U.S. transparency instruments. It also requires an annual inventory verification of the natural uranium equivalent feed material returned to Russia. The specific program indicators include:

- Monitoring the conversion of 30 metric tons per year of HEU from dismantled Russian nuclear weapons into LEU for purchase by the USEC.

- Implementing and enhancing transparency monitoring activities at Russian uranium processing facilities, by conducting on-site monitoring activities, that provide assurance that the nuclear non-proliferation objectives of the Agreement are being met.

- Installing and maintaining U.S. Blend Down Monitoring System (BDMS) equipment at all three Russian blending facilities and retrieve and analyze the independent transparency data.

- Collecting and analyzing monitoring data and other information to help provide overall confidence that the Russians are converting HEU from dismantled nuclear weapons into LEU.

- Leading the interagency effort to compile and analyze all transparency monitoring data and information to develop an assessment of confidence of compliance with the non-proliferation objectives enumerated in the HEU Purchase Agreement.

- Providing assistance in the development and negotiation of new transparency measures to enhance

transparency operations and provide enhanced inputs to confidence assessments for intergovernmental deliberations and decisions.

Performance Standards:

Blue: Meet all planned Annual Performance targets identified in the next section, and meet them ahead of schedule.

Green: Meet all planned Annual Performance targets on schedule.

Yellow: Meet most, but not all, planned Annual Performance targets. I.e. Nearly Met Goal.

Red: Below expectations; more than one primary Annual Performance target not met reflecting a major delay in the program performance schedule, or that of a major project. I.e. Did Not Meet Goal.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Results	FY 2003 Targets
Monitored the Conversion of 30 metric tons of HEU from dismantled Russian nuclear weapons into LEU for purchase by USEC. (NS4-5)	Monitor the Conversion of 30 metric tons of HEU from dismantled Russian nuclear weapons into LEU for purchase by USEC. (NS2-3)	Monitor the Conversion of 30 metric tons of HEU from dismantled Russian nuclear weapons into LEU for purchase by USEC. (NS2-3)
Conducted 20 special monitoring visits to the four Russian nuclear processing facilities. (NS4-5)	Conduct up to 18 of 24 allowed special monitoring visits to the four Russian nuclear processing facilities. (NS2-3)	Conduct up to 18 of 24 allowed special monitoring visits to the four Russian nuclear processing facilities. (NS2-3)
[NOTE: Negotiated and signed revised Annex 3 covering BDMS operations at UEIP. Retrieved all BDMS data output reports covering Jan. 99 thru Aug. 01 for analysis in US.]	Complete documentation and licensing requirements for the installation of Blend-Down Monitoring System (BDMS) equipment at the Electro Chemical Plant. (NS2-3)	Install BDMS monitoring equipment at the Electro Chemical Plant (ECP) blending facility in Zelenogorsk and being generating monitoring data. (NS2-3)

	Initiate technical discussions with the Siberian Chemical Plant (SChE) in Seversk on modifications to their blending facility leading to BDMS equipment installation in 2004. Order long lead-time BDMS components. (NS2-3)	Complete technical discussions and cost agreement with SChE on blending facility changes. Build, assemble, test and ship BDMS equipment for installation and complete operational status by early FY 2004. (NS2-3)

FY 2001 Results	FY 2002 Results	FY 2003 Targets
	Conduct negotiations to open a Permanent Presence Office at SChE processing facility. (NS2-3)	Complete negotiations to open a Permanent Presence Office at SChE processing facility. (NS2-3)
Conducted first annual inventory of natural uranium feed returned to Russia.(NS4-5)	Conduct annual inventory of natural uranium feed returned to Russia. (NS2-3)	Conduct annual inventory of natural uranium feed returned to Russia. (NS2-3)

Significant Accomplishments and Program Shifts

Monitored the conversion of 30 metric tons of weapons grade HEU into LEU delivered to the USEC in CY 2001. This brought the total for HEU conversion to 141.3 metric tons of material since the first product delivery in 1995**.**

Completed 20 of 24 allowed monitoring trips in FY 2001 to the four Russian processing facilities to observe processing operations and to gather specified and pertinent transparency data for detailed analysis and assessment of compliance. These monitoring trips are our primary means of gathering required transparency data, including the retrieval of detailed Blend-Down Monitoring System (BDMS) data.

Maintained and staffed the Permanent Presence Office (PPO) at the Ural Electrochemical Integrated Plant (UEIP) facility in Novouralsk where we have daily access to the processing and blending facilities. In August 2001, we celebrated the fifth consecutive year of PPO operations at UEIP.

Performed the first Joint Data Analysis review of BDMS data at UEIP in January 2001 and began the receipt and removal to the U.S. of BDMS detailed output reports in August 2001 from UEIP.

Completed an agreement between DOE and Minatom, at the Ministerial level, in July 2001 to install BDMS equipment at the remaining two Russian blending facilities. Installation of BDMS equipment at the second dilution facility - the Electro Chemical plant (ECP) in Zelenogorsk should be completed by May 2002. Facility modifications are required and installation of BDMS equipment at the Siberian Chemical Enterprise in Seversk should be completed by early FY 2004.

Collected, analyzed, and evaluated all monitoring data and information and prepared reports to support a confidence assessment of Russian compliance with the non-proliferation objectives.

Completed the first annual inventory verification visit to the Russian facility, UEIP, where returned natural uranium feed material is stored. The first feed material was returned to Russia in July 2000. Per the Agreement, Minatom provided DOE with a written inventory of feed cylinders delivered to Russia through

December 31, 2000. This inventory report was received in March 2001 and became the basis for the on-site inventory verification.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
HEU Transparency Implementation	14,592	13,950	0	13,950	17,229
Total, HEU Transparency Implementation . . .	14,592	13,950	0	13,950	17,229

Public Law Authorizations:

Public Law 107-107, “National Defense Authorization Act for FY2002"

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	1,200	1,400	2,200	800	57.1%
Sandia National Laboratories	2,000	1,665	2,065	400	24.0%
Total, Albuquerque Operations Office	3,200	3,065	4,265	1,200	39.2%
Chicago Operations Office					
Argonne National Lab	700	800	800	0	0.0%
Brookhaven National Laboratory	27	25	25	0	0.0%
New Brunswick Laboratory	450	450	450	0	0.0%
Total, Chicago Operations Office	1,177	1,275	1,275	0	0.0%
Nevada Operations Office					
Remote Sensing Laboratory.	375	375	375	0	0.0%
Oakland Operations Office					
Lawrence Livermore National Laboratory	6,000	5,800	5,800	0	0.0%
Oakland Operations Office	750	600	1,600	1,000	166.7%
Total, Oakland Operations	6,750	6,400	7,400	1,000	15.6%
Oak Ridge Operations Office					
Oak Ridge- (ORNL / Y-12 / K-25)	3,000	2,770	3,879	1,109	40.0%
Portsmouth	60	35	35	0	0.0%
Total, Oak Ridge Operations Office	3,060	2,805	3,914	1,109	39.5%
Richland Operations Office					
Pacific Northwest National Laboratory	30	30	0	-30	-100.0%
Total, HEU Transparency Implementation	14,592	13,950	17,229	3,279	23.5%

Site Description

Argonne National Laboratory

Argonne National Laboratory (ANL) is a DOE National Laboratory that provides the HEU Transparency Implementation Program with technical experts to serve as permanent and special monitors at the Russian facilities involved in the conversion of HEU into LEU; technical assistance in the coordination and maintenance of Permanent Presence Office (PPO) monitors and monitoring activities in Russia; technical and logistical support and expertise in the planned opening of a PPO in Seversk, Russia; and technical support in analysis of transparency data and information. ANL also maintain a small staff in the Washington, DC area to support the program.

Brookhaven National Laboratory

Brookhaven National Laboratory (BNL) is a DOE scientific research laboratory that provides the HEU Transparency Implementation Program with personnel to serve as technical experts to serve as permanent and special monitors at the Russian facilities involved in the conversion of HEU into LEU and analysis of transparency information gathered in Russia.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) is a DOE weapons laboratory that provides the HEU Transparency Implementation Program with one segment of non-intrusive nondestructive assay equipment - the Blend Down Monitoring System (BDMS) - for measuring the enrichment of uranium hexaflouride gas in the blending pipes and technical experts to maintain and support this equipment. LANL will support engineering efforts to modify current BDMS designs, as well as Russian plant modifications, to support future BDMS equipment fabrication and installations. The equipment will provide continuous monitoring of the enrichment level of uranium flowing through the blending pipes. LANL personnel also prepare technical manuals related to the assembly, operation, and maintenance of the enrichment measurement equipment; training of both Russian and U.S. personnel on the installation, operation, and maintenance of the equipment; and, assistance in installing the equipment on the pipes in the Russian facilities. LANL equipment experts are also used as monitors on trips to Russia to ensure that the monitoring equipment is operating properly, perform maintenance activities as necessary, and review and retrieve output reports for return to the U.S. LANL personnel also provide technical expertise to interpret resultant BDMS data during Joint Data Analyses reviews and to trouble shoot the installed equipment.

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) is a DOE weapons laboratory that provides the HEU

Transparency Implementation Program with technical experts to serve as U.S. permanent presence and special monitors at the Russian facilities where HEU is converted into LEU; Russian language interpreters to serve with each special monitoring team and negotiating team; overall coordination for all U.S. special monitoring trips; coordination of training courses for personnel to serve as monitors; operation and implementation of the health and safety monitoring program for all U.S. HEU Transparency personnel serving on trips to Russia; procurement and technical troubleshooting for the portable nondestructive analysis equipment used for measuring the enrichment of uranium in closed Russian material containers; exchange of information with the Russians on the use of LEU delivered to the U.S.; leadership in the collection and analysis of information obtained from monitoring activities; provides expert technical and logistical support to conduct inventories of natural uranium cylinders stored at Russian plants; provides logistical and technical support for the bilateral Transparency Review Committee meetings; logistical and technical support to Russian monitoring teams in the U.S.; and provides technical support at meetings dealing with transparency issues. LLNL has developed and will maintain the automated Data Archive, Retrieval, and Transfer system, to effectively manage all accumulated transparency monitoring data. LLNL also maintain a small staff in the Washington, DC area that provides technical support to the program.

Oak Ridge - Oak Ridge National Laboratory, Y-12 Plant, and K-25 Plant

Oak Ridge is a DOE weapons and R&D site located in Oak Ridge, TN. We use technical expert personnel from each of these organizations to participate in the Program to serve as U.S. permanent and special monitors at the Russian facilities where HEU is converted into LEU; they participate in and conduct the training at the Y-12 plant of personnel to serve as transparency monitors; ORNL experts developed a segment of the non-intrusive nondestructive assay equipment - the Blend Down Monitoring System (BDMS) - for measuring the flow of uranium hexafluoride gas in the blending pipes; they will support engineering efforts to modify current BDMS designs, as well as Russian plant modifications to support future BDMS equipment fabrication and installation at the ECP and SCHE blending facilities; and K-25 staff will manage the integration of ORNL and LANL efforts on BDMS equipment for its installation and maintenance in Russian plants. This includes the development, procurement, preparation of technical manuals, training of Russian and U.S. personnel, shipment of equipment, licensing of BDMS equipment in Russia, and installation of the BDMS equipment on the blending pipes in the Russian HEU dilution facilities. Oak Ridge personnel assist in the analysis of information obtained from monitoring activities in Russia and provide assistance in hosting Russian monitoring visits to the Portsmouth Gaseous Diffusion Plant. Oak Ridge personnel also provide technical experts to conduct the inventory of natural uranium cylinders stored at Russian facilities, and technical expertise to interpret resultant BDMS data and trouble shoot equipment operations and maintain BDMS equipment.

New Brunswick Laboratory

New Brunswick Laboratory (NBL) is a DOE nuclear material standards laboratory that provides technical experts to serve as permanent presence and special monitors at the Russian facilities involved in the conversion of HEU into LEU; technical experts to conduct inventories of natural uranium cylinders stored at Russian facilities; and expertise in the evaluation and analysis of transparency data.

Oakland Operations Office

DOE's Oakland Operations Office (OAK) provides contract procurement and administrative oversight of LLNL activities. OAK also manages a contract with the Pragma Corporation of McLean, VA that has an office in Yekaterinburg, Russia, to support U.S. personnel assigned to the Permanent Presence Office in Novouralsk, any future PPO e.g. Seversk, Russia, and assistance to U.S. personnel serving on special monitoring visits to Russian processing facilities. OAK also transfers funds to Russian facilities for reimbursable expenses associated with monitoring activities, including the installation of Blend Down Monitoring System (BDMS) flow and enrichment equipment on the pipes in the three Russian dilution facilities.

Remote Sensing Laboratory

The Remote Sensing Laboratory (RSL) is a DOE laboratory that provides technical experts to serve as monitors at the Russian facilities involved in the conversion of HEU into LEU. RSL is also intimately involved in the development and field testing of the next generation of portable nondestructive assay (NDA) instruments to be fabricated to replace the aging NDA instruments used by U.S. monitors at the four Russian uranium processing facilities.

Sandia National Laboratory New Mexico

Sandia National Laboratory (SNL) is a DOE weapons research laboratory that provides technical experts to serve as permanent presence and special monitors at the Russian facilities involved in the conversion of HEU into LEU; provides for the procurement, installation, replacement, and disposal of radioactive sources required for operating the BDMS equipment installed in the Russian HEU dilution facilities. This is achieved through a contract with the "All Russian Technical Institute for Physics" (C-70) in Schnezinsk, Russia. SNL also constructs secure housings for the enrichment monitoring equipment developed by LANL; participates in technology development activities to enhance current and future transparency equipment and procedures; participates in transparency data analysis operations; and acts as an adviser on tamper indicating devices to ensure U.S. equipment, in Russian facilities, is not unknowingly compromised; and, coordinates Russian visits to the United States for discussions related to use of U.S. monitoring equipment in Russian facilities and Russian visits to U.S. facilities subject to Russian monitoring activities.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Permanent Monitoring in Russia	2,582	2,050	2,100	50	2.4%
Special Monitoring Visits to Russia	4,075	4,750	5,000	250	5.3%
Russian Monitoring in the U.S. & Negotiations	1,225	1,100	1,100	0	0.0%
Monitoring Equipment	3,395	3,350	5,829	2,479	74.0%
Technical Support Activities	3,315	2,700	3,200	500	18.5%
Total, HEU Transparency Implementation	14,592	13,950	17,229	3,279	23.5%

HEU Transparency Implementation

Mission Supporting Goals and Objectives

Permanent Monitoring in Russia

Continue to staff and maintain the U.S. permanent presence monitoring office (PPO) in Novouralsk, Russia staffed with U.S. technical experts which have routine access to the Ural Electrochemical Integrated Plant (UEIP). The technical work conducted by UEIP has been restructured and we have modified monitor staffing plans commensurately. We will continue the practice to include PPO staff as members of special monitoring visit (SMV) teams to other Russian uranium processing facilities to enhance the quality of all transparency monitoring operations.

In FY 2003, plan to complete detailed negotiations with the Ministry of the Russian Federation for Atomic Energy (Minatom) to establish a PPO at the Siberian Chemical Enterprise (SChE), Seversk, Russia. As the SChE facility performs all major HEU to LEU processing steps from weapon component receipt through HEU to LEU blending, a permanent presence monitoring office at this site would offer expanded access to the full complement of activities where 2/3 of the total HEU material is processed. Daily access to all processing areas would greatly enhance the level of transparency operations. Full implementation of this PPO would take place in future years as funds permit.

Special Monitoring Visits (SMV) to Russia

SMVs' are multi-faceted operations and are the primary means to acquire direct, expert on-site monitoring information, access to the actual uranium process operating areas, and acquire nuclear material accountability forms and data for return to the U.S. for archival and detailed analysis. These team visits are also used to install and maintain the Blend Down Monitoring System (BDMS) equipment at the Russian blending facilities and to acquire the detailed output reports for removal to the U.S. for detailed analysis and archiving. Through December, 2001, performed over 6,400 monitor-days at the four Russian uranium processing facilities. In FY 2003, continue with these essential monitoring visits, but only 18 of the 24 permitted special monitoring trips would be completed, including support for the installation of BDMS equipment at SChE. This will reduce the quantity and quality of transparency data and information available to the Program for assessment of compliance with nuclear nonproliferation objectives. Every effort will be made to complete the full complement of monitoring visits within budget.

In 2001, the HEU Transparency Program initiated a new monitoring activity by conducting an annual inventory of natural uranium feedstock returned to Russia. Under the Feed Agreement, natural uranium in quantities equivalent to that associated with the HEU converted to LEU and delivered to the U.S. is returned to Russia for storage and authorized use. The 30 metric tons of HEU processed annually results in about 9,000 metric tons of natural uranium feed material. In order to provide confidence that the terms of the Feed Assurances

Agreement are being implemented, the U.S. is permitted and plans to conduct an annual inventory of the uranium in storage and disposition of any material returned to Russia. The first shipment of natural uranium was initiated in July 2000 and is continuing on a regular basis.

Russian Monitoring in U.S. and Negotiation Support

This program activity maintains an office facility for Russian monitors at the U.S. Portsmouth Gaseous Diffusion Plant and coordinates transparency actions with the Nuclear Regulatory Commission and the five U.S. fuel fabricators for Russian monitoring visits to these facilities. Minatom conducted a monitoring trip to the U.S. in October 2000, which the program supported by briefing facilities on current transparency operations, Russian monitoring activities, and logistical support to the Russian monitoring team. The Program maintains support for such future Russian monitoring visits.

The program also provides technical, logistical, and document preparation support for various bilateral negotiation meetings that complement the Protocol on HEU Transparency Arrangements in Furtherance of the MOU (1994), and 16 Annexes to the Protocol (1994-2001). Critical to program operations is the use of the bilateral Transparency Review Committee (TRC) meetings to negotiate transparency rights and responsibilities for current and future activities. To date, eight such meetings were conducted including one in 2001 and we expect to support at least one major TRC meeting per year. We also supported and participated in three Executive sessions of TRC's in 2001 to complete technical negotiations involving the BDMS equipment installed at UEIP. Additional meetings are planned to fully implement and complete the "path forward" agreed to by DOE and Minatom in 2001 to fully implement the BDMS installations and operations at all three blending facilities.

Provide Minatom with prescribed nuclear material accountability documentation for the LEU product received by USEC, transferred to the five U.S. reactor fuel fabrication facilities, and delivered to power reactors. This will consist of over 3,000 total pages of information per year provided on a quarterly basis.

