# 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, $1,340,195,000, to remain available until expended.*

Note.—A regular 2003 appropriation for this account had not been enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 107–229, as amended). The amounts included for 2003 in this budget reflect the Administration's 2003 policy proposals.

## Explanation of Change

The only change from the language proposed in FY 2003 is the proposed funding amount.

# Defense Nuclear Nonproliferation

## Executive Summary

## Threat and Response

*"The gravest danger our Nation faces lies at the crossroads of radicalism and technology. Our enemies have openly declared that they are seeking weapons of mass destruction, and evidence indicates that they are doing so with determination. The United States will not allow these efforts to succeed....History will judge harshly those who saw this coming danger but failed to act. In the new world we have entered, the only path to peace and security is the path of action."*

President Bush
The National Security Strategy of the United States of America
September 17, 2002

The world's most dangerous and unpredictable people continue to pursue the acquisition of weapons of mass destruction – chemical, biological and nuclear weapons. Under-secured radiological materials in Russia and elsewhere also pose a serious threat to the United States. The human and economic damage caused by a well-executed weapons of mass destruction attack could far exceed the attacks of September 11, 2001. Consequently, reducing the threat of weapons of mass destruction has become a priority at the highest levels of the United States Government.

The December 2002 release of the Bush Administration's "National Strategy to Combat Weapons of Mass Destruction" was an historic recognition that the threat environment has worsened, and that dramatic action needs to be taken to reduce the threat of weapons of mass destruction. The nonproliferation activities of the National Nuclear Security Administration's Office of Defense Nuclear Nonproliferation are central to the Bush Administration's strategy, which listed "Strengthened Nonproliferation" as one of the pillars of its approach to reducing the weapons of mass destruction threat.

## Mission

The mission of the Office of Defense Nuclear Nonproliferation is to detect, prevent and reverse the proliferation of weapons of mass destruction, while promoting nuclear safety. Defense Nuclear Nonproliferation develops and applies weapons of mass destruction technologies and expertise from headquarters as well as the national laboratories.

## Program Strategic Performance Goals

- NS2-1: Enhance the capability to detect weapons of mass destruction, including nuclear materials and terrorist threats.
- NS2-2: Prevent and reverse the proliferation of weapons of mass destruction.
- NS2-3: Protect or eliminate weapons and weapons-useable nuclear material or infrastructure, and redirect excess foreign weapons expertise to civilian enterprises.
- NS2-4: Reduce the risk of accidents in nuclear fuel cycle facilities worldwide.

To these ends, under the guidance of Secretary Abraham and the National Nuclear Security Administration (NNSA) Administrator, and with our friends and our allies, Defense Nuclear Nonproliferation is identifying new ways of denying expertise and materials from our enemies and, wherever possible, accelerating our programs to address the proliferation threat more swiftly and efficiently.

## FY 2004 Budget Summary

Our 2004 budget request is $1.340 billion, a 30% increase over FY 2003. Our budget is divided into nine programs with funding distributed as follows:

| Program | % of FY 2004 Budget |
|---|---|
| Nonproliferation and Verification Research and Development | 15.0% |
| Nonproliferation and International Security | 7.5% |
| Nonproliferation Programs with Russia: | |
| International Nuclear Materials Protection and Cooperation | 17.0% |
| Russian Transition Initiatives | 3.0% |
| HEU Transparency Implementation | 1.3% |
| International Nuclear Safety and Cooperation | 1.0% |
| Elimination of Weapons-Grade Plutonium Production | 4.0% |
| Accelerated Materials Disposition | 2.2% |
| Fissile Materials Disposition | 49.0% |

Defense Nuclear Nonproliferation activities during FY 2004 are to continue at the FY 2003 funding level for most programs. Key funding changes are:

- Construction of the Mixed Oxide Fuel Fabrication Facility begins for disposition of surplus U.S. plutonium (87% of the increase).
- Accelerating materials disposition in accordance with Bush-Putin initiatives and G-8 Summit (10% of the increase).
- Based on substantial progress in International Materials Protection and Cooperation in FY 2003, we are shifting funds within this program to:
  - Improve security at Russian Federation Strategic Rocket Forces nuclear warhead sites.
  - Reduce the threat of a radiological attack against the U.S.
- In Nonproliferation and International Security we will focus on development and delivery of tools to meet ongoing and longstanding requirements to detect, understand and verify dismantlement of foreign clandestine nuclear programs.

## Global Partnership

In June 2002, with the leadership of the United States, G-8 nations agreed to a new comprehensive nonproliferation effort known as the Global Partnership. To advance this goal, G-8 leaders committed to raise up to $20 billion over 10 years to fund nonproliferation programs in the former Soviet Union. The United States intends to provide half that total through the Department of Energy, Department of Defense, and the Department of State. The Department of Energy programs to reduce and prevent the proliferation of nuclear weapons, nuclear and radioactive material, and nuclear expertise total $459 million in FY 2004.

## Department of Homeland Security Transfers

Defense Nuclear Nonproliferation counterterrorism programs totaling $83 million in FY 2004 have been transferred to the Department of Homeland Security and are not included in this budget request. These programs include: (1) $77 million in research and development to counter the chemical, biological, nuclear, and radiological threat; and (2) $6 million for the nuclear assessment program.

## Program Assessment Rating Tool (PART)

Improving performance by focusing on results is an integral component of the President's Management Agenda. The PART is a diagnostic tool that examines different aspects of program performance to identify the strengths and weaknesses of a given program. The first Defense Nuclear Nonproliferation program assessed using PART was the International Nuclear Materials Protection and Cooperation Program. The PART assessment noted that the program achieved a perfect score on purpose and design because it has a clear purpose that addresses a specific need, and achieved a perfect score in strategic planning because the Department has established specific, measurable goals and timeframes. Since the program achieves its results and has adequate measures, OMB assigned its highest rating of "Effective".