Monitoring Equipment

The HEU Transparency Program has thirteen sets of portable, non-destructive assay system instruments at the four Russian plants for use by U.S. monitoring teams. These units were developed in 1996 and provide direct and independent measurement data on closed material containers to assure the presence or absence of weapons grade uranium (nominally 90% U-235 assay material) as HEU material passes through the various plant operations. It is the first set of independent data for U.S. monitors to assure the presence and use of weapons grade HEU in the processing operations. Enhanced and more reliable instruments are being developed and fabricated and should be fielded to replace the initial instruments beginning in FY 2002 and completed in FY 2003. These are more reliable and rugged instruments that provide the required transparency information.

The Blend Down Monitoring System (BDMS) equipment provides continuous, independent transparency monitoring data for blend point operations. A critical data element produced by this equipment is the detection

of HEU material passing through the blending point and into the LEU product stream of material, which we term traceability. This provides significant assurance that HEU is being down blended into LEU product. This data complements Russian plant data.

In January 1999, we installed BDMS equipment on each of the two blending systems at the UEIP. This was a major and unique milestone to have U.S. measurement equipment installed in a Russian nuclear processing facility. Efforts and discussions continued with Minatom to complete the full calibration and adaptation of this equipment to actual plant operating conditions at UEIP, with successful completion in December 2000. Complete data retrieval and analysis was implemented in August 2001 and the output reports were removed to the U.S.

In 2002, we expect to install the BDMS equipment on the blending system pipes at the second of three Russian enrichment facilities - the Electro Chemical Plant (ECP) in Zelenogorsk. We plan to have the BDMS equipment installed and operating at ECP by May, 2002. This is a high priority action for the program and consistent with recommendations from the General Accounting Office review of the HEU Transparency Program.

The program has begun technical discussions with the Siberian Chemical Enterprise (SChE) technical staff leading to detailed engineering discussions for adapting BDMS type equipment for installation at this blending facility. Actual BDMS equipment designs, fabrication, delivery and licensing should be completed in FY 2003 at SChE. Installation and operation of the BDMS equipment should be completed by early FY 2004. This will complete a major Program milestone of 100% monitoring coverage of HEU to LEU blending operations at all three Russian blending facilities. This will substantially enhance the level of HEU-to-LEU transparency confidence.

Technical Support Activities

Efforts include detailed logistical support system to manage and facilitate all of the technical monitoring team visits to Russian facilities. Provide personnel health and safety coverage for all monitors inside Russian uranium processing facilities plus technical support during travel inside Russia. A personnel dosimetry and bio-assay program was established and continues to provide individual and group radiation exposure data for all monitors for all trips. An associated Health and Safety plan exists and is updated as necessary to document the Russian facility operations and operating conditions that U.S. monitors are expected to encounter.

A centralized automated Data Archive, Retrieval, and Transfer (DART) system database was developed to handle all transparency information gathered by monitors. This system was expanded in FY 2001 to accommodate the expected growth in data handling and associated access by technical analysts. Through FY 2001, over 60,000 data entries are achieved in the system. Two assessment teams were formed to focus upon the analysis of information on 1) conversion, and 2) blending of HEU into LEU in Russian plants. Over 58,000 nuclear material accountability and material transfer files from the Russian facilities are managed and made available to analytical experts for technical assessments and generation of necessary technical reports.

Detailed Program Justification

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Permanent Monitoring in Russia			
# U.S. Monitors staffing of PPO	1,382	950	1,000

Provide U.S. monitors to staff the Permanent Presence Office (PPO) in Novouralsk, Russia with daily access to the Ural Electrochemical Integrated Plant (UEIP) processing and down blending operations. This includes travel, salary, and per diem for a staff of two performing bi-monthly assignments, and other expenses such as trip report preparation and technical de-briefings. FY 2002 decrease reflects closing of the PPO for 2 months of the year and reduce staffing to two monitors to permit higher priority program activities. *FY 2003 increase of $ 50,000 reflects slight increase to cost of staffing and support to the PPO. Staffing level maintained at a reduced minimum level of 2 monitors per shift and closing the office for three months of the year to match funding resources.*

# Non-staffing Support	800	750	750

Provide planning, logistical support, and coordination with Minatom for monitoring activities. Provide enhanced training on Blend Down Monitoring System (BDMS) operations and data removal, instructions for conduct of operations, and coordinating information for PPO operations, especially at other Russian transparency facilities.

# Reimburse Russian facilities .	400	350	350

Reimburse Russian facilities for costs of good and services provided by the Russian Federation for U.S. monitoring operations. Includes transportation, escorts, interpreters, office supplies, office rent, and other costs necessary to complete transparency tasks.

Subtotal, Permanent Monitoring in Russia	**2,582**	**2,050**	**2,100**
Special Monitoring Visits to Russia			
# Direct Special Monitoring Costs	2,200	2,200	2,850

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Conduct 18 of 24 permitted special monitor visits (SMVs) in FY 2003, involving 130 technical monitors to the 4 Russian plants processing of 30 metric tons of HEU to LEU per year for delivery to the U.S.. Includes salaries, travel, per diem and expenses of monitors, trip reports and technical de-briefings. BDMS maintenance, which includes the replacement of decayed radioactive sources and re-calibration of equipment at UEIP, and data retrieval output reports is also included. *FY 2003 increase of $650,000 reflects the additional costs associated with the installation of BDMS equipment at Siberian Chemical Enterprise (SChE) and the extended staffing effort for this task.*

#	Reimburse Russian facilities	175	400	400

Reimburse Russian facilities for costs of goods and services provided to U.S. monitors. Includes transportation, escorts, interpreters, technical service for BDMS maintenance, etc. *FY 2003 funding reflects that the reimbursable costs to the Russian blending facility at SChE for U.S. monitor extended operations associated with the BDMS installation.*

#	Special Monitoring Support Costs	1,700	1,950	1,550

Provide planning, logistical support and coordination with Minatom for all team visits. Training for monitors, maintenance of monitor information database, preparation of trip planning documents and instructions and logistical support in Russia. *The FY 2003 decrease of $400,000 reflects the decreased logistics and licensing support, associated with the reduced level of SMV trips.*

#	Uranium Inventorying	0	200	200

Conduct annual inventory of natural uranium feedstock in storage cylinders at Russian facilities which were supplied by U.S. Enrichment Corp. (USEC) for the equivalent Russian uranium in the LEU purchased. Prepare comparative report of findings and declared inventories. Includes salary, travel, per diem, and other expenses.

	Subtotal, Special Monitoring Visits to Russia	**4,075**	**4,750**	**5,000**

Russian Monitoring in the U.S. & Negotiations

#	Accommodate Russian Monitoring	250	250	250

Maintain Permanent Presence Office (PPO) for Russian monitors, assist them in monitoring operations at U.S. facilities and provide LEU accountability documents to Minatom.

#	Coordination efforts	975	850	850

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Provide technical experts, interpreters and translators, and logistical support for Transparency Review Committee and other negotiating sessions in Russia and elsewhere to enhance U.S. transparency rights. Complete negotiations to open a Permanent Presence Office at SChE processing facility.			
Subtotal, Russian Monitoring in the U.S. & Negotiations	**1,225**	**1,100**	**1,100**

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Monitoring Equipment

#	Portable Equipment	550	550	500

Maintain portable Non Destructive Assay (NDA) instruments shipped to Russian sites for U.S. monitor use. On a multi-year basis, develop, pilot test, fabricate, and deliver to Russia advanced portable NDA instruments. Development and testing was completed in FY 2001. Fabrication and shipment to Russia of upgraded instruments to replace existing systems will begin in FY 2002. *FY 2003 reduction of $50,000 results from completing the replacement of older instruments which reduces maintenance work and costs.*

#	Stationary Equipment, design	0	50	200

Blend Down Monitoring System (BDMS) equipment requires modification for compatibility with Siberian Chemical Enterprise (SChE) blending facility. We plan to work with SChE technical experts on this design modification effort starting in FY 2002. *The FY 2003 funding increase of $150,000 supports new technical discussions on BDMS design modifications for SChE blending facility. Complete cost agreement with SChE on required blending facility changes for BDMS installation.*

#	Stationary Equipment, acquisition and maintenance	2,845	2,750	5,129

Maintain the installed BDMS equipment and support installation of equipment at SChE that provides continuous and independent measurements of uranium hexaflouride (UF_6) at blend-points in two dilution facilities (UEIE and ECP). Procure, replace, and dispose of radioactive sources (Co-57 and Cf -252) critical to the operation of the BDMS units. The Co-57 sources have a 1 year life and need to be replaced annually, which includes re-adjustment of the enrichment monitor instruments. Replace defective components and upgrade installed BDMS equipment as necessary. *The cost increase of $2,379,000 reflects the fabrication of* BDMS *equipment for SChE, costs to modify the SChE blending facilities, radioactive sources and support for the BDMS, and actual installation operations. Complete calibration and full operation of BDMS expected by FY 2004.*

Subtotal, Monitoring Equipment	**3,395**	**3,350**	**5,829**

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
Technical Support Activities			
# Data Analysis and Reporting	1,340	1,040	1,350

Compile, archive and analyze all monitoring records, forms, and data gathered by monitoring activities. Two facilities will have BDMS units installed and generating additional output reports on all blending operations for the year requiring detailed handling and analyses. Prepare monthly, annual, and ad hoc reports on HEU processing and HEU to LEU conversion rates and quantities. Conduct and document internal assessment of transparency performance and results. *Increase of $310,000 reflects the increase in data generated, especially from the BDMS units, requiring expanded data management and detailed analyses that support fuller and more detailed assessment of compliance with nonproliferation objectives.*

# Lab Technical and Management Support	1,100	950	950

Management and Operating contractors exercise local program management activities at each participating DOE laboratory and contractor organization and prepare required budgetary and topical status reports of activities. Provide technical and project management insights to enhance transparency operations and meet program needs.

# Worker Health and Safety Support	875	710	900

Maintain the personnel radiation dosimetry and bio-assay program covering all monitors traveling to Russia. Assure the occupational safety of U.S. monitors working in Russia and update the Program Health and Safety plan, as needed. *Increase of $190,000 is consistent with inflation of supporting staff operations and level of work in Russia with additional special dosimeters for personnel operations near the installed BDMS units.*

Subtotal, Technical Support Activities	**3,315**	**2,700**	**3,200**
Total, HEU Transparency Implementation	14,592	13,950	17,229

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2003 vs. FY 2002 ($000)
Permanent Monitoring in Russia	
Increase reflects cost of living adjustments for staffing of the Permanent Presence Office (PPO) at Ural Electrochemical Integrated Plant (UEIP) and for slightly enhanced reimbursable expenses at the Russian plant associated with increased operation of the program's HEU Blend Down Monitoring System (BDMS).	+50
Special Monitoring Visits to Russia	
Increase reflects additional work to install BDMS equipment at the Siberian Chemical Enterprise (SChE) in FY 2003. Additional staffing of U.S. experts and increase in associated costs for installation operations and reimbursement of expenses at SChE is included in these costs.	+250
Monitoring Equipment	
Increase results from: the fabrication and delivery of Blend Down Monitoring System (BDMS) equipment for Siberian Chemical Enterprise (SChE); the associated cost to modify the SChE blending facility to accommodate the BDMS equipment; and licensing activities. Fabrication of and support for radioactive sources for the SChE BDMS installation are also included.	+2,479
Technical Support	
Increase reflects the added costs for personnel dosimetry support associated with BDMS activities at three separate sites. Also, BDMS units generate additional data to be analyzed and processed into transparency information for compliance assessment evaluations and comparison with plant supplied data	+500
Total Funding Change, HEU Transparency Implementation	+3,279

International Nuclear Safety and Cooperation

Program Mission

The National Nuclear Security Administration (NNSA) authorizing legislation directs Defense Nuclear Nonproliferation to "promote international nuclear safety and nonproliferation" as one of its six missions. The mission of the International Nuclear Safety and Cooperation program is to strengthen national security by improving international nuclear safety to prevent nuclear incidents and accidents at foreign nuclear facilities, to mitigate consequences of accidents should they occur, and to enhance nuclear nonproliferation by assisting the Russian Federation in ceasing its production of weapons-grade plutonium. The program is the focal point within the NNSA and the Department of Energy (DOE) for international nuclear safety policy and program efforts. The program provides technical expertise and leadership for NNSA and DOE in interagency, bilateral, and multilateral fora involving international nuclear safety matters.

The program works closely with foreign governments and international organizations to develop, implement and sustain improved levels of nuclear safety to prevent nuclear accidents and to minimize their consequences. A major nuclear accident would have severe environmental, public health, economic and political consequences and would cause regional destabilization that would require billions of dollars in mitigation and remediation efforts. Nuclear problems abroad threaten the U.S. national security.

Over the past several years, the program has focused on correcting specific safety deficiencies in Soviet-designed nuclear power plants. Substantial nuclear safety projects were completed in nine countries at 26 nuclear sites with 67 operating reactors. Significant reductions in operating risk have been achieved at these nuclear power plants. Successful projects include simulators for training reactor operators, safety parameter display systems for helping operators control the reactors, conducting comprehensive analyses to identify weaknesses, and improving procedures for operating the plant. The program facilitated the closure of the Chornobyl plant and the Kazakhstan BN-350 reactor.

With the completion in FY03 of the Soviet-Designed Reactor Safety Program, the International Nuclear Safety and Cooperation program will reorient its activities to address critical nuclear safety issues worldwide in countries of concern through an integrated and risk-based approach. Efforts will not only address current nuclear safety issues and mandates, but also support other broader nonproliferation and national security policy objectives. Several of those objectives have changed or are changing as the result of the September 11, 2001 attacks.

The program is closely coordinated with the U.S. Department of State (DOS) and other U.S. government agencies to ensure that it supports and achieves foreign policy objectives. Program efforts are supplemented with country-specific funding from the Foreign Operations, Export Financing, and Related Programs Appropriations Act to support country-specific foreign policy objectives.

Program Strategic Performance Goals

NN2-4 Reduce the risk of accidents in nuclear fuel cycle facilities worldwide.

Preformance Indicators:

- Successful completion and close out of the Soviet-Designed Reactor Safety Program.
- Performance of nuclear safety analyses to identify and prioritize safety deficiencies and to formulate specific corrective measures to address nuclear safety threats in countries and facilities of concern worldwide.
- Implementation of corrective measures to resolve identified nuclear safety risks or vulnerabilities by working cooperatively with international organizations and host countries.
- Performance of international emergency cooperation activities to prepare for and respond to possible foreign nuclear events.

Performance Standards:

Blue: Meet all planned Annual Performance targets identified in the next section, and meet them ahead of schedule.

Green: Meet all planned Annual Performance targets on schedule.

Yellow: Meet most, but not all, planned Annual Performance targets. I.e. Nearly Met Goal.

Red: Below expectations; more than one primary Annual Performance target not met reflecting a major delay in the program performance schedule, or that of a major project. I.e. Did Not Meet Goal.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Results	FY 2003 Targets
Soviet-Designed Reactor Safety:		
Completed a full-scope simulator for Ukraine's Rivne nuclear power plant unit 3 and South Ukraine nuclear plant unit 1. (NS4-2)	Complete full-scope simulators for Kalinin unit 2 in Russia and the Bohunice reactors in Slovakia. (NS2-4)	Complete full-scope simulators at Zaporizhzhya unit 1 and Rivne unit 2 in Ukraine. (NS2-4)
Completed Safety Parameter Display Systems for Ukraine's South Ukraine unit 3, and Zaporizhzhya units 2 and 4. (NS4-2)	Complete Safety Parameter Display Systems in Ukraine at Zaporizhzhya units 1 and 6, Lithuania at Ignalina unit 2, and Russia at Novovoronezh unit 5. (NS2-4)	No activities.
Completed a Probabilistic Risk Assessment at Ukraine's South Ukraine unit 1 and Rivne unit 1, and at Russia's Novovoronezh unit 3, and Leningrad unit 2. (NS4-2)	Begin an international peer review of the Russian Kursk unit 1 In-depth Safety Assessment (ISA). (NS2-4)	Complete Ignalina unit 2 ISA in Lithuania. Complete international review of Kursk 1 ISA. (NS2-4)
Completed construction of heat plant to support long-term decommissioning of the Chornobyl reactors. (NS4-2)	No activities.	No activities.
Nuclear Safety Analyses:		
No activities.	Perform program planning efforts, especially in the area of HEU-fueled research reactors in countries of concern. Gather existing research reactor data. (NS2-4)	Develop database on nuclear power plants, research reactors, and non-reactor nuclear facilities and their safety status. Initiate evaluation and prioritization of nuclear safety concerns. (NS2-4)

FY 2001 Results	FY 2002 Results	FY 2003 Targets
[NOTE: Coordinated on international nuclear issues, especially with countries of concern and emerging nuclear countries, through international fora and organizations.]	Coordinate on international nuclear issues, especially with countries of concern and emerging nuclear countries, through international fora and organizations. (NS2-4)	Prepare needs assessment for technology transfer of nuclear safety methods based on risk with Vietnam and China as potential participant countries. (NS2-4)
Corrective Measures and Technical Cooperation:		
No activities.	No activities.	Develop programs to assist countries, such as Vietnam as a first case, to improve their emerging nuclear infrastructures by technology transfer of nuclear safety methodologies, and by building an independent regulator. (NS2-4)
No activities.	Perform program planning efforts on HEU-fueled research reactors in countries of concern. (NS2-4)	Cooperatively upgrade, or shutdown and decommission, high-risk research reactors in sensitive countries such as Romania and Uzbekistan. (NS2-4)
Plutonium Production Reactor Safety:		
[NOTE: Coordinated on safety issues at the three Russian plutonium production reactors. In December 2001, the program eliminating weapons grade plutonium production was transferred from DOD to DOE.]	Complete walk-down and preliminary assessment of three plutonium production reactors in Seversk and Zhelezhnogorsk in Russia. Begin work on near-term safety upgrades. (NS2-4)	Follow-on activities will be funded under the comprehensive Russian Plutonium Reactor Replacement Program, see next section below.
International Emergency Cooperation:		
[NOTE: Assisted Russia in the development of the Minatom Situation and Crisis Center through the transfer of methodologies and expertise.]	Assist Russia in the communication linking and networking of crisis centers for nuclear emergency response. (NS2-4)	Upgrade Russia's emergency procedures and training and its Situation and Crisis Center to ensure a reliable program. (NS2-4)

FY 2001 Results	FY 2002 Results	FY 2003 Targets
[NOTE: Participated in the development of a worldwide emergency program through exercise development with the IAEA and NEA.]	Participate in and provide leadership to international organizations for standardizing emergency preparedness and response guidelines. (NS2-4)	Participate in and provide leadership to international organizations enhancing emergency programs to protect public health and safety. (NS2-4)
[NOTE: Established a Nuclear Power Plant offsite training and emergency center and assisted in the development of two training courses.]	Develop two additional training courses and establish a continuing training program. (NS2-4)	Network Ukraine plants to its offsite training and emergency center for improved response. (NS2-4)

NN2-3 Protect or eliminate weapons and weapons-usable nuclear material or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

Performance Indicators:

Eliminate non-reactor grade plutonium production by assisting the Russian Federation in shutting down the three weapons-grade plutonium production reactors located in Seversk and Zheleznogorsk by providing alternate energy generating capacity.

Performance Standards:

Blue: Meet all planned Annual Performance targets identified in the next section, and meet them ahead of schedule.

Green: Meet all planned Annual Performance targets on schedule.

Yellow: Meet most, but not all, planned Annual Performance targets. I.e. Nearly Met Goal.

Red: Below expectations; more than one primary Annual Performance target not met reflecting a major delay in the program performance schedule, or that of a major project. I.e. Did Not Meet Goal.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Results	FY 2003 Targets
Elimination of Weapons-Grade Plutonium Production:		
[NOTE: Under the DOE Work-For-Others program, supported DOD Elimination of Weapons-Grade Plutonium Production Program by preparing a core conversion alternatives study.]	Transfer the program from DOD to DOE and satisfy FY01 Congressional reporting requirements regarding the transition of the program scope from the original re-design of the Plutonium Production Reactors (PPRs) to instead a program of shutting down the PPRs after providing alternate fossil-fueled generating capacity. (NS2-3)	Begin refurbishment of the Seversk heat and power plant. Complete design and begin initial site construction of the new Zheleznogorsk heat and power plant to provide replacement energy. (NS2-3)

Significant Accomplishments and Program Shifts

FY 2001 specific accomplishments can be found in the previous section, the Annual Performance Results and Targets table.

1. Substantial improvements in the safety of Soviet-designed reactors have been achieved over the past several years. Remaining activities of the Soviet-Designed Reactor Safety Program are being completed this year and are being closed out. Significant accomplishments include:

- # Substantial improvements in the safety of Soviet-designed reactors have been achieved with no major accidents and very few incidents in last several years. Equipment deficiencies were corrected, including: fire safety upgrades; sealing of confinement structures; emergency batteries and emergency power supplies; isolation valves, and control and protection systems. Completed 13 simulators or simulator upgrades for improving operator training. Installed 17 safety parameter display systems to substantially improve the capability of operators to respond to abnormal or emergency situations. Improved training methods have been implemented in Armenia, Bulgaria, Lithuania, Russia, and Ukraine. Technology transfer for improved emergency operating instructions (EOIs) has been completed. EOIs have been implemented in Lithuania, the Czech Republic, Slovakia, Hungary, and at one reactor in Russia. In-depth Safety Assessments (ISAs) have been completed for the Czech Republic's Dukovany units 1 and 2, Lithuania's Ignalina unit 1, and Russia's Leningrad unit 2.
- # In cooperation with other Western countries, facilitated the closure of Ukraine's Chornobyl plant and the Kazakhstan BN-350 reactor, and the planned closure of Lithuania's Ignalina unit 1. Completed the Chornobyl heat plant to provide heat to facilities used for the long-term decommissioning of the site.
- # Established communication links between International Nuclear Safety Centers (INSC) in Russia and in Ukraine and the U.S. INSC at Argonne National Laboratory. As a result, international nuclear safety experts have been able to use U.S. nuclear safety computer codes and to collaborate more effectively.

2. The International Emergency Cooperation activities joined this program in 2001 from the International Materials Protection and Cooperation program, NA-25. Accomplishments include:

- # Provided technical advice and assistance to international organizations (IAEA, OECD's Nuclear Energy Agency, Arctic Council) and foreign governments (Russia, Ukraine, France, Japan) for cost effective emergency programs.
- # Established working relationship with Norway, United Kingdom, South Korea, European Union, and NATO in emergency management issues.
- # Developed and delivered two emergency management courses for Ukrainian nuclear power plant workers and government representatives.
- # Assisted Russia and Ukraine in networking their emergency facilities, developed emergency plans and procedures, and emergency training to ensure rapid emergency communications and response.
- # Participated in the development, conduct, and evaluation of two emergency response exercises.
- # Provided equipment for additional Minatom sites to ensure rapid emergency communications and response.

3. Efforts for the Elimination of Weapons-Grade Plutonium Production stem from the September 1997, Plutonium Production Reactor Agreement between the U.S. and Russian Federation where the cores of three Russian plutonium production reactors, at two sites, were to be converted to no longer produce weapons-grade plutonium.

- In the spring of 2000, DOD terminated all new work on the original Highly Enriched Uranium (HEU) fuel and reactor core re-design due to the increasing design complexity and a negative assessment by the Russian nuclear reactor regulatory agency, GosAtomNadzor (GAN). Options for fossil-fueled alternatives for generating the required heat and electricity for the surrounding communities were re-examined.
- As the direction of the program shifted towards providing fossil-fuel replacement capacity and as the Administration reviewed U.S. Nonproliferation and Threat Reduction Assistance to the Russian Federation, a decision was reached in December, 2001, to transfer the funding and management of the program from DOD to DOE.
- DOE is now the Executive Agent for the entire Plutonium Production Reactor Agreement including the responsibility to cooperate with the Russian Federation to provide alternative fossil fuel plants to produce heat and electricity so that the plutonium production reactors can be shut down at the earliest possible dates.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Soviet-Designed Reactor Safety (DOE)	16,401	12,400	0	12,400	4,000
Soviet-Designed Reactor Safety (DOS/USAID) [a]	46,500	0	0	0	0
Subtotal, Soviet-Designed Reactor Safety [b]	62,901	12,400	0	12,400	4,000
Nuclear Safety and Cooperation [b]	4,180 [c]	7,600	1,100 [c]	8,700	10,576
Less DOS/USAID Appropriation Transfers	-46,500	0	0	0	0
Subtotal, International Nuclear Safety and Cooperation	20,581	20,000	1,100	21,100	14,576
Use of Prior Year Balances	-15	0	0	0	0
Total, International Nuclear Safety and Cooperation	20,566	20,000	1,100	21,100	14,576

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Total, Elimination of Weapons-Grade Plutonium Production	0	0	0	0	49,338

Public Law Authorization:

Public Law 107-107, National Defense Authorization Act for FY 2002

Plutonium Production Reactor Agreement, September, 1997

[a] Reflects appropriation transfers from the Department of State/ U.S. Agency for International Development for Soviet-Designed Reactor Safety. DOS/USAID amounts for FY 2001 includes funding received for nuclear power plant safety for Ukraine, Armenia, and Kazakhstan ($46.5 million). FY 2002 and FY 2003 DOS/USAID funds of $36 million are tentatively planned.

[b] For display purposes, Soviet-Designed Reactor Safety is listed separately from Nuclear Safety and Cooperation for additional transparency and comparability.

[c] Reflects comparability adjustment to reflect the transfer of International Emergency Cooperation activity from the International Nuclear Materials Protection and Cooperation program ($1,100K in FY 02; $1,180K in FY 01).

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	25	35	50	25	71.4%
Sandia National Laboratory	40	0	50	25	100.0%
Total, Albuquerque Operations Office	65	35	100	50	142.9%
Chicago Operations Office					
Argonne National Laboratory (Illinois/Idaho)	9,600	4,600	4,876	276	6.0%
Brookhaven National Laboratory (New York)	500	500	500	0	0.0%
Total, Chicago Operations Office	10,100	5,100	5,376	276	5.4%
Idaho Operations Office (Idaho)					
Idaho National Engineering and Environmental Laboratory	1,900	900	900	0	0.0%
Oakland Operations Office					
Lawrence Livermore National Laboratory	125	150	200	50	33.3%
Nevada Operations Office					
Remote Sensing Laboratory	400	75	250	175	233.3%
Richland Operations Office (Washington)					
Pacific Northwest National Laboratory	53,671	14,040	56,364	42,324	301.5%
Washington Headquarters (Maryland and Washington DC)	820	800	725	-75	-9.4%
All Other Sites	0	0	0	0	0.0%
Subtotal, International Nuclear Safety and Cooperation (Includes EWGPP)	67,081	21,100	63,915	42,800	202.8%
Less Use of AID Funding	-46,500	0	0	0	0.0%
Use of Prior Year Balances	-15	0	0	0	0.0%
Total, International Nuclear Safety and Cooperation (Includes EWGPP)	20,566	21,100	63,915	42,800	202.8%

Site Description

Argonne National Laboratory

Argonne National Laboratory (ANL) is one of DOE's multi-program national laboratories. ANL occupies one site in Illinois and one site in Idaho. ANL supports Kazakhstan BN-350 reactor shutdown activities, safety and vulnerability analysis activities, and International Nuclear Safety Center activities.

Brookhaven National Laboratory

Brookhaven National Laboratory (BNL) is one of DOE's multi- program national laboratories. BNL is located on Long Island, New York. BNL supports simulator development and installation activities.

Idaho National Engineering and Environmental Laboratory

Idaho National Engineering and Environmental Laboratory (INEEL) is one of DOE's multi-program national laboratories. INEEL, is located in Idaho, supports safety and vulnerability analysis activities.

Lawrence Livermore National Laboratory

The LLNL located in Livermore, CA, provides Atmospheric Release Advisory Capability (ARAC) stewardship to the international community for plume modeling and supports the International Emergency Cooperation activities with exercise development, execution, evaluation and training.

Los Alamos National Laboratory

The LANL is located in Los Alamos, NM, and is a DOE weapons lab. LANL supports the International Emergency Cooperation activities by assisting in the design and installation of communications and networking systems and equipment.

Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory (PNNL) located in Richland, WA, is one of DOE's multi-program national laboratories. PNNL is the lead laboratory for the Soviet-designed reactor safety activities and provides technical, contracting, and administrative program support. PNNL supports the corrective measures activities to resolve identified risks and vulnerabilities. PNNL supports the International Emergency Cooperation activities with exercise development, execution, and evaluation and provides training support and assistance. PNNL will serve as the lead laboratory for the program for the Elimination of Weapons-Grade Plutonium Production in Russia program.

Remote Sensing Laboratory

The Remote Sensing Laboratory (RSL) located in Las Vegas, NV, supports the International Emergency Cooperation activities by conducting facility and site analysis and assisting in the design and installation of communications and networking systems and equipment.

Sandia National Laboratory

Sandia National Laboratories is a DOE weapons research laboratory that supports International Emergency

Cooperation activities by coordinating and performing arctic monitoring efforts in Alaska down wind of the Russian Bilibino nuclear power plant in Eastern Siberia.

Nuclear Safety and Cooperation

Mission Supporting Goals and Objectives

The program is the focal point within NNSA and DOE for international nuclear safety policies and program efforts. The program provides technical expertise and leadership in coordinating NNSA and DOE nuclear safety objectives with international organizations such as the International Atomic Energy Agency (IAEA), the European Bank for Reconstruction and Development's Nuclear Safety Account, the Organization for Economic Cooperation and Development's Nuclear Energy Agency (NEA), and the G-7 Nuclear Safety Working Group to ensure that nuclear safety and security issues are identified and resolved using a risk-based, coordinated approach among donor countries and organizations. The goal is to develop a sustainable culture of nuclear fuel cycle safety, particularly in emerging nuclear countries and other countries of concern.

The Soviet-Designed Reactor Safety Program will be successfully completed and closed out in FY03. The program will reorient its activities to address critical nuclear safety issues in other countries and nuclear facilities of concern through a process of safety analysis, corrective measures, and emergency management cooperation on a worldwide basis as envisioned in the Atomic Energy Act and subsequent legislation.

The program will evaluate the nuclear safety and risks associated with nuclear facilities in countries of concern to identify deficiencies and prioritize corrective measures. Industry accepted risk-based tools are used to assess and prioritize the safety of nuclear facilities and nuclear programs. These tools include walk-downs, cost/benefit analyses, and in-depth safety and operational assessments. Existing analyses will be obtained and used, and additional analyses will be undertaken as needed. In some cases, existing analyses, such as probabilistic safety analyses, will be revised to account for new threats, such as sabotage. The program will build and maintain a database of facilities and countries and their detailed safety-related information. These facilities include nuclear power plants, research reactors, and non-reactor nuclear facilities.

The program will implement corrective measures to resolve identified nuclear safety risks or vulnerabilities by working cooperatively with international organizations and host countries. Activities will be coordinated with appropriate international organizations, such as the IAEA, and other countries to maximize information sharing, leverage resources, and optimize results. Activities will include technical coordination, technology transfer and upgrades, and training to improve the nuclear safety culture and infrastructure in emerging countries. Projects will also support safety and non-proliferation efforts to inventory and control radioactive sources and to provide information and procedures for their safe and responsible use. Operational procedures and mechanisms, such as those enabling clearance and access of only authorized personnel to critical nuclear systems, are examples of systems that ensure safety and reduce proliferation concerns.

The program will cooperate on international emergency management activities to prepare for and respond to possible foreign nuclear events. Specific emergency response programs, plans and systems are developed and implemented to improve the capability of foreign governments, international organizations and U.S. embassies to handle nuclear and radiological emergency situations. Assistance is provided for the development of emergency policy and planning documents; the development of emergency operations facilities, systems and

procedures; and the development and use of emergency management training exercises. The program will support NNSA interests and policy in international fora. Cooperative exercises to respond to an accident involving radioactive sources are also carried out. This program effort was transferred to the Office of International Nuclear Safety and Cooperation,
NA-23, from the International Materials Protection and Cooperation program, NA-25.

These activities are in support of the amended Atomic Energy Act of 1954 and other legislation, Executive Order 12656, Federal Emergency Plans, and International Agreements. Activities include:

- Support the Department as a leader in international emergency management regimes, promoting the Department's emergency policy interests in international fora.
- Continue expansion of the Minatom Situation and Crisis Center, networking Russian facilities and assisting in the development of emergency procedures, plans, training, drills and exercises.
- Support and enhance international activities to ensure existence of effective early warning and notification systems.
- Liaison and interaction with international organizations and foreign governments to provide assistance in developing adequate emergency plans, procedures, training and response, and
- Technical assistance and advice to Ukraine in establishing an effective emergency program.

The International Nuclear Safety and Cooperation program is also coordinating with the Departments of State and Defense, and with the National Security Council to address safety concerns at three Russian plutonium production reactors until alternative heat and electricity generating capacity is made available and the reactors are shut down. The reactors have deficiencies in the areas of design, equipment, materials and training and are considered to be the three highest risk reactors in the world. They are planned to operate to provide heat and electricity for a large local population of about 250,000, until fossil-fueled plants to provide the heat and electricity required by the surrounding communities are built. High priority safety upgrades to these reactors are being expeditiously pursued to maximize their effect on safety. These efforts will support their earliest possible closure and not extend the lifetime of these reactors.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Soviet-Designed Reactor Safety (DOE)	16,401	12,400	4,000	-8,400	-67.7%
Soviet-Designed Reactor Safety (DOS/USAID)	46,500	0	0	0	0.0%
Nuclear Safety Analyses	0	0	3,200	3,200	100.0%
Corrective Measures and Technical Cooperation	0	0	3,100	3,100	1.0%
Plutonium Production Reactor Safety	0	5,200	0	-5,200	-100.0%
International Emergency Cooperation [b]	1,180	1,100	2,300	1,200	109.1%
Technical Support Activities	3,000	2,400	1,976	-424	-17.7%
Subtotal, Nuclear Safety and Cooperation	67,081	21,100	14,576	-6,524	-30.9%
Less use of DOS/USAID Funding [a]	-46,500	0	0	0	0.0%
Less use of Prior Year Balances	-15	0	0	0	0.0%
Total, Nuclear Safety and Cooperation	20,566	21,100	14,576	-6,524	-30.9%

[a] Reflects appropriation transfers from the Department of State/ U.S. Agency for International Development for Soviet-Designed Reactor Safety. DOS/USAID amounts for FY 2001 includes funding received for Ukraine, Armenia, and Kazakhstan ($46.5 million). FY 2002 and FY 2003 DOS/USAID funds of $36 million are tentatively planned.

[b] Reflects comparability adjustment to reflect the transfer of International Emergency Cooperation activity from the International Nuclear Materials Protection and Cooperation program ($1,100K in FY02; $1,180K in FY 01).

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Soviet-Designed Reactor Safety

Conduct projects to improve reactor safety in Russia, including: complete international review of the Russian safety assessment for the Kursk reactor, conduct analysis for improving emergency procedures, validate U.S. computer codes for use in analyzing Russian reactors, develop a reactor component reliability database, and provide simulator training and engineering support. Provide technical support for the Kazakhstan BN-350 reactor closure. Provide U.S. expert participation in Lithuania's nuclear safety commission and complete the Ignalina unit 2 in-depth safety assessment. The U.S. International Nuclear Safety Center and its Russian counterpart enhance nuclear safety through shared information transmitted via internet links to other safety centers. This includes materials data for safety analyses, results of safety assessments, and generic safety issues such as development of accident management strategies for RBMK and VVER reactors. Complete full-scope simulators Zaporizhzhya unit 1 and Rivne unit 2 in Ukraine.

A Congressional earmark of $1.5 million FY02 has been used for developing a cooperative effort between the U.S. and Russia (and endorsed by IAEA) to address intergranular stress corrosion cracking problems in reactor piping. In FY03, the technology will be transferred to two additional Russian plants. *The FY03 decrease of $8,400,000 reflects completion of the program with FY 03 being the last year of funding.*

Soviet-Designed Reactor Safety (DOE)	16,386	12,400	4,000
Soviet-Designed Reactor Safety (DOS/USAID transfers)	46,500	0	0
Subtotal, Soviet-Designed Reactor Safety	**62,886**	**12,400**	**4,000**

Nuclear Safety Analyses

Identify, evaluate, and prioritize safety deficiencies and develop specific corrective measures to address the nuclear safety threat. Use industry accepted risk-based tools to assess and prioritize the safety of nuclear facilities and nuclear programs in countries of concern. Perform walk-downs, cost/benefit analyses, and in-depth safety and operational assessments. Existing analyses will be obtained and used, and additional analyses will be undertaken as needed.

Build and maintain a database of facilities and countries and their detailed safety-related information. These facilities include nuclear power plants, research reactors, and non-reactor nuclear facilities. Prepare needs assessment for technical cooperation and technology transfer of nuclear safety methods for selected countries, based on safety concerns and national security and foreign policy considerations. Support G7 Nuclear Safety Working Group activities regarding licensing decisions for continued operation of reactors in countries of concern.