## Defense Nuclear Nonproliferation Activities

The nonproliferation activities of Defense Nuclear Nonproliferation address the full dimension of the threat of weapons of mass destruction proliferation. The nine broad areas of work include: Nonproliferation and Verification Research and Development; Elimination of Weapons Grade Plutonium Production; Highly Enriched Uranium (HEU) Transparency Implementation; International Nuclear Safety and Cooperation; Nonproliferation and International Security; Russian Transition Initiatives; International Material Protection and Cooperation; Accelerated Materials Disposition; and Fissile Materials Disposition. The following sections will provide brief overviews of each of these areas.

## Nonproliferation and Verification Research and Development

The Nonproliferation and Verification Research and Development Program conducts applied research, development, testing, and evaluation to produce technologies that lead to prototype demonstrations and resultant detection systems, strengthening the U.S. response to current and projected threats to national security worldwide posed by the proliferation of nuclear weapons and the diversion of special nuclear material. The R&D program is the technical base which provides a wide range of operational agencies, including the Department of Defense and the intelligence community, with innovative systems and technologies to meet their nonproliferation and counterproliferation mission responsibilities.

This program directly supports the NNSA mission and the goal in the NNSA Strategic Plan to detect, prevent, and reverse the proliferation of weapons of mass destruction while promoting nuclear safety worldwide. The 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 and to meet U.S. nuclear explosion monitoring goals.

NNSA is the only U.S. government agency investing in high-risk technical solutions to proliferation and counterterrorism problems with a strategic view. The Nonproliferation R&D Program pushes state-of-the-art technology to detect and analyze proliferation activities, harnessing the technical excellence of the national laboratories to develop prototypes and conduct technology demonstrations with other agencies who operationalize the systems for nonproliferation and counterterrorism missions.

Those agencies have a short-term focus based on their operational missions, and the Nonproliferation R&D Program partners with these users to address near-term technology needs. At the same time, those agencies increasingly rely more on the NNSA to conduct the long-term R&D which will provide innovative solutions for future systems to address their missions. This program has a long record of success in transitioning technology to end users.

In FY 2004 activities will include demonstrating portal and long range detection concepts to track and monitor nuclear materials transit; delivering a satellite payload sensor package to detect nuclear explosions; documenting threat signatures for priority nonproliferation problems; and researching detection technologies that are requisite for development to advanced weapons of mass destruction. The R&D activities are requested at $203.8 million, essentially the 2003 funding level.

## Nonproliferation and International Security

Nonproliferation and International Security activities include a wide range of efforts to reduce the threat of weapons of mass destruction proliferation or terrorism by: (1) securing at risk nuclear materials in regions of concern and sustaining nuclear security improvements in the non-Russian republics of the former Soviet Union and other countries; (2) reducing or eliminating the risk posted by civil commerce in Highly Enriched Uranium; (3) overseeing the implementation of International Atomic Energy Agency safeguards at U.S. facilities; (4) cooperating with bilateral partners on safeguards, physical protection, and peaceful nuclear applications; (5) participating in the development of proliferation-resistant fuel cycle technologies; (6) reviewing sensitive exports by U.S. companies that could contribute to the proliferation of nuclear, chemical and biological weapons and missiles for their delivery; (7) supporting U.S. export control diplomacy, and working with partner governments

to strengthen foreign national export control systems; (8) preventing adverse migration of weapons of mass destruction expertise from the former Soviet weapons complex by removing functions and equipment, reducing the physical footprint; (9) strengthening International Atomic Energy Agency safeguards and the International Atomic Energy Agency role in combating proliferation and weapons of mass destruction terrorism, and (10) strengthening regional security and the global nonproliferation regime through the development of transparency measures that encourage wider participation and broader adherence.

FY 2004 activities include an increase in funding for: (1) the development and delivery of tools to meet ongoing and longstanding requirements to detect, understand and verify dismantlement of foreign clandestine nuclear programs; and (2) implementation of the Additional Protocol at U.S. DOE/NNSA sites.

**International Nuclear Materials Protection and Cooperation**

The International Nuclear Materials Protection and Cooperation (known as MPC&A) program reduces the threat to U.S. national security by securing nuclear weapons, weapons-usable nuclear materials and radiological sources in Russia, the Former Soviet Union, and other countries of concern and enhances the detection of illicit trafficking of nuclear and radiological materials. NNSA has currently identified 105 sites in Russia and the Former Soviet Union which may require security upgrades. Fifty two of these sites are Ministry of Defense nuclear warhead sites, (42 Russian Navy and 10 Strategic Rocket Force), 11 of these sites are Russia Navy Fuel Storage sites; 11 of these sites are MinAtom weapons complex sites; and the remaining 31 sites are civilian nuclear sites, (18 Russian and 13 Former Soviet Union). NNSA estimates that there is approximately 600 metric tons (MT) of weapons attractive nuclear material at these sites. In addition, NNSA estimates that there are approximately 4,000 nuclear warheads located at the 42 Russian Navy nuclear warhead storage sites and several thousand warheads at the 10 Strategic Rockets Force sites in need of security upgrades.

MPC&A activities are divided into eight areas: Navy Complex, Strategic Rocket Forces, MinAtom Weapons Complex, Civilian Nuclear Sites, Material Consolidation and Conversion, Radiological Dispersion Devices (RDD), National Programs and Sustainability, and Second Line of Defense. FY 2004 program highlights include the completion of MPC&A comprehensive security upgrades on an additional 4 percent of the 600 metric tons (MT) of nuclear material and an additional 30 percent of the estimated