	(dollars in thousands)		
	FY 2001	FY 2002	FY 2003
Subtotal, Nuclear Safety Analyses	**0**	**0**	**3,200**

Corrective Measures and Technical Cooperation

Resolve identified nuclear safety risks or vulnerabilities under a collaborative approach. Coordinate with appropriate international organizations, such as IAEA, and other countries to maximize information sharing and to optimize results. Activities include technical coordination, technology transfer and upgrades, and training to improve nuclear safety culture and infrastructure in emerging countries. Operational procedures and mechanisms, such as those enabling clearance and access of only authorized personnel to critical nuclear systems, are examples of systems that ensure safety and reduce proliferation concerns.

Perform safety upgrades at one or two highest-risk, research reactors to address safety and national security concerns; encourage and provide assistance for the shutdown and decommissioning of these facilities where possible. Research reactors pose a safety threat because they are not as closely regulated as nuclear power plants, are often located in high population centers, do not have containment buildings, and are vulnerable to terrorism. Of the 538 active research reactors in 65 countries, 345 are in 58 countries and use highly enriched uranium (HEU), a weapons usable material which poses proliferation concerns. About 80 reactors are in countries open to safety cooperation or joint efforts to decommission these facilities. An incident or accident could be devastating. If attacked with a conventional explosive, some could have a radiological release equivalent to Chornobyl. Project selection criteria includes: age of facility, deferral of return to operation, lack of safety assessments and quality assurance programs, lack of financial support for safety measures, poor mission definition, and equipment obsolescence.

Other efforts will demonstrate safety upgrades at a nuclear power plant to guard against sabotage vulnerabilities. Transfer nuclear safety methods and training programs to nuclear experts and utility regulators in developing nuclear countries, such as China and Vietnam. For instance, Vietnam is developing nuclear power to have its first reactor on line by 2020. The Vietnam Atomic Energy Commission would like to negotiate a Peaceful Uses of Atomic Energy agreement with the U.S. and has specifically requested cooperation to help with human resource development in the nuclear field. Specific areas of interest are nuclear safety and radiation protection, nuclear regulations, nuclear reactor technology, nuclear power, radioactive waste management, environmental impact assessment of nuclear facilities, and the application of nuclear techniques to health care, agriculture, industry and the environment. Cooperation could include exchanges of information and experts, seminars and workshops, training courses, and post-graduate education. These nuclear safety and cooperation efforts could lead to further NNSA collaboration on nonproliferation concerns, as was the case with the Kazakhstan BN-350 plutonium production reactor.

Subtotal, Corrective Measures and Technical Cooperation	**0**	**0**	**3,100**

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Plutonium Production Reactor Safety

Russia still operates three plutonium production reactors that were designed in the 1950s, built in the 1960s, and began operation in 1964 or 1965. The cessation of plutonium production from these reactors is a national security and nonproliferation goal. The current approach under consideration to complete the program would be to supply the heat and electricity needs of the surrounding communities from fossil-fuel power plants. The reactors will continue to operate to provide heat and electricity for local populations until the fossil fuel plants can be brought on-line. Recognizing that these reactors have safety deficiencies in the areas of design, equipment, materials, and training, and are considered to be the three highest risk reactors in the world; an effort to jointly address appropriate and urgent safety upgrades to these reactors, without extending the operating life of these reactors, is being concurrently pursued.

FY 2002 efforts include walkdowns evaluations at all three plants begin the development of improved accident management procedures and implementation of corrective measures for identified deficiencies. An example of likely corrective measures include leak detection and other safety monitoring equipment. FY 2003 efforts will be funded from an alternate source, as they will be combined with Department of Defense transferred efforts, previously funded under the Cooperative Threat Reduction program.

Subtotal, Plutonium Production Reactor Safety	**0**	**5,200**	**0**

International Emergency Cooperation

Conduct information sharing and coordination with other countries, but predominately with Japan, Sweden, Norway, Russia, and Ukraine. Continue liaison with and participation in international organizations (IAEA, Nuclear Energy Agency, EU, NATO, Arctic Council, and the U.N.), exhibiting leadership, under assistance and cooperation agreements to provide effective early warning and notification, and consistent emergency plans and procedures. Research, document, and harmonize differences between worldwide plume modeling and dispersion programs developed by the Atmospheric Release Advisory Capability, Japan's WSPEEDI, EU's RODOS, and Russia's ROSHYDROMET. Integrate the Atmospheric Release Advisory Capability (ARAC) plume modeling and graphic information system into other systems (Japan's WSPEEDI, the European Union's RODOS) for a worldwide capability for nuclear/radiological incidents.

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Support emergency response cooperative activities between U.S. and Russia (EMERCOM, Minatom, Ministry of Health) protecting the public and the environment from the consequences of nuclear/radiological incidents in Russia. Assist Russia's Minatom in the development of emergency management procedures to enhance its Situation and Crisis Center network. Provide emergency assistance in Ukraine enhancing assurance of effective emergency programs. Conduct emergency table top drills involving nuclear power plant workers and local and national government counterparts in Ukraine and Russia. Develop and conduct three training courses for nuclear power plant emergency staff in Ukraine. *The FY03 increase of $1,200,000 provides for communication networking of Crisis Centers in Russia and Ukraine; enhanced emergency program assistance to include procedure development, training, and exercises, and to provide effective early warning and notification. This program was funded in FY 2001 and FY 2002 by the International Material Protection and Cooperation, NA-25, program.*

Subtotal, International Emergency Cooperation	**1,180**	**1,100**	**2,300**

Technical Support Activities

Provide resources for general laboratory technical support, quality assurance, sub-contract administration, technical information development, and communications products and services. Close-out of completed projects, initiate new projects, streamlined contractual management, and supporting strategic planning requirements. *Reduction is consistent with net decrease in overall activities.*

Subtotal, Technical Support Activities.	**3,000**	**2,400**	**1,976**
Subtotal, Nuclear Safety and Cooperation	67,066	21,100	14,576
Less DOS/USAID appropriation transfers for Soviet-Designed Reactor Safety	-46,500	0	0
Total, Nuclear Safety and Cooperation	**20,566**	**21,100**	**14,576**

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 03 vs. FY 02 ($000)
Soviet-Designed Reactor Safety	
# Decrease reflects ramp down of this program in FY 2003 for successful completion and close out. No funding is planned for FY 2004. FY 2003 does not support any new efforts, rather supports orderly completion requirements.	-8,400
Nuclear Safety Analyses	
# Increase supports new activities to identify and prioritize safety deficiencies and to develop specific corrective measures to address the nuclear safety threats. Efforts pursue a risked-based approach for countries of nuclear safety and nonproliferation concern. Develop a database of nuclear facilities by countries of concern to aid in the analyses, using existing data where possible. Supplement that data as necessary.	+3,200
Corrective Measures and Technical Cooperation	
# Increase provides for collaborative corrective actions for identified nuclear safety risks or vulnerabilities. Activities include technical coordination, technology transfer and upgrades, and training to improve nuclear safety culture and infrastructure in emerging countries. Safety and nonproliferation concerns at HEU-fueled research reactors are known issues. Collaborative efforts at engage emerging nuclear countries under a peaceful, collaborative approach are also planned which complement other NNSA objectives.	+3,100
Plutonium Production Reactor Safety	
# FY 2003 efforts will be funded from an alternate source, as they will be combined with Department of Defense transferred efforts, previously funded under the Cooperative Threat Reduction program. Complete improved accident management procedures and initial corrective measures identified in FY02 "walkdown" safety analyses. An example of likely corrective measures include leak detection and other safety monitoring equipment.	-5,200
International Emergency Cooperation	
# Increase reflects restoration to historical levels and assists Russia's Minatom in the development of emergency management procedures for the situation and crisis center network; conducts emergency table top drills involving nuclear power plant workers, and local and national government counterparts in Ukraine and Russia; and develops and conducts three training courses for nuclear power plant emergency staff in Ukraine.	+1,200

Technical Support Activities

C Decrease reflects reduced technical and contracting support needed to establish new project, and contract close-out and reporting requirements associated with the completion of the Soviet-design Reactor Safety program.	-424
Total Funding Changes, Nuclear Safety and Cooperation	-6,524

Elimination of Weapons-Grade Plutonium Production

Mission Supporting Goals and Objectives

In December 2001, the National Security Council facilitated interagency agreement to transfer management and funding for the Elimination of Weapons-Grade Plutonium Production Program from the Department of Defense (DOD) to the Department of Energy's International Nuclear Safety and Cooperation Program.

The Elimination of Weapons-Grade Plutonium Production Program is a cooperative effort with the Russian Federation to reduce the threat from weapons of mass destruction by stopping plutonium production at its source. There are three plutonium production reactors still in operation in Russia, two located at Seversk and one at Zheleznogorsk. The three reactors have approximately 15 years of remaining lifetime and as a group could generate an additional 25 metric tons of weapons-grade plutonium for the Russian stockpile. These reactors, although originally designed to produce weapons-grade plutonium, also provide heat and electricity required by the surrounding communities. Early DOD program efforts attempted to redesign the reactor core so that weapons-grade plutonium would no longer be a by-product, while permitting continued reactor operation to supply heat and electricity. This initial concept ran into technical difficulties and other alternatives were evaluated.

The current approach is to complete the program by providing alternate fossil-fueled energy plants to supply heat and electricity to the surrounding communities.

The Seversk plutonium ADE-4 and ADE-5 production reactors will be shut down following the provision of U.S. assistance to commission heat and electric capacity of up to 1,560 gigacalories per hour of steam generation and 230 megawatts of electricity generation. Major activities include:

- Refurbishing or replacing 12 existing coal-fired boilers,
- Providing one new 120 gigacalorie-per-hour high pressure coal-fired boiler,
- Replacing three turbine generators,
- Completing construction of the fuel supply system, and
- Refurbishing the industrial heating unit and ancillary systems.

The Zheleznogorsk ADE-2 plutonium production reactor will be shut down following the provision of U.S. assistance to commission heat and electric capacity of up to 478 gigacalories per hour of steam generation and 117 megawatts of electricity generation by building a new fossil plant consisting of:

- One co-generation boiler,
- One extraction/condensing steam turbine,
- Three heating only boilers,
- The fuel handling system, an ash removal system, environmental controls, and a hot water pipeline to connect the new plant with the district heating system.

With this approach, the three weapons-grade plutonium production reactors will continue to operate for up to six more years. The reactors have deficiencies in the areas of design, equipment, materials and training and are

considered to be the highest risk reactors in the world. High priority safety upgrades to these reactors are being expeditiously pursued to maximize their effect on safety.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Seversk Site Activities	0	0	23,600	23,600	100.0%
Zheleznogorsk Site Activities	0	0	25,739	25,739	100.0%
Total, Elimination of Weapons-Grade Plutonium Production	0	0	49,339	49,339	100.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Seversk Site Activities

FY 2001
Under the DOE work-for-others program authority, DOE supported the DOD Elimination of Weapons-Grade Plutonium Production Program by preparing a core conversion alternatives study.

FY 2002
In December 2001, the program was transferred to DOE's International Nuclear Safety and Cooperation Program. FY 2002 reflects a transition year satisfying FY 2001 Congressional reporting requirements regarding the transition of the program scope from the original re-design of the Highly Enriched Uranium (HEU) fueled Plutonium Production Reactors (PPRs) to no longer produce weapons-grade (or non-reactor grade) plutonium; to instead, a program of shutting down the PPRs after the provision of U.S. assistance to provide alternate fossil-fueled generating capacity for the requisite heat and electricity for the surrounding communities. In addition, management of the program will be transitioned from DOD to DOE. Unobligated balances at DOD will be transferred to DOE after appropriate Congressional coordination. Design work for the high-pressure boiler and two of the three turbine generators will begin.

FY 2003
Procure equipment for Boiler No. 21, and begin its construction and other ancillary equipment installations. Complete the design of Turbine/Generator No.13 (115 MW). The majority of equipment and material procurements for Turbine No.13 will be initiated. The dismantling of the existing turbine at station No.13 will also be initiated. Initiate construction and installation activities in support of Turbine No.13. The design and procurement of the new coal handling facility will be initiated, begin related work supporting construction. The re-tubing and overhaul of four existing boilers will be initiated during the first year. Re-tubing and overhaul takes approximately 24-26 months and the start of work on the first four boilers will be staggered over the course of the first year. A new cafeteria required to support the large increase in workforce will be constructed. A fuel and lubricant storage depot will also be constructed. Complete design and begin procurement, construction, and equipment installation for Turbine/Generator No.1 (60 MW). The dismantling of the existing Turbine/Generator at station No.1 will be completed. The design and procurement of auxiliary systems and equipment (such as turbine cooling water pumps) will be initiated and completed.

The $23,600,000 increase in FY03 supports the first full year of an accelerated five-year program to provide replacement heat and electric capacity of up to 1,560 gigacalories per hour of steam generation, and 230 megawatts of electricity generation.

Subtotal, Seversk Site Activities	**0**	**0**	**23,600**

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Zheleznogorsk Site Activities

FY 2001
Under the DOE work-for-others program authority, DOE supported the DOD Elimination of Weapons-Grade Plutonium Production Program by preparing a core conversion alternatives study.

FY 2002
In December 2001, the program was transferred to DOE's International Nuclear Safety and Cooperation Program. FY 2002 reflects a transition year satisfying FY 2001 Congressional reporting requirements regarding the transition of the program scope from the original re-design of the Highly Enriched Uranium (HEU) fueled Plutonium Production Reactors (PPRs) to no longer produce weapons-grade (or non-reactor grade) plutonium; to instead, a program of shutting down the PPRs after the provision of U.S. assistance to provide alternate fossil-fueled generating capacity for the requisite heat and electricity for the surrounding communities. In addition, management of the program will be transitioned from DOD to DOE. Unobligated balances at DOD will be transferred to DOE after appropriate Congressional coordination. Begin the detailed design of the Zheleznogorsk thermal heat and electric plant.

FY 2003
Complete the detailed design of the Zheleznogorsk thermal heat and electric plant will be and obtain Russian regulatory approval. Access roads to the site will be constructed. The site will be cleared of trees and stumps and temporary facilities for the construction workforce and construction yard will be completed. A 2-circuit 6 kV 110V line will be completed to provide power to the construction site. The foundation for the start-up boiler facility and the main power building will be initiated. The start-up boiler will provide heat for the construction activities. Construction activities supporting the installation of water and sewer lines will be initiated. Construction of coal storage and supply facilities will be initiated. Construction of on-site roadways and rail lines will be initiated.

The $25,739,000 increase in FY03 supports the first year of an accelerated five-year program to provide a new steam and electric generating plant with a capacity of up to 478 gigacalories per hour of steam generation and 117 megawatts of electricity.

Subtotal, Zheleznogorsk Site Activities	**0**	**0**	**25,739**
Total, Elimination of Weapons-Grade Plutonium Production	**0**	**0**	**49,339**

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 03 vs. FY 02 ($000)
Seversk Site Activities	
C Increase supports the refurbishment, over five-years, of an existing fossil fuel generating plant to supply the heat and electric capacity of up to 1,560 gigacalories per hour of steam generation and 230 megawatts of electricity. Major FY03 efforts include the design completion, initial procurements, and initial construction of a high-pressure coal-fired boiler, of two turbine generators, of the new coal handling facility, and the initial efforts for refurbishing (re-tubing and overhaul) of four existing boilers. Dismantling of some existing systems will occur..	+23,600
Zheleznogorsk Site Activities	
C Increase supports funding requirements for the design completion, development, licensing, site preparation and initial construction activities for a new steam and electric generating plant with a capacity of up to 478 gigacalories per hour of steam generation and 117 megawatts of electricity.	+25,739
Total Funding Changes, Elimination of Weapons-Grade Plutonium Production Program	+49,339

Fissile Materials Disposition

Program Mission

The Office of Fissile Materials Disposition (OFMD) is responsible for disposing of inventories of U.S. surplus weapons-usable plutonium and highly enriched uranium (HEU), as well as providing technical support for, and ultimately implementation of, efforts to obtain the reciprocal disposition of Russian surplus weapon-grade plutonium. The potential threat or diversion of surplus plutonium by terrorists or rogue nations has been called a "clear and present danger" by the National Academy of Sciences (NAS) and "the most urgent unmet national security threat to the United States" in the Baker-Cutler Report on DOE's nonproliferation programs with Russia.

The OFMD program helps to prevent the threat of theft or diversion by terrorists or rogue nations of surplus plutonium in Russia. At the same time, disposing of this surplus fissile materials in the U.S. reduces long-term storage costs, helps meet compliance agreements associated with the clean up and closure of former DOE nuclear weapons complex sites, and honors commitments with the state of South Carolina for removal of the surplus materials brought to the Savannah River Site (SRS) for disposition.

The program objectives include:

- Eliminate U.S. surplus plutonium in approximately 20 years by irradiating mixed oxide (MOX) fuel.
- Eliminate U.S. surplus HEU in approximately 20 years primarily by down-blending the material to low-enriched uranium (LEU) for peaceful use as fuel for commercial reactors.
- Implement the U.S.-Russia Plutonium Management and Disposition Agreement for surplus weapon-grade plutonium disposition in the U.S. in rough parallel with plutonium disposition in Russia.

Program Strategic Performance Goal

NS2-3: Protect or eliminate weapons and weapons-usable nuclear material or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

Performance Indicators

U.S. Surplus Fissile Materials Disposition

The performance measures and significant accomplishments of each OFMD element represent part of the overall program's mission.

U.S. Plutonium Disposition

Reactor-Based Technologies/MOX Fuel Fabrication Facility (MOX FFF)

- As part of Fuel Qualification activities, continue the Lead Test Assembly (LTA) work, including initiation of fuel fabrication.
- Continue Fuel Irradiation Services and Fuel Transportation and Packaging activities, including submitting all certification documents to the Nuclear Regulatory Commission (NRC).
- Submit revised licensing documents and supporting information to assure timely NRC approval for the Construction Authorization Request (CAR) for the MOX FFF.
- Begin modifications to the commercial nuclear reactors.
- Complete MOX FFF Title II (detailed) design.
- Begin site preparation for the MOX FFF.

Pit Disassembly and Conversion Facility (PDCF)

- Continue limited upgrades of the Advanced Recovery and Integrated Extraction (ARIES) demonstration system (HEU and Special Recovery Line (SRL) only) and limited demonstration of the ARIES technology.
- Complete disassembly of every pit type destined for the PDCF.
- Complete limited laboratory and host-site design support for the PDCF.
- Continue development of HEU decontamination, material characterization, and SRL activities.
- Continue Title II (detailed) design for the PDCF.

Immobilization and Associated Processing Facility (Plutonium Immobilization Plant (PIP)

- Complete closeout activities.

U.S. Uranium Disposition

Highly Enriched Uranium

- Ship surplus HEU (11 MT (22% of 50 MT) from the Y-12 Plant (Oak Ridge Reservation) to the United States Enrichment Corporation (USEC) for blend down to LEU.
- Complete capital improvements at SRS for off-specification HEU blend-down, begin blend-down activities at SRS, and begin deliveries of LEU and HEU from SRS and Y-12 to TVA's contractor.

- < Continue efforts to dispose of additional lots of surplus HEU through down-blending and commercial or research reactor use.

Supporting Activities

Surplus Plutonium Storage

- < Continue the design of and certification process for the new surplus pit shipping container.

National Environmental Policy Act (NEPA)

- **<** Complete the supplemental environmental analyses for the revised US. plutonium disposition strategy and issue amended Records of Decision.
- < Complete the review of the NRC Environmental Impact Statement (EIS) for the MOX FFF.

Common Technologies

- **<** Continue negotiations with Russia on a bilateral monitoring and inspection regime.
- < Conduct R&D for monitoring and inspection of Russian plutonium disposition.

Russian Surplus Fissile Materials Disposition [a]

Russian Plutonium Disposition

- **< Plutonium Conversion**
  - S Complete the design of the plutonium conversion demonstration facility.
  - **S** Continue ordering equipment of the plutonium conversion demonstration facility.
  - **S** Begin construction of the plutonium conversion demonstration facility.
  - **S** Continue the preliminary design of an industrial-scale plutonium conversion facility.
- **< MOX Fuel Fabrication**
  - S Continue the design and modifications to existing facilities for the fabrication of VVER-1000 reactor MOX LTAs.

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[a]As a result of the Administration's review of nonproliferation program with Russia, the U.S. will work with Russia on ways to improve the Russian Program. These efforts are expected to lead to changes in the Russian Disposition Program.

- S Continue the design of modifications to existing facilities for fabrication for Vipac MOX fuel for the BN-600 reactor hybrid core.
- S Continue the design of an industrial-scale MOX fuel fabrication facility.

< **VVER-1000 Reactors**

- S Continue work on VVER-1000 reactor MOX fuel insertion studies.
- S Complete all remaining VVER-1000 reactor design modification packages.
- S Continue the safety analysis.

< **BN-600 Reactor**

- S Complete the Post Irradiation Examination (PIE) of previously irradiated BN-600 reactor MOX fuel.
- S Complete the BN-600 reactor MOX fuel insertion studies.
- S Complete all remaining BN-600 reactor design modification packages.
- S Complete the hybrid core design and the safety analysis.
- S Complete the BN-600 reactor life extension studies.

< **Licensing and Regulation/Other Program Support**

- S Continue limited development and review of new Russian licensing regulations.
- S Continue modifying the licensing Roadmaps as changes occur in the technical programs.
- S Continue limited licensing reviews as needed.

< **Packaging, Transportation, and Storage**

- S Develop and test new equipment as a follow-on to the FY 2002 evaluations and feasibility studies.
- S Complete initial feasibility studies to evaluate possible enhancements to existing equipment and infrastructure.

Support and Oversight in the U.S.

< Continue to review and provide oversight of Russian Plutonium Disposition program, including the following:

- S Review and provide oversight of the design and construction of the plutonium conversion demonstration facility.
- S Review the preliminary design of the industrial-scale plutonium conversion facility.
- S Complete the review of deliverables from Russian design activities for the MOX LTA facilities.

- **S** Provide oversight of the construction of the modifications for the VVER-1000 MOX LTA line.
- **S** Conduct a major review and provide oversight of the VVER-1000 reactor modification design packages.
- **S** Complete the review of the PIE of previously irradiated BN-600 reactor MOX fuel.
- **S** Review all remaining BN-600 reactor design modification packages.
- S Conduct a major review and provide oversight of the BN-600 reactor modification design packages.

Advanced Reactor Technology

- **<** Continue work in Russia using prior-year balances.
- < Continue testing and fabrication of test fuel at the Bench-Scale Fuel Fabrication Facility at Bochvar.
- < Begin preparations for gas turbine-modular helium reactor (GT-MHR) fuel irradiation testing.

Performance Standards

Blue: Meet all of the planned Annual Performance targets identified in next section, and exceed planned requirements on one or more key elements.

Green: Substantially meet all planned Annual Performance targets.

Yellow: In no more than one instance will the program fail to substantially meet all planned Annual Performance targets.

Red: In two or more instances the program fails to substantially meet all planned Annual Performance targets.

Annual Performance Results and Targets

FY 2001 Results	FY 2002 Targets	FY 2003 Targets
Mixed Oxide Fuel Fabrication Facility (MOX FFF)		
Initiated Title II (detailed) design of the MOX FFF. (NS4-6)	Complete 50% of Title II (detailed) design for the MOX FFF. (NS2-3)	Complete Title II (detailed) design for the MOX FFF. (NS2-3)
Pit Disassembly and Conversion Facility (PDCF)		
Continued the design of the PDCF at a reduced rate. (NS4-6)	Complete Title I (preliminary) design and begin Title II (detailed) design for the PDCF. (NS2-3)	
Immobilization and Associated Processing Facility (Plutonium Immobilization Plant)		
Suspended immobilization activities and document results. (NS4-6)	Initiate closeout of immobilization activities. (NS2-3)	Complete closeout of immobilization activities. (NS2-3)
Common Technologies		
Initiated a study to examine alternatives aimed at reducing costs in the U.S. and Russia and making greater use of existing facilities and equipment. (NS4-6)	Complete a study of plutonium disposition alternatives and begin implementation of the revised strategy. (NS2-3)	
Highly Enriched Uranium (HEU)		
Shipped 4.5 MT (9% of 50 MT) of surplus HEU to USEC. (NS4-6)	Ship 8 MT (16% of 50 MT) of surplus HEU to USEC. (NS2-3)	Ship 11 MT (22% of 50 MT) of surplus HEU to USEC. (NS2-3) Begin blend-down of off-spec HEU at SRS and begin deliveries of LEU (48 MT) and HEU (2 MT) to TVA's contractor. (NS2-3)
Russian Plutonium Disposition Activities		
Completed studies on conversion and MOX demonstration facilities. (NS4-6)	Initiate the design of industrial-scale plutonium conversion and MOX fabrication facilities in Russia. (NS4-6	Continue the design of industrial-scale plutonium conversion and MOX fabrication facilities in Russia. (NS2-3)

Significant Accomplishments and Program Shifts

FY 2001 accomplishments include the following:

U.S. Surplus Fissile Materials Disposition

U.S. Plutonium Disposition

Reactor-Based Technologies/MOX FFF

- **<** Submitted to the NRC the Environmental Report (ER) and the CAR for the MOX FFF.
- < Approved the Regulatory Management Plan
- < Completed early and intermediate irradiation testing of Advanced Test Reactor fuel.
- < Completed the commercial nuclear reactors modification plan.
- < Completed Title I (preliminary) design of the MOX FFF.
- < Began Title II (detailed) design of the MOX FFF.
- < Completed the initial phase of site geotechnical work for MOX FFF.

Pit Disassembly and Conversion Facility

- **<** Continued limited upgrades of the ARIES demonstration system and limited demonstration of the ARIES technology (including verifying the Direct Metal Oxidation (DMO) technology).
- < Continued disassembly of every pit type destined for the PDCF.
- < Began low-level development of HEU decontamination and material characterization.
- < Completed the majority of the geotechnical investigation of the PDCF site.
- < Continued Title I (preliminary) design of the PDCF.

Immobilization and Associated Processing Facility (Plutonium Immobilization Plant)

- **<** Initiated suspension of immobilization activities pending completion of the Administration's review of nonproliferation programs with Russia.

Repository Impacts

- **<** Completed Quality Assurance implementation at DOE national laboratories to support performance testing.
- < Issued the Technical Data Package to DOE's Office of Civilian Radioactive Waste (RW) to incorporate additional test data from ceramic form.

Plutonium Disposition Support Systems (PDSS)

- **<** Developed a Design-Only Conceptual Design Report (DO-CDR).
- < Suspended PDSS activities pending completion of the Administration's review of the U.S.-Russian nonproliferation programs.

U.S. Uranium Disposition

Highly Enriched Uranium

- **<** Shipped 4.5 MT of surplus HEU from the Y-12 Plant to USEC for blend down to LEU.
- < Signed the TVA/DOE Interagency Agreement for blend down of off-specification HEU, completed Title I (preliminary) design, and initiated construction of capital improvements at SRS.
- < Continued efforts to dispose of additional lots of surplus HEU through down-blending and commercial use.
- < Procured the first 100 ES-2100 shipping containers.

Supporting Activities

Surplus Plutonium Pit Storage

- **<** Completed the systems analysis for the selection of a new surplus pit shipping container.
- < Completed the preliminary design concept of the surplus pit shipping container.

NEPA

- **<** Reviewed NEPA documents (i.e., EISs) prepared by other DOE programs for their impact on the Fissile Materials Disposition Program.

Common Technologies

- **<** Under the U.S.-Russian 1998 Scientific and Technical Agreement, constituted a Monitoring and Inspection Working Group to develop and test plutonium disposition inspection techniques.
- < Negotiated with the Russians the goals and missions of the Monitoring and Inspection Working Group.
- < Initiated an evaluation to identify possible alternative plutonium disposition options.

Russian Surplus Fissile Materials Disposition

Russian Plutonium Disposition

Signed the U.S.-Russia Plutonium Management and Disposition Agreement in September 2000.

< Plutonium Conversion

S Supported the development of the selected process to convert plutonium metal to oxide.

S Determined the technology and site for plutonium conversion.

S Initiated the design of the plutonium conversion demonstration facility.

< Immobilization

S Completed the technical and engineering feasibility studies for plutonium immobilization at Krasnoyarsk-26 Chemical and Mining Combine (K-26).

< MOX Fuel Fabrication

S Supported the research and development (R&D) to develop and fabricate MOX fuel for use in Russian VVER-1000 and BN-600 reactors.

S Developed a schedule for reactor activities to fabricate VVER-1000 and BN-600 reactor MOX fuel.

< VVER-1000 Reactors

S Designed equilibrium core (30 percent MOX) for the VVER-1000 reactor.

S Developed plans for VVER-1000 reactors MOX fuel insertion studies.

S Continued VVER-1000 reactor design modifications.

S Continued the work on the safety analysis.

< BN-600 Reactor

S Initiated PIE of previously irradiated BN-600 reactor MOX fuel.

S Developed plans for BN-600 reactor MOX fuel insertion studies.

S Continued the hybrid core design and the safety analysis.

S Continued the BN-600 reactor design modifications.

- **Licensing and Regulation/Other Program Support**

  - Executed Gosatomnadzor (GAN) task orders for regulatory document outlines, roadmapping, and Parallex licensing and began work on the regulatory and licensing process in GAN.

  - Continued to provide technical assistance for the Russian regulatory infrastructure.

Support and Oversight in the U.S.

- Participated in the Russian conversion technology and site selection for an industrial-scale plutonium conversion facility.

- Initiated the review of PIE of previously irradiated BN-600 reactor MOX fuel.

Advanced Reactor Technology

- Continued work in Russia using prior-year balances.

- Continued preliminary design of the GT-MHR.

- Defined the preliminary Russian licensing process for the GT-MHR.

- Initiated a Level 1 and Level 2 Roadmap effort defining the development, design, licensing, and construction activities required to develop a GT-MHR in Russia.

- Initiated the construction of a Bench-Scale Fuel Fabrication Facility at Bochvar.

- Initiated a detailed cost and schedule development effort for the GT-MHR.

Funding Profile

(dollars in thousands)

	FY 2001 Comparable Appropriation	FY 2002 Original Appropriation	FY 2002 Adjustments	FY 2002 Comparable Appropriation	FY 2003 Request
Fissile Materials Disposition					
U.S. Surplus Fissile Materials Disposition					
Operations and Maintenance	116,863	135,089	0	135,089	194,000
Construction	69,778	106,333	0	106,333	156,000
Total, U.S. Surplus Fissile Materials Disposition	186,641	241,422	0	241,422	350,000
Russian Surplus Fissile Materials Disposition					
Russian Fissile Materials Disposition					
Operations and Maintenance	29,660	56,000	0	56,000	97,000
Advanced Reactor Technology					
Operations and Maintenance	9,847	5,000	0	5,000	1,000
Total, Russian Surplus Fissile Materials Disposition	39,507	61,000	0	61,000	98,000
Subtotal, Fissile Materials Disposition	226,148	302,422	0	302,422	448,000
Less use of prior-year balances	-94[a]	-50,333[b]	0	-50,333[b]	-64,000[b]
Total, Fissile Materials Disposition	226,054	252,089	0	252,089	384,000

[a]FY 2001 General Reduction.

[b]Use of prior-year balances from the $200,000,000 appropriated in the FY 1999 Emergency Supplemental Appropriation for the Russian Plutonium Disposition program; use of prior year balances ($8,333,000) from Project 97-D-140 Consolidated Special Nuclear Materials storage ($5,340,000) and Project 01-D-142 Immobilization and Associated Processing Facility ($2,993,000).

Public Law Authorization and Other Agreements:

PDD-13, Nonproliferation and Export Control Policy — 9/93

PDD-41, Improving Nuclear Security in Russia — 10/95

Public Law 104-134, USEC Privatization Act — 4/96

Public Law 105-261, Licensing of Certain Mixed Oxide Fuel Fabrication and Irradiation Facilities — 10/99

Public Law 106-398, National Defense Authorization Act of FY 2002 — 12/01

U.S.-Russia Plutonium Management and Disposition Agreement - 9/00

Interagency Agreement between the DOE and the TVA for the Off-Specification Fuel Project—— 4/01

Funding by Site

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	31,850	40,485	33,060	-7,425	-18.3%
Pantex Plant	5,692	7,805	8,640	835	10.7%
Sandia National Laboratory	815	1,350	160	-1,190	-88.1%
Albuquerque Operations Office	80	1,960	——	-1,960	——
Total, Albuquerque Operations Office	38,437	51,600	41,860	-9,740	-18.9%
Chicago Operations Office					
Argonne National Laboratory (West)	919	75	——	-75	-100.0%
MOX Fuel Fabrication Facility Design and Construction (DCS)	25,943	65,693	93,000	27,307	41.6%
MOX Fuel Fabrication & Irradiation (DCS)	20,548	25,700	43,500	17,800	69.3%
Pit Disassembly & Conversion Facility (WGI)	12,249	7,000	33,000	26,000	371.4%
Total, Chicago Operations Office	59,659	98,468	169,500	71,032	72.1%
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	——	——	——	——	——
National Energy Technology Laboratory (NETL) (formerly FETC)	3,690	——	——	——	——
Nevada Operations Office					
Nevada Operations Office	299	——	——	——	——
Oakland Operations Office					
Lawrence Livermore National Laboratory	17,766	1,747	2,500	753	43.1%

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Atomic Energy of Canada, Ltd	665	3,750	1,000	-2,750	>999%
Oakland Operations Office	9,766	2,200	900	-1,300	-59.1%
Total, Oakland Operations Office	28,197	7,697	4,400	-3,297	-42.8%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	13,953	11,150	27,800	16,650	149.3%
Y-12 Plant	10,620	12,236	54,000	41,764	341.3%
Oak Ridge Operations Office	12	—	—	—	—
Total, Oak Ridge Operations Office	24,585	23,386	81,800	58,414	249.8%
Richland Operations Office					
Pacific Northwest National Laboratory	2,658	2,534	8,000	5,466	215.7%
Russian Federation	12,851	42,000	64,000	22,000	52.4%
Savannah River Operations Office					
Savannah River Site	48,451	59,729	68,000	8,271	13.8%
Savannah River Operations Office	3,131	5,300	—	-5,300	-100.0%
Total, Savannah River Operations Office	51,582	65,029	68,000	2,971	4.6%
Washington Headquarters	3,141	7,768	5,940	-1,828	-23.5%
All Other Sites	1,049	3,940	4,500	560	14.2%
Subtotal, Fissile Materials Disposition	226,148	302,422	448,000	145,578	48.1%
Use of prior-year balances	-94	-50,333	-64,000	-13,667	-27.2%
Total, Fissile Materials Disposition	226,054	252,089	384,000	131,911	52.3%

Site Description

Chicago Operations Office

The Chicago Operations Office (CHO) provides project and contract management support for the MOX fuel program and MOX FFF project and contract management support for the PDCF design contract. It may also prepare the solicitation for an Integrating Contractor for the Russian plutonium disposition effort.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) is a multi-program laboratory located in Los Alamos, New Mexico. It is the lead laboratory for the development of U.S. weapons pit disassembly and conversion technology. The ARIES demonstration system, located at LANL, serves as the prototype demonstration project. The lab also provides technical services, independent design review, and independent assessment of the safety basis for the MOX FFF. LANL is also the lead laboratory for the design of a plutonium conversion line in Russia.

Oak Ridge National Laboratory

Oak Ridge National Laboratory (ORNL) is a multi-program laboratory in Oak Ridge, Tennessee. It is the lead laboratory for R&D of irradiation of MOX fuel in domestic, commercial reactors. The lab analyzes MOX fuel, advises on reactor licensing, and supervises fuel qualification R&D. ORNL is the lead laboratory for the Parallex project and also provides physics analysis of reactor types for disposition of Russian plutonium.

Pantex Plant

The Pantex Plant (Amarillo, Texas) stores surplus pits pending shipment to LANL and LLNL to support the PDCF technology demonstration. The Pantex Plant also packages and stores surplus pits for future shipment (estimated to begin around FY 2006) to the SRS for conversion in the PDCF.

Sandia National Laboratory

Sandia National Laboratory(SNL) (Albuquerque, NM) provides robotic and automation support for pit disassembly and conversion and inspection and monitoring activities.

Savannah River Site

Savannah River Site (SRS) (Aiken, South Carolina) provides design authority for PDCF and site coordination services for MOX FFF and PDCF. SRS also supports design review of MOX FFF and integration of the two plutonium disposition facilities with other site support services (actual design of facilities is contracted to private sector firms). In addition, SRS provides down-blending services for off-specification HEU.

Y-12 Plant, Oak Ridge Reservation

The Oak Ridge Y-12 Plant serves as the lead for all surplus HEU disposition activities through the HEU Disposition Program Office. The Y-12 Plant also provides storage for surplus HEU pending disposition via shipment to USEC/TVA.

All Other Sites

Argonne National Laboratory (ANL) (Argonne, IL) supports ORNL on BN-600 reactor core design modifications and safety analysis. The Oakland Operations Office contracts for development of gas reactor technology and Parallex testing of a Canadian Parallex heavy-water reactor (CANDU) option for potential future use for plutonium disposition in Russia. Pacific Northwest National Laboratory (PNNL) (Richland, WA) supports closeout for immobilization activities and work on licensing and regulation development cooperating with Gosatomnadzor of Russia.

U.S. Surplus Fissile Materials Disposition

Mission Supporting Goals and Objectives

U.S. policy calls for DOE to eliminate, where possible, accumulation of stockpiles of surplus plutonium and HEU and to ensure that, where these materials already exist, they are subject to the highest standards of safety, security, and international accountability. After reviewing the fissile materials required to support the nuclear weapons program and other national security needs, 38 MT of weapon-grade plutonium and approximately 174 MT of HEU have been declared surplus.

U.S. Plutonium Disposition

OFMD is responsible for disposing of inventories of U.S. surplus weapons-usable plutonium. OFMD was previously pursuing a dual-track strategy that called for fabricating the surplus plutonium into mixed oxide (MOX) fuel for irradiation in existing, commercial nuclear reactors and converting the plutonium not suitable for MOX into a ceramic and surrounding it with vitrified radioactive high-level waste. This approach involved the construction and operation of three key facilities at DOE's Savannah River Site (SRS) in Aiken, South Carolina. To further reduce the danger, the United States and Russia signed a Plutonium Management and Disposition Agreement (PMDA) in September 2000, which commits the countries to dispose of 68 metric tons of surplus weapon-grade plutonium – 34 metric tons in each country.

In September 2000 the U.S. and Russia signed a Plutonium Management and Disposition Agreement (PMDA). This Agreement commits each country to dispose of surplus weapon-grade plutonium in rough parallel. Under the terms of the PMDA, each country will:

- Dispose of 34 metric tons of weapon-grade plutonium, either by irradiating the plutonium as MOX fuel or by immobilizing the plutonium.
- Begin hot startup of industrial-scale disposition facilities no later than the third quarter of FY 2007.
- Dispose of at least two metric tons per year of weapon-grade plutonium, and seek to at least double the disposition rate in each country.
- Allow monitoring and inspection to confirm that terms and conditions of the Agreement are met.
- Allow for the disposition of additional surplus material, beyond the 34 MT, in accordance with the terms of this Agreement.

A recent Administration review of nonproliferation programs with Russia raised concerns about the cost and the ability to implement the U.S. and Russian programs. This review resulted in a revised approach for plutonium disposition in the U.S.

The revised approach is aimed at reducing the cost of the U.S. plutonium disposition program and making it more effective. Under the new approach, the U.S. will rely almost exclusively on the irradiation of MOX fuel to

dispose of surplus plutonium. Approximately 6 metric tons of plutonium previously destined for immobilization will now be processed in a MOX Fuel Fabrication Facility with an expanded capability to accommodate this material. A small amount of plutonium that is the most difficult and costly to convert to MOX fuel wold be disposed of as waste in DOE's Waste. Equally important, the revised strategy provides a pathway out of the Savannah River Site for plutonium shipped there for disposition, saves billions of dollars in storage costs, and facilitates the closure of DOE's former Nuclear Weapons Complex sites.

In accordance with the Administration's review, to lower the peak-year funding problem associated with simultaneously building two disposition facilities at SRS, NNSA is proceeding with the development of the MOX FFF, which is the key to plutonium disposition in Russia, while delaying work on the PDCF until closer to the time when it is needed.

Reactor-Based Technologies/MOX FFF

The MOX FFF will: 1) mix surplus weapon-grade plutonium oxide from the pit disassembly and conversion process with depleted uranium oxide, 2) form MOX fuel pellets, 3) fabricate MOX fuel assemblies (MOX fuel), and 4) ship completed fuel assemblies to existing domestic commercial nuclear reactors for irradiation. After the anticipated 12- to 13-year operational time span, the facility will be decontaminated and decommissioned.

The NRC will regulate the construction and operation of the facility. Duke Power Company will irradiate the MOX fuel assemblies in commercial reactor facilities in North Carolina and South Carolina. Revised operating licenses from the NRC are necessary in order for the Duke Power Company reactors to irradiate mixed oxide fuel.

A private consortium (Duke Engineering Services, Cogema, and Stone & Webster (DCS)) was selected in March 1999 to design, construct, and operate the MOX FFF and to provide irradiation services for fuel produced in that facility. The irradiation services include all activities needed to irradiate MOX fuel in selected NRC-licensed domestic reactors.

Fabrication and irradiation of Lead Test Assemblies (LTA) are required to verify the performance of the MOX fuel. The data from these LTAs will be used to predict the performance of production quantities of fuel in the domestic nuclear reactors and to support NRC licensing activities. In FY 2001 the program developed a draft integrated plan for potentially fabricating these LTAs in Europe (Eurofab), with a backup plan to produce the assemblies as the first fuel fabricated in the full-scale MOX FFF. Fabrication of LTAs in the facility, however, will cause delays of at least two years in achieving full-scale MOX production, relative to the Eurofab approach.

Since the PIP was eliminated in the Administration's revised plutonium disposition strategy, and since the MOX FFF and PDCF are being constructed sequentially, the MOX-related capital infrastructure improvements required at SRS (previously funded within the Plutonium Disposition Support System (PDSS) project) will be incorporated into the MOX project. These infrastructure improvements, which include utilities (e.g., water, sewer, waste treatment, electricity, and telecommunications) and temporary roads, will be configured to allow expansion for the PDCF.

Pit Disassembly and Conversion Facility (PDCF)

The PDCF will: 1) disassemble surplus weapons pits, 2) extract or separate the plutonium metal from other weapon parts, 3) convert the plutonium metal to an unclassified plutonium oxide powder (plutonium dioxide) suitable for feed material to the MOX FFF and inspection, and 4) package the resulting plutonium oxide for storage, pending disposition in the MOX FFF.

The PDCF will be operational for ten years and then decontaminated and decommissioned. A demonstration system (ARIES) is currently operating at LANL to demonstrate the technology and the capability to disassemble the various pit types in the surplus inventory. The facility will use the ARIES process — a dry pyrochemical-process — to convert plutonium metal to an oxide form.

U.S. Uranium Disposition

Highly Enriched Uranium

The United States declared over 174 metric tons (MT) of HEU surplus to defense needs. In July 1996 the Department issued a Record of Decision (ROD) which calls for reducing stockpiles of HEU. The ROD requires DOE to make the surplus HEU non-weapons-usable within 15 to 20 years, primarily by blending it down to LEU and recovering its economic value by using the resultant LEU as fuel for power or research reactors.

In December 1994, the Department signed a memorandum of agreement with USEC for the transfer and down-blending of surplus HEU for commercial reactor fuel. Approximately 13 MT of HEU were transferred to USEC in 1994 and subsequently down-blended at the Portsmouth Facility in Piketon, OH. Title to an additional 50 MT was transferred to USEC in April 1998. To date, approximately 15 MT have been transferred to USEC; the remainder will be transferred in phased deliveries through FY 2005.

The 174 MT declared surplus includes "off-specification" HEU (LEU fuel derived from HEU does not meet standard commercial fuel specs, but it is nonetheless useable in commercial reactors with special processing). On April 5, 2001, DOE and TVA signed an Interagency Agreement to implement a program to down-blend approximately 33 MT of DOE off-specification surplus HEU to LEU for use as fuel in TVA reactors. The agreement includes revenue sharing with TVA plus significant capital improvements at SRS, where at least 16 MT (out of the 33 MT) of the off-specification HEU will be processed through the SRS H-Canyon to remove impurities and then down-blended to LEU at SRS and delivered to the TVA as LEU solution. The resulting LEU solution will then be converted to nuclear fuel by vendors under contract to TVA. The remainder of the 33 MT (17 MT) will be delivered to TVA's vendor as HEU, which will be down-blended by the vendor and converted to fuel.

Lifecycle costs of the off-specification HEU Blend-down project requires approximately $350,000,000 to provide for infrastructure improvements at the SRS and operations at multiple sites. A portion of the $350,000,000 may be repaid by the end of the project from DOE/TVA-shared fuel savings (depending on future market prices for uranium). This project satisfies Defense Nuclear Facilities Safety Board (DNFSB) Recommendations 94-1 and 2000-1 stabilization/disposition objectives for a portion of the 33 MT. The project

also avoids the alternate disposition option of down-blending all off-specification HEU to LEU and disposing of it as waste at a cost of over $900,000,000. Planning for the disposition of additional quantities of surplus HEU is on-going.

Supporting Activities

Surplus Plutonium Storage

In accordance with Congressional direction, OFMD assumed funding responsibility in FY 2001 for storing surplus plutonium in Zone 4 at the Pantex Plant and at the Plutonium Facility (LANL) (approximately 1.5 MT). [a] At the Pantex Plant, operational costs associated with surplus plutonium storage include surveillance and maintenance operations and thermal monitoring. [b] Storage requirements at the Pantex Plant will continue until the material is moved to SRS for disposition.

Surplus pits at the Pantex Plant will be shipped to the PDCF (at SRS) where they will be converted to plutonium oxide suitable for fabrication into MOX fuel. Because DOE does not have a pit shipping container that can perform this function, OFMD initiated a five-year effort in FY 2000 to design, test, certify, and fabricate a new pit shipping container to transport surplus pits from the Pantex Plant to SRS.

Surplus HEU Storage

In FY 2001 operating costs associated with storing 85 MT of surplus HEU residing at the Y-12 Plant were transferred from DP to the OFMD program. Storage requirements will continue until the material is moved to the disposition (blending) site (begun in FY 2000 and estimated to end in FY 2020). Storage operations include planning, providing and maintaining storage facilities, limited repackaging of material as necessary for safety, and surveillance for surplus HEU materials and facilities.

NEPA

NEPA activities include preparing or reviewing Environmental Assessments (EA), EIS's, supplemental NEPA analyses for fissile material storage and disposition activities. In addition, NEPA efforts include preparing supplements and amended RODs.

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[a]Previously the Office of Defense Programs (DP) was responsible for funding this activity.

[b]In FY 2002 and 2003 the Office of Defense Programs (DP) will continue to repackage into sealed-insert (SI) storage containers the national security and surplus pits at the Pantex Plant to provide a more controlled storage environment.

Common Technologies

As specified in the U.S.-Russia Plutonium Management and Disposition Agreement, DOE will participate in government-to-government technical negotiations with Russia to develop a detailed monitoring and inspection regime, which will be implemented at plutonium disposition facilities in both countries. The regime will provide monitoring and inspection throughout the plutonium disposition process to confirm that the obligations set forth in the Agreement are being met and the resulting spent fuel and immobilized forms meet agreed criteria. Support will include development of guidance to U.S. design engineers on monitoring and inspection specifications which need to be included in the design of the three plutonium facilities. The Agreement requires **that these negotiations be concluded prior to** the construction of the Russian facilities. The Common Technologies program also conducts studies for the U.S. Surplus Fissile Materials program.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Operations and Maintenance					
U.S. Plutonium Disposition	86,152	81,000	94,400	13,400	16.5%
U.S. Uranium Disposition	14,177	26,000	75,000	49,000	188.5%
Supporting Activities	16,440	28,089	24,600	-3,489	-12.4%
Subtotal, Operations and Maintenance	116,769	135,089	194,000	58,911	43.6%
Construction	69,778	106,333	156,000	49,667	46.7%
Total, U.S. Surplus Fissile Materials Disposition	186,547	241,422	350,000	108,578	45.0%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

U.S. Plutonium Disposition

#	**Reactor-Based Technologies**	**36,498**	**52,000**	**62,400**

As part of Fuel Qualification activities, continue the implementation of the LTA work, including initiation of fuel fabrication. Continue Fuel Irradiation Services. Continue Fuel Transportation and Packaging activities, including submitting certification documents to the NRC. Develop information and responses to NRC questions to assure NRC approval for the CAR for the MOX FFF and begin modifications to the commercial nuclear reactors. *The increase is due to ramp-up of Fuel Qualification activities and commencement of modifications to the commercial nuclear reactors.*

#	**Pit Disassembly and Conversion**	**27,145**	**26,000**	**30,600**

Continue limited upgrades of the ARIES demonstration system and limited demonstration of the ARIES technology. Complete disassembly of every pit type destined for the PDCF and complete limited laboratory and host-site design support for the PDCF. Continue development of HEU decontamination, material characterization, and SRL activities. *The increase is due to development and testing of the SRL for processing of tritium-contaminated pits, upgrade and testing of the plutonium conversion furnace module, and increased host site review and support of PDCF Title II (detailed) design.*

#	**Immobilization and Associated Processing**	**20,483**	**3,000**	**1,400**

Complete closeout activities associated with the Plutonium Immobilization Plant.

#	**Repository Impacts**	**299**	**——**	**——**

No planned activities.

#	**Plutonium Disposition Support System (PDSS)**	**1,727**	**——**	**——**

In accordance with the Administrations revised plutonium disposition strategy, PDSS activities will be incorporated into the MOX FFF project.

Total, U.S. Plutonium Disposition	**86,152**	**81,000**	**94,400**

	(dollars in thousands)		
	FY 2001	**FY 2002**	**FY 2003**

U.S. Uranium Disposition

#	**Highly Enriched Uranium**	14,177	26,000	75,000

- < Off-Specification HEU Blend Down Project: Continue training personnel and other operational preparations at SRS. Begin the following activities: final processing, blend-down, and LEU loading operations at SRS for shipments to NFS; HEU alloy shipments from SRS to NFS; and HEU metal and alloy shipments from Y-12 to NFS.
- < Program Management, Inventory Management, Technical Support and Special Studies: Continue surplus HEU planning, project management, HEU disposition technical support and special studies, and inventory management.
- < ES-2100 Shipping Containers: Receive certification for HEU oxide contents and procure additional containers and/or container components suitable for HEU oxide contents.
- < USEC 50 MT Transfer Project: Continue shipping surplus HEU (11 MT (22% of 50 MT)) from the Y-12 Plant to USEC for blend down to commercially usable LEU.
- < Unallocated Material Planning, Packaging, Shipment, and Disposition: Complete preparations for packaging and shipping of Idaho National Engineering and Environmental Laboratory (INEEL) off-specification HEU (i.e., denitrator oxide) and begin preparations on other unallocated material projects.
- < *The increase is primarily due to workscope related to the off-specification HEU Blend Down Project, including TVA off-specification project integration activities, Y-12 HEU shipments, beginning of SRS down-blending and LEU and HEU shipment operations, laboratory analyses of product material, payments to TVA for Uranium/Aluminum (U/Al) ingot processing, and vendor waste returns. The increase is also due to additional unallocated HEU efforts, including preparations for packaging, shipment, and disposition.*

Total, U.S. Uranium Disposition	14,177	26,000	75,000

Supporting Activities

#	**Surplus Plutonium Storage**	7,042	12,000	11,200

Continue storing surplus plutonium at the Pantex Plant and LANL. Continue to package pits for shipment from the Pantex Plant to LANL for the ARIES demonstration system; the pits are needed as feed material to validate equipment for the PDCF. Continue the design of and certification process for the new surplus pit shipping container. *The decrease is due to completion in of the LANL vault upgrades.*

	(dollars in thousands)		
	FY 2001	FY 2002	FY 2003
# Surplus HEU Storage	6,006	6,000	6,000
Continue to store 85 MT of surplus HEU at the Y-12 Plant.			
# NEPA	1,552	1,500	2,500
Complete an environmental analysis for the revised US. plutonium disposition strategy; prepare follow-up EAs, supplemental analyses, and/or supplemental EIS for the FMD Program; continue to review NEPA documents (i.e., EISs) prepared by other DOE programs for their impact on the Fissile Materials Disposition Program, and conduct a review of the NRC EIS for the MOX FFF. *The increase is due to preparation of a supplemental Environmental Impact Statement (EIS) (or other NEPA documentation) to support changes to the U.S. plutonium disposition strategy resulting from efforts to reduce cost and make greater use of existing facilities.*			
# Common Technologies and Integration	1,840	8,589	4,900
< Conduct technical analyses to support negotiations with Russia on a bilateral monitoring and inspection regime and joint U.S.-Russian demonstrations to test options for monitoring and inspections.			
< *The decrease is primarily due to completing in FY 2002 the Alternative Plutonium Disposition Study.*			
Total, Supporting Activities	16,440	28,089	24,600
Subtotal, U.S. Surplus Fissile Materials Disposition	116,769	135,089	194,000
Construction	69,778	106,333	156,000
# See "Capital Operating Expenses and Construction Summary" for details. *The increase is due to procurement engineering and site preparation for the MOX FFF, increased Architectural-Engineer design activities needed for PDCF Title II (detailed) design, and ramp-up of HEU Blend Down Project capital improvements at SRS to meet the required completion in FY 2003.*			
Total, U.S. Surplus Fissile Materials Disposition	186,547	241,422	350,000

Russian Surplus Fissile Materials Disposition

Mission Supporting Goals and Objectives

As part of the U.S. government's nonproliferation strategy, the U.S. initiated a dialog with Russia to address the potential threat of diversion of Russian surplus weapon-grade plutonium. This resulted in the U.S. and Russia signing an Agreement for Scientific and Technical Cooperation in the Management of Plutonium That Has Been Withdrawn From Nuclear Military Programs. This Agreement, signed in July 1998, provides for the conduct of tests and demonstrations of proposed plutonium disposition technologies.

Russian Plutonium Disposition

To support the disposition of the excess Russian plutonium, the U.S. and Russia developed a plutonium disposition roadmap and a nominal schedule for the Russian plutonium disposition program. This roadmap includes technology development of plutonium conversion and nondestructive assay, and irradiation of MOX fuel in fast and thermal reactors. Key elements of this work include:

- Assisting Russia to design and build a demonstration facility for converting weapons-origin plutonium metal to an oxide form for use in MOX fuel and suitable for international inspection (pending an evaluation of the need for this facility).
- Developing a MOX fuel fabrication process that would be compatible with surplus weapon-grade plutonium, testing the resulting fuel, and qualifying it for use in VVER-1000 reactors and the BN-600 reactor.
- Supporting the design modification effort to convert Russia's BN-600 reactor — a fast-neutron reactor — into a net burner of plutonium.
- Working with Russian institutes and private industry to develop gas-turbine, modular helium reactor (GT-MHR) technology as an option to dispose of surplus Russian weapon-grade plutonium.
- Examining the technical feasibility of using the Canadian Parallex heavy-water reactors (CANDU) by burning a small quantity of MOX fuel made from surplus U.S. and Russian weapon-grade plutonium in a Canadian test reactor. Irradiating MOX fuel in Canadian nuclear reactors is one of several options being examined to expand Russia's capacity to disposition surplus weapon-grade plutonium.

In September 2000 the U.S. and Russia signed a Plutonium Management and Disposition Agreement (PMDA). This Agreement defines detailed strategies for implementing disposition activities in both the U.S. and Russia, and it specifies the technological approach and facilities to be constructed in each country. The PMDA calls for both parties to develop a detailed plan to at least double the rate of surplus weapon-grade plutonium disposition (from 2 MT to 4 MT per year) within one year after the PMDA enters into force.

The Agreement also calls for financial commitments for a substantial portion of the Russian Plutonium Disposition program from the U.S. and the international community. Congress appropriated $200,000,000 [a] in FY 1999 and an additional $70,000,000 in FY 2000 and 2001 for Russian plutonium disposition. The United Kingdom, France, and Japan have collectively pledged the equivalent of an additional $200,000,000. G-8 countries have provided political support, as well as some research and development funding, since 1996. The U.S. has been actively seeking to obtain the balance of the funds for the Russian disposition program from countries other than the U.S. and possibly non-governmental or commercial sources as well.

A recent Administration review of nonproliferation programs with Russia raised concerns about the cost and the ability to implement the U.S. and Russian programs. The U.S. will work with Russia on ways to improve the Russian Program. These efforts are expected to lead to changes in the Russian Disposition Program.

Support and Oversight in the U.S.

FY 2000 and 2001 funding primarily supported work begun under the 1998 Scientific and Technical Cooperation Agreement. FY 2001 activities included participating in the Russian plutonium conversion technology, site selection for an industrial-scale plutonium conversion facility, and initiating the review of the PIE of previously irradiated BN-600 reactor MOX fuel. Beginning in FY 2002, the program will focus on U.S. support to and oversight and management of the work performed in Russia as defined in the U.S.-Russia PMDA. FY 2003 efforts will continue to review and provide oversight of Russian Plutonium Disposition program.

Advanced Reactor Technology

The GT-MHR is being developed in Russia as a potential option for expanding the surplus weapon-grade plutonium disposition capacity of existing reactors in Russia. The joint U.S.-Russian developmental program is scheduled to complete preliminary design of the GT-MHR in FY 2002. Research, development and testing of GT-MHR fuel and nuclear reactor components will continue at various Russian organizations through CY 2006, to verify technical aspects of the design. The Ministry of Atomic Energy of the Russian Federation (MINATOM) has proposed constructing a prototype GT-MHR module at the Siberian Chemical Combine in Seversk, by 2010. If successful, the GT-MHR could supply replacement power for the existing plutonium production reactors at Tomsk and also provide district heating capability to the Seversk/Tomsk region. MINATOM plans to continue to match the funds that the U.S. provides to the Russian Federation for GT-MHR development, as it has in previous years. The U.S. will continue to solicit financial commitments from other nations to continue development of this technology in Russia.

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[a] FY 1999 Emergency Supplemental appropriated $200,000,000, of which $49,000,000 was used to offset prior-year balances in FY 2000.

Funding Schedule

(dollars in thousands)

	FY 2001	FY 2002	FY 2003	$ Change	% Change
Russian Fissile Materials Disposition					
Russian Plutonium Disposition	12,851	42,000	64,000	22,000	52.4%
Support and Oversight in the U.S.	16,809	14,000	33,000	19,000	135.7%
Total, Russian Fissile Materials Disposition	29,660	56,000	97,000	41,000	73.2%
Advanced Reactor Technology	9,847	5,000	1,000	-4,000	-80.0%
Subtotal, Russian Surplus Fissile Materials Disposition	39,507	61,000	98,000	37,000	60.7%
Less Use of Prior-Year Balances	——	-42,000	-64,000	-22,000	-52.4%
Total, Russian Surplus Fissile Materials Disposition	39,507	19,000	34,000	15,000	78.9%

Detailed Program Justification

(dollars in thousands)

FY 2001	FY 2002	FY 2003

Russian Fissile Materials Disposition

Russian Plutonium Disposition

As specified in the U.S.-Russia Plutonium Management and Disposition Agreement signed in September 2000, funding from new budget authority and the FY 1999 Emergency Supplemental Appropriation continue the work initiated in FY 2001 and 2002.

< Plutonium Conversion 3,126 12,000 15,000

Complete the design of the plutonium conversion demonstration facility, continue ordering equipment for and begin construction of the conversion demonstration facility, and begin the preliminary design of an industrial-scale plutonium conversion facility. *The increase is due to construction of the conversion demonstration facility and the design work on the industrial-scale conversion facility.*

< Immobilization . . . . . 1,500 —— ——

In FY 2002 completed the technical and engineering feasibility studies for plutonium immobilization at Mayak. All work was completed in FY 2002 using prior-year balances.

< MOX Fuel Fabrication 2,689 13,000 14,000

Continue the following: design and modifications to existing facilities for the fabrication of VVER-1000 reactor MOX LTAs, design of modifications to existing facilities for fabrication for Vipac MOX fuel for the BN-600 reactor hybrid core, and design of an industrial-scale MOX facility. *The increase is due to purchase of equipment and modification of facilities for the MOX fuel LTA line and also due to increased work on the preliminary design of the industrial-scale facility.*

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
< **VVER-1000 Reactors**	1,862	4,500	11,000

Continue work on VVER-1000 reactor MOX fuel insertion studies and the safety analysis. Complete all remaining VVER-1000 reactor design modification packages. *The increase is due to additional work in the VVER-1000 reactor design modification area.*

< **BN-600 Reactor**	2,500	6,000	13,000

Complete the following: the PIE of previously irradiated BN-600 reactor MOX fuel, the BN-600 reactor MOX fuel insertion studies, all remaining BN-600 reactor design modification packages, the hybrid core design and the safety analysis, and the BN-600 reactor life extension studies. *The increase is due to additional work in the BN-600 reactor design modification area.*

< **Licensing and Regulation/Other Program Support**	1,174	2,500	5,000

Continue the following: limited development and review of new Russian licensing regulations, modification of the licensing Roadmaps as changes occur in the technical programs, and limited licensing reviews as needed. *The increase is due to more work in the development of regulations and licensing reviews for th*e plutonium conversion demonstration and MOX LTA facilities.

< **Packaging, Transportation, and Storage**	——	4,000	6,000

This is a new effort beginning in FY 2002. Activities in FY 2003 include continuing work gun in FY 2002, including: developing and testing new equipment as a follow-on to the FY 2002 evaluations and feasibility studies and completing initial feasibility studies to evaluate possible enhancements to existing equipment and infrastructure. *The increase is due to equipment development and testing.*

Subtotal, Russian Plutonium Disposition	12,851	42,000	64,000
Less Use of Prior-Year Balances	——	-42,000	-64,000
Total, Russian Plutonium Disposition	12,851	——	——

(dollars in thousands)

	FY 2001	FY 2002	FY 2003
# **Support and Oversight in the U.S.**	16,809	14,000	33,000

Continue to review and provide oversight of Russian Plutonium Disposition program, including the following:

- < Review and provide oversight of the design and construction of the plutonium conversion demonstration facility.
- < Review the preliminary design of the industrial-scale plutonium conversion facility.
- < Complete the review of deliverables from Russian design activities for the MOX LTA facilities.
- < Provide oversight of the construction of the modifications for the VVER-1000 MOX LTA line.
- < Conduct a major review and provide oversight of the VVER-1000 reactor modification design packages.
- < Complete the review of the PIE of previously irradiated BN-600 reactor MOX fuel.
- < Review all remaining BN-600 reactor design modification packages.
- < Conduct a major review and provide oversight of the BN-600 reactor modification design packages.

The increase is due to accelerated design and construction activities for plutonium conversion, MOX fuel development, and VVER-1000/BN-600 reactor modification designs, which will require increased U.S. support to and oversight of the work performed in Russia. The increase is also due the decreased use of prior-year carryover balances.

Subtotal, Russian Fissile Materials Disposition	29,660	56,000	97,000
Less Use of Prior-Year Balances	——	-42,000	-64,000
Total, Russian Fissile Materials Disposition	29,660	14,000	33,000

# **Advanced Reactor Technology**	9,847	5,000	1,000

Continue work in Russia using prior-year balances and continue fabrication of test fuel at the Bench-Scale Fuel Fabrication Facility at Bochvar. Begin preparations for GT-MHR fuel irradiation testing at Dimitrovgrad. Continue reactor plant component testing.

Subtotal, Russian Surplus Fissile Materials Disposition	39,507	61,000	98,000
Less Use of Prior-Year Balances	——	-42,000	-64,000
Total, Russian Surplus Fissile Materials Disposition	39,507	19,000	34,000

Explanation of Funding Changes from FY 2002 to FY 2003

	FY 2003 vs. FY 2002 ($000)
U.S. Surplus Fissile Materials Disposition	
U.S. Plutonium Disposition	
# Reactor-Based Technologies	
The increase is due to significant ramp-up of Fuel Qualification activities, including LTAs and commencement of modifications to the commercial nuclear reactors.	10,400
# Pit Disassembly and Conversion	
The increase is due to development and testing of the Special Recovery Line (SRL) for processing of tritium-contaminated pits, upgrade and testing of the plutonium conversion furnace module, and increased host site review and support of PDCF Title II (detailed) design.	4,600
# Immobilization and Associated Processing	
The decrease is due to closeout of immobilization activities.	-1,600
Total, U.S. Plutonium Disposition	13,400
U.S. Uranium Disposition	
# Highly Enriched Uranium (HEU)	
The increase is primarily due to workscope related to the off-specification HEU Blend Down Project, including TVA off-specification project integration activities, additional Y-12 HEU shipments, beginning of SRS down-blending and LEU and HEU shipment operations, laboratory analyses of product material, payments to TVA for Uranium/Aluminum (U/Al) ingot processing, and vendor waste returns. The increase is also due to unallocated material efforts, including preparations for packaging, shipment, and disposition of unallocated materials.	49,000
Total, U.S. Uranium Disposition	49,000
Supporting Activities	
# Surplus Plutonium Storage	
The decrease is due to completion of the LANL vault upgrades.	-800

	FY 2003 vs. FY 2002 ($000)
# NEPA	
The increase is due to preparation of a supplemental Environmental Impact Statement (EIS) (or other NEPA documentation) to support changes to the U.S. plutonium disposition strategy resulting from efforts to reduce cost.	1,000
# Common Technologies and Integration	
The decrease is primarily due to completing in FY 2002 the Alternative Plutonium Disposition Study and the plutonium disposition transportation study.	-3,689
Total, Supporting Activities	-3,489
Subtotal, U.S. Surplus Fissile Materials Disposition	58,911
Construction	
The increase is due to Administration's revised strategy on plutonium disposition which requires increased processing capability and advances design of long-lead equipment for the MOX FFF. Increases are also due to increased Architectural-Engineer design activities needed for PDCF Title II (detailed) design, and ramp-up of HEU Blend Down Project capital improvements at SRS to meet the required completion in FY 2003.	49,667 [a]
Total, U.S. Surplus Fissile Materials Disposition	108,578
Russian Surplus Fissile Materials Disposition	
Russian Fissile Materials Disposition	
# Russian Plutonium Disposition	
< Plutonium Conversion	
The increase is due to construction of the conversion demonstration facility and the design work on the industrial-scale conversion facility.	3,000
< MOX Fuel Fabrication	
The increase is due to purchase of equipment and modification of facilities for the MOX fuel LTA line and also due to increased work on the preliminary design of the industrial-scale facility.	1,000

[a]The increase includes use of prior-year balances ($8,333,000) from Project 97-D-140 Consolidated Special Nuclear Materials storage ($5,340,000) and Project 01-D-142 Immobilization and Associated Processing Facility ($2,993,000).

	FY 2003 vs. FY 2002 ($000)
< **VVER-1000 Reactors**	
The increase is due to additional work in the VVER-1000 reactor design modification area.	6,500
< **BN-600 Reactor**	
The increase is due to additional work in the BN-600 reactor design modification area.	7,000
< **Licensing and Regulation/Other Program Support**	
The increase is due to more work in the development of regulations and licensing reviews for the plutonium conversion demonstration and MOX LTA facilities.	2,500
< **Packaging, Transportation, and Storage**	
The increase is due to equipment development and testing.	2,000
Total, Russian Plutonium Disposition	22,000
S **Support and Oversight in the U.S.**	
The increase is due to accelerated design and construction activities for plutonium conversion, MOX fuel development, and VVER-1000/BN-600 reactor modification designs, which will require increased U.S. support to and oversight of the work performed in Russia. The increase is also due the decreased use of prior-year carryover balances.	19,000
Subtotal, Russian Fissile Materials Disposition	41,000
Less Use of Prior-Year Balances	-22,000
Total, Russian Fissile Materials Disposition	19,000
S **Advanced Reactor Technology**	
The program will continue efforts in FY 2003 using prior-year balances.	-4,000
Total, Russian Surplus Fissile Materials Disposition	15,000
Total Funding Change, Fissile Materials Disposition	123,578

Capital Operating Expenses and Construction Summary

Construction Projects

(dollars in thousands)

	Total Estimated Cost (TEC) [a]	Prior Year Appropriations	FY 2001	FY 2002	FY 2003	Unappropriated Balance
99-D-141 Pit Disassembly & Conversion Facility	TBD	38,751	19,956	11,000	33,000	TBD
TBD01-D-142 Immobilization & Associated Processing Facility	TBD	——	2,993	——	——	TBD
99-D-143 Mixed Oxide (MOX) Fuel Fabrication Facility	TBD	40,375	25,943	65,993 [b]	93,000	TBD
01-D-407 Highly Enriched Uranium (HEU) Blend Down Project	80,226	——	20,886	29,340 [c]	30,000	——
Total, Construction		79,126	69,778	106,333	156,000	TBD

[a]Total Estimated Cost (TEC) estimate will be determined when the facility construction cost and schedule baselines are established at the completion of Title I (preliminary) design.

[b]Includes the use of prior-year balances $2,993,000 from the Plutonium Immobilization Project to the MOX FFF project. This increased FY 2002 appropriated funds from $63,000,000 to $65,993,000.

[c]Includes use of prior-year balances $5,340,000 from Project 97-D-140 Consolidated Special Nuclear Materials storage.

99-D-141, Pit Disassembly and Conversion Facility — Title I & II Design, Savannah River Site, Aiken, South Carolina

(Changes from FY Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| # The design cost has increased by $13 million due to the schedule extension and increase in the scope of work. Design completion is scheduled for the first quarter in FY 2004. Previous reported design completion date was first quarter FY 2002.

| # Funds that were designated for the purchase of long-lead equipment in FY 2001 and FY 2002 are being used to reduce the funding requirements in FY 2003. The start of construction for PDCF has been delayed to reduce the future-year peak funding requirements.

|

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(A-E and technical design only)*	2Q 1999	4Q 2001	2Q 2001	4Q 2004	[a]	[a]
FY 2001 Budget Request *(Preliminary Estimate)*	3Q 1999	1Q 2002	1Q 2002	3Q 2005	[a]	[a]
FY 2002 Budget Request *(Preliminary Estimate)*	3Q 1999	TBD	TBD	TBD	[a]	[a]
FY 2003 Budget Request *(Preliminary Estimate)*	3Q 1999	1Q 2004	TBD	TBD	[a]	[a]

[a]Total Estimated Cost (TEC) and Total Projected Cost (TPC) estimates will be determined when the Project Performance Baseline is established in FY 2002. This Baseline will be included in the FY 2004 Congressional Budget.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Design			
1999	20,000	20,000	211
2000	18,751	18,751	12,305
2001	19,956	19,956	17,551
2002	11,000	11,000	32,500
2003	33,000	33,000	40,140 [a]
2004	3,593	3,593	3,593

3. Project Description, Justification and Scope

The Pit Disassembly and Conversion Facility (PDCF) is a complex consisting of a hardened building (that will contain the plutonium processes) and conventional buildings and structures (which will house support personnel, systems, and equipment). The plutonium processing building will be a material access area of approximately 115,000 square feet and house the following key systems: pit shipment, receiving, assay and storage; pit plutonium metal extraction and conversion to oxide; and plutonium oxide packaging, assay, storage, and shipment. Also included are facilities for recovery, decontamination, and declassification of other special nuclear material and non-special nuclear material resulting from pit disassembly. In addition, there are facilities to accommodate international monitoring and inspection involving specific portions of the processes and facility.

The conventional buildings and structures, requiring approximately 50,000 square feet, will house offices, change rooms, a central control station, waste treatment, packaging, storage, and shipment systems. This facility is equipped with lag storage for incoming pit materials and storage for finished oxide. The facility will be operational for ten years after which it will be decontaminated and decommissioned over a three- to four-year period. The project consists of the following: design and construction of the buildings and structures; design, procurement, installation, testing, and start-up of equipment to disassemble pits and convert the plutonium from pits to oxide form; and associated supporting equipment, components, and systems. The facility will be constructed to Nuclear Regulatory Commission (NRC) licensing standards but will not be licensed by the NRC.

At the completion of Title I (preliminary) design in FY 2002, the construction cost and schedule baseline will be established. Current construction estimates are based on a conceptual design.

[a]Because start of construction has been delayed until FY 2007 (to reduce the future-year peak funding requirements), funds allocated for long-lead equipment in FY 2000 and 2001 will be costed in FY 2003 for design work.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design, Drawings, and Specifications)	75,940	67,779
Design Management costs @ 16% of Above Costs	12,360	6,778
Total, Design Phase	88,300	74,557
Contingencies at approximately 20% of above costs		
Design Phase	18,000	18,639
Total, Design Costs	106,300	93,196
Long-Lead Equipment and Site Preparation (incl. M&O Support)	——	64,011
Total Agency Requirement (Design Only)	106,300	157,207

5. Method of Performance

A cost plus fixed-fee contract was awarded in June 1999 for the preliminary and detailed design of the PDCF. The procurement strategy includes an option for construction inspection services (Title III) for which a decision will be made at the end of the Title I (preliminary) design phase. A purchase order for procurement of long-lead equipment fabrication will be issued approximately one to two years prior to start of construction.

It is anticipated that a fixed-price construction contract will be awarded on the basis of competitive bidding.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 2001	FY 2002	FY 2003	Outyears	Total
Design						
Design	38,751	19,956	11,000	33,000	3,593	106,300
Total Design (Federal and Non-Federal)	38,751	19,956	11,000	33,000	3,593	106,300
Long-Lead Equipment and Site Preparation		[a]	[a]	[a]	[a]	0
Total Agency Requirement (Design, Long-Lead Equipment, and Site Preparation)	38,751	19,956	11,000	33,000	3,593	106,300

[a]The start of construction for PDCF has been delayed until after the MOX FFF facility is constructed. As a result, long-lead equipment has not been purchased and site preparation activities have not been initiated as planned. Funding for these activities, originally scheduled for FY 2000 ($1.355 million) and FY 2001 ($6.656 million), has been reallocated to design and used to reduce the funding request for design. Timing for long-lead equipment procurement and site preparation activities will be scheduled in FY 2002 upon completion of the Title I (preliminary) design and establishing the project baseline.

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	[a]	N/A

[a]Annual facility operating costs will be defined at the completion of Title I (preliminary) design.

99-D-143, Mixed Oxide Fuel Fabrication Facility, Savannah River Site, Aiken, South Carolina

(Changes from FY Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

Design cost has increased from $92M to $171M due primarily to significant scope increases related to the Administration's decision on a revised plutonium disposition strategy.

Start of physical construction of the MOX FFF has been delayed from FY 2003 until FY 2004 due to Administration's decisions. The processing capability of the MOX FFF has been expanded.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(A-E and technical design only)*	2Q 1999	4Q 2001	1Q 2002	4Q 2005	[a]	[a]
FY 2001 Budget Request *(Preliminary Estimate)*	2Q 1999	3Q 2002	4Q 2002	1Q 2006	[a]	[a]
FY 2002 Budget Request *(Preliminary Estimate)*	2Q 1999	4Q 2002	2Q 2003	1Q 2007	[a]	[a]
FY 2003 Budget Request *(Preliminary Estimate)* [b]	2Q 1999	4Q 2003	2Q 2004	4Q 2007	[a]	[a]

[a]Total Estimated Cost (TEC) and Total Projected Cost (TPC) estimates will be determined when the Project Performance Baseline is established in the third quarter of FY 2002. This Baseline will be included in the FY 2004 Congressional Budget.

[b]The Project Performance Baseline is expected to be approved in the third quarter of FY 2002.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Design, Procurement Engineering, and Site Preparation			
1999	28,000	9,600	2,546
2000	12,375	30,775	33,512
2001	25,943	25,943	30,000
2002	65,993 [a]	65,993	65,993
2003	93,000	93,000	93,260

3. Project Description, Justification and Scope

A Mixed Oxide Fuel Fabrication Facility (MOX FFF) will provide the U.S. with the capability to convert plutonium oxide derived from surplus weapons grade plutonium stocks to MOX fuel suitable for use in U.S. commercial nuclear reactors. Subsequent disposal of the spent fuel will be carried out in accordance with the Nuclear Waste Policy Act. A contract was awarded to a private consortium (Duke Engineering Services, COGEMA, Inc. and Stone & Webster (DCS)) on March 22, 1999. The contract requires that DCS design a MOX FFF to be built at a DOE site (SRS)and licensed by the Nuclear Regulatory Commission.

The MOX FFF will produce completed MOX fuel assemblies for use in existing domestic, commercial nuclear power reactors. The MOX FFF will be designed to receive and process 3.5 MT of plutonium dioxide powder from the PDCF and other selected inventories of weapon-grade plutonium oxide available within the DOE complex and accommodate about two-years storage for the incoming plutonium power. The facility's operating life is expected to be approximately 12 years.

Design of the MOX FFF is based on processes and facilities currently being successfully operated in Europe, specifically the MELOX and La Hague facilities. The MOX fuel fabrication design will replicate the automated MELOX facility design and will include lessons learned from operations and maintenance experiences. The MOX FFF will be designed and built to meet U.S. conventions, codes, standards, and regulatory requirements ("Americanization" process). After completing its mission, the facility will be deactivated, decontaminated, and decommissioned over a three- to four-year period.

The MOX FFF will require approximately 366,000 square feet to perform all material processing and fabrication operations to produce MOX fuel. Specific MOX FFF operations include the following: aqueous polishing (to purify plutonium before fabrication into fuel); blending and milling; pelletizing; sintering; grinding; fuel rod fabrication; fuel bundle assembly; storage of feed material, pellets, and fuel assemblies; a laboratory; and space for use by IAEA. The facility also requires 120,000 square feet of structures adjacent to the MOX

[a]Includes the use of prior-year balances $2,993,000 from the Plutonium Immobilization Project to the MOX FFF project.

process buildings for secure shipping and receiving, material receipt, secure warehousing, utilities, administration, and technical support.

| The MOX FFF design cost baseline was $92.3 M. This value is increased to $171 M. The design costs has increased due to additions in scope to the existing design ($52 M) cost growth within the existing technical baseline ($27 M), and where all figures include applicable contingency. These factors are discussed separately.

- Within scope cost growth.

The FY 2002 MOX FFF design cost has grown due to three factors: incorporation of a series minor design changes to the MOX FFF; increases in direct and indirect labor rates; and greater than expected effort to perform planned work. The last factor includes the significant contribution of increased work effort to "Americanize" the French technology to U.S. standards and licensing requirements and the effort to support greater than expected requests for additional information from the Nuclear Regulatory Commission to support licensing.

- **S** Scope additions to the MOX FFF design basis.

Owing to programmatic and policy decisions by the Administration that relate to reformulating the domestic plutonium disposition program, the scope of the MOX FFF design has been expanded to include the following features:

- **#** Enhanced aqueous polishing capability.

The FY 2002 design basis for the MOX FFF expanded to included purification of plutonium oxide rendered from surplus weapons, a relatively well-characterized and homogeneous inventory. The MOX FFF design basis has now been expanded to include other selected inventories of weapons-grade plutonium oxide which are significantly less well characterized and more heterogeneous. This design change requires expansion of the aqueous polishing facility design by about 46, 000 sq. feet

- **#** Site infrastructure and site interfaces.

Infrastructure engineering will begin for temporary and permanent utilities, rough grading, electrical power, and roads. This will support the early site work activities scheduled to begin in FY 2003, presuming favorable actions from the Nuclear Regulatory Commission to approve at least some limited authorization to initiate construction. Design of the administration building, secured warehouse, and material receipt buildings will also commence. Lastly, low level waste fluid transfer operations will be designed.

- **#** Software and glovebox equipment design.

In order to preserve the near-term schedule in light of the delay in construction from FY 2003 to FY 2004 as well as to abate longer-term equipment procurement risks, the design of selected highly complex facility control software and glovebox arrays will be performed by the architect-engineer instead of subcontracted. The A-E will provide build-to-print drawings for equipment as the end product of the effort. The design approach differs from the previously planned, more conventional approach in which the development of the software and the glovebox designs would have been performed as part of the construction effort by vendors under design-build subcontracts. The FY 2002 scope is included as part of the design effort and the balance of the effort is

included as part of the construction effort in FY 2003 and later fiscal years. The net result is that the FY 2002 design effort is increased by the FY 2002 portion of this equipment design scope; however, the overall scope of the project is not expanded because the overall TEC remains unchanged.

Overall design is 60 percent complete (as of December 1, 2001). Title I (preliminary) design began in mid FY 1999 and was completed in December 2000. Based on Title I design information, cost estimates have been developed to establish the initial Project Performance Baseline, which is expected to be approved in the second quarter of FY 2002 and documented in the FY 2004 Congressional Budget. An independent cost estimate has been performed based upon the Title I (preliminary) design. Title II (detailed) design began in FY 2001. A revised cost estimate for the MOX FFF to incorporate the scope changes identified above will be completed in the third quarter of FY 2002.

FY 2003 activities include completion of Title II design (final design for the MOX facility) which is needed to develop construction bid packages for the mechanical and electrical systems to support FY 2004 construction. Manufacturing design activities will continue for the glovebox and process units to support long-lead procurement activities which begin in FY 2004. New manufacturing engineering activities will commence for rod handling, rod storage, and most of the fuel rod assembly and inspection units. In the aqueous polishing area, the initial designs will be completed for the units and the precipitation/filtration, silver recovery, and off-gas treatment process unit designs will start. The software design activities will continue to develop the networks, standards, and manufacturing management information system. FY 2003 effort also includes initiation of site preparation which consists of land clearing, temporary road construction and parking, and establishment of temporary construction services (trailers, computers, etc). The construction access road will be built and underground utilities installed to prepare for commencement of major construction in FY 2004.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design, Drawings and Specifications)	125,730	73,300
Design Management costs at 10% before Contingency	14,270	7,700
Contingencies	31,318	11,318
Total, Design Phase	171,318	92,318
Procurement Engineering and Site Preparation	54,311	46,000
Total Agency Requirement (Design, Procurement Engineering, and Site Preparation)	225,629	138,318

5. Method of Performance

The procurement strategy for the MOX FFF includes a base contract and three subsequent phases. The first step was completed on March 22, 1999 when DOE awarded a base contract to DCS to provide MOX fuel fabrication and irradiation services. This base contract includes the design and licensing of the MOX FFF, fuel qualification activities, and reactor license modifications.

Sequential contract phases include general construction contractor (Phase 1), plant operations (Phase 2), and facility deactivation (Phase 3). It is expected that an incentive contract with the consortium will be the most appropriate and cost beneficial instrument for the construction work. Actual physical construction will be through fixed-price subcontracts to the extent practical, with a cost-type contract for construction management services. The MOX Fuel Fabrication Facility will be Government owned and contractor operated. It is expected that during the facility operating phase of the consortium contract, facility operating costs will be partially offset by the value of the MOX fuel which will displace the low-enriched uranium (LEU) fuel that utility companies would have otherwise purchased.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 2001	FY 2002	FY 2003	Outyears	Total
Design Cost						
Design	40,375	25,943	65,993[a]	39,007	——	171,318
Total Design (Federal and Non-Federal)	40,375	25,943	65,993	39,007	——	171,318
Procurement Engineering and Site Preparation (incl. M&O Support)	——	——	——	53,993	TBD	53,993
Total Agency Requirement (Design, Procurement Engineering, and Site Preparation)	40,375	25,943	65,993	93,000	TBD	225,311

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	[b]	N/A

[a]Includes the use of prior-year balances $2,993,000 from the Plutonium Immobilization Project to the MOX FFF project. This increased FY 2002 appropriated funds from $63,000,000 to $65,993,000. This reprogramming will reduce outyear requirements by an amount equal to the reprogramming ($2,993,000).

[b]Annual costs will be defined when the Project Performance Baseline is established in the second quarter of FY 2002.

01-D-407, Highly Enriched Uranium (HEU) Blend Down Project, Savannah River Site, Aiken, South Carolina

(Changes from FY Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2001 Budget Request *(Preliminary Estimate)*	2Q 2000	3Q 2001	3Q 2000	3Q 2003	74,900	99,600
FY 2002 Budget Request *(Preliminary Estimate)*	1Q 2001	4Q 2001	1Q 2001	4Q 2003	74,900	99,600
FY 2003 Budget Request *(Preliminary Estimate)*	1Q 2001	2Q 2002	2Q 2001	3Q 2004	80,226	99,600

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Cost
2000	——	——	——
2001	20,886	14,590	14,590
2002	29,340 [a]	35,636	35,636
2003	30,000	30,000	30,000

3. Project Description, Justification and Scope

In the aftermath of the Cold War, significant quantities of weapons-usable highly enriched uranium (HEU) have become surplus to national defense needs both in the United States and Russia. The Department issued a Record of Decision (ROD) on the Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement (EIS) in July 1996. The ROD requires DOE to disposition surplus HEU by blending it down to low-enriched uranium (LEU) and recovering its economic value by using it as fuel in power reactors where practicable. The 174 MT of surplus HEU includes a quantity of "off-specification" HEU that is a product of DOE uranium reprocessing operations. The reprocessed HEU contains uranium isotopes, fission products, and

[a]Includes use of prior-year balances $5,340,000 from Project 97-D-140, Consolidated Nuclear Materials Storage.

other contaminants not present in virgin uranium. This project supports disposition of a majority of the existing inventory of off-specification HEU.

The off-specification HEU includes solutions and spent reactor fuel (located at the Savannah River Site (SRS)) which are required to be stabilized in accordance with the Department's Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendations 94-1 and 2000-1. Also included are unirradiated fuel and alloy at SRS and the Y-12 Plant at the Oak Ridge Reservation, made from reprocessed HEU, and some reprocessed HEU metal at the Y-12 Plant. These off-specification materials total approximately 34 MT.

On April 5, 2001 DOE and the Tennessee Valley Authority (TVA) signed an Interagency Agreement to implement a program to down-blend approximately 33 MT of DOE off-specification surplus HEU to LEU for use as fuel in TVA reactors. At least 16 MT of the HEU will be processed through the SRS H-Canyon to remove impurities and then down-blended to LEU at SRS and delivered to the TVA as LEU solution. The resulting LEU solution will then be converted to nuclear fuel by vendors under contract to TVA. The remainder of the 33 MT will be delivered to TVA's vendor as HEU, which will be down-blended by the vendor and converted to fuel.

Several capital improvements are needed at SRS in support of this project. The Conceptual Design Report (CDR) includes the following work scope:

- **Highly Enriched Uranium Material Feed Segment, K-Area Subsegment.** The 105-K assembly area will be modified to provide transitional services for removing the fuel tubes from their current storage configurations, packaging them into bundles, and loading them into shipping containers mounted on a trailer for shipment to H-Area. This includes rooms for denesting contaminated fuel bundles and for worker change/cool down.

- **Highly Enriched Uranium Material Feed Segment, H-Canyon Material Transfer Subsegment**. This subsegment covers the transfer of H-Canyon HEU feedstock materials from Building 105-K to H-Canyon. New infrastructure includes an unloading dock in H-Canyon to receive trailers from Building 105-K, jib crane, transfer sling, and new rail car to move material within H-Canyon.

- **Highly Enriched Uranium Material Segment, Shipping Container Subsegment**. This subsegment provides the shipping containers and related infrastructure for shipping the HEU feedstock from Building 105-K to H-Canyon and/or TVA. It includes flatbed trailers, stainless steel containers sized to ship bundles of fuel tubes and handling cranes.

- **Purified Highly Enriched Uranium Production Segment**. This segment includes installing tanks, monitoring equipment, process equipment and jumpers, and reconfiguring certain aspects of the process to improve throughput and meet purity specifications.

- **Low-Enriched Uranium Production/Loading Segment**. This segment consists of the infrastructure to enable receiving natural uranium blendstock, storing HEU solution, blending HEU and natural uranium, and filling the 230-gallon shipping containers with LEU for transport to TVA's vendors. This infrastructure includes a new building with a loading dock to accept flat bed trailers carrying shipping containers and equipment to fill the

containers, a Personnel Change Room/Remote Instrument/Control Room, and tanks to facilitate solution transfers, blending, and storage.

Feed/Product Chemical Analysis Segment. The chemical laboratory will perform isotopic composition and chemical impurities analyses to support the off-specification fuel program. The facility will use both new and existing laboratory space and equipment to perform this activity. New infrastructure will include hoods, cabinets, and analytical equipment and physical modifications for safeguards and security purposes. Some existing lab space will be demolished prior to installing the new equipment.

Support Services Segment/Safeguards and Security Subsegment. This segment provides the facilities and services required to protect and maintain accountability for the transportation of Security Category II quantities of HEU from Building 105-K to H-Canyon and/or TVA and for transportation within H-Canyon**.** This will be accomplished by enhancing monitoring and alarm capabilities.

Life cycle costs of this overall program will require appropriations estimated at approximately $350,000,000 to provide infrastructure improvements and operations at DOE and TVA contractor facilities and to dispose of low-level radioactive waste from the project start until FY 2013. A portion of the $350,000,000 may be repaid by the end of the project from DOE/TVA-shared fuel savings (depending on future market prices for uranium). These actions satisfy DNFSB Recommendation 94-1 and 2000-1 stabilization/disposition objectives for a portion of the material and meet non-proliferation objectives of the July 1996 ROD for all the material. This approach avoids the alternative disposition path (i.e., blending all off-specification HEU to waste and disposing of it), which is estimated to cost over $900,000,000.

H-Canyon processing and solution storage tanks will reach operational capacity; and all H-Canyon material stabilization operations, including DNFSB commitments, will be curtailed in March 2003. Because existing tank space is limited for storage of LEU solution, the LEU loading station will be completed first to allow off-site shipment of LEU solutions (beginning in April 2003). This will minimize interruption of material processing and, in particular, processing of the DNFSB Recommendation 94-1 materials. The Office of Fissile Materials Disposition will fund the incremental cost (standby mode to operations) of additional processing in H-Canyon for the rest of the HEU that is not covered by DNFSB Recommendation 94-1.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and final design costs (design drawings and specifications)	15,185	9,600
Design management costs (2.0% of TEC)	1,500	1,050
Project management costs (2.7% of TEC)	2,000	1,850
Design Contingency (1.3% of TEC)	980	4,000
Total, Design Costs (26.8% of TEC)	19,665	16,500
Construction Phase		
Improvements to Land	500	500
Buildings	400	5,000
Special Equipment	2,500	8,000
Other Structures	27,005	10,600
Utilities	300	300
Standard Equipment	3,000	4,000
Removal cost less salvage	500	1,000
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	2,000	1,000
Construction management costs (8.2% of TEC)	6,000	4,100
Project management costs (5.4% of TEC)	4,000	3,700
Construction Contingency (15.0% of TEC)	14,356	20,200
Total, Construction Costs	60,561	58,400
Total, Line Item Costs (TEC)	80,226	74,900

5. Method of Performance

The management and integration contractor will design the facility under an existing contract. To the extent feasible, construction and procurement of equipment will be accomplished by fixed-price contracts awarded on the basis of competitive bids.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 2001	FY 2002	FY 2003	Outyears	Total
Project Cost						
Facility Cost [a]						
Design	——	11,788	6,177	2,000	——	19,965
Construction	——	9,098	23,163	28,000	——	60,261
Total, Facility Cost (Federal and non-Federal) (New Budget Authority)	——	20,886	29,340 [b]	30,000	——	80,226
Other Project Costs (OPC)						
Conceptual design costs	2,571	335	——	——	——	2,906
NEPA and other project-related cost	——	4,031	5,225	5,826	1,386	16,468
Total, Other Project Costs (OPC)	2,571	4,366	5,225	5,826	1,386	19,374
Total Project Cost (TPC)	2,571	25,252	34,565	35,826	1,386	99,600

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	TBD	N/A
Annual facility maintenance/repair costs	TBD	N/A
Annual utility costs	TBD	N/A
Total related annual funding	TBD	N/A
Total operating costs (operating from FY 2001 through FY 2010)	250,400	N/A

[a]These funds support five projects in various stages of design and construction.

[b]Includes the use of prior-year balances $5,340,000 from Project 97-D-140, Consolidated Nuclear Materials Storage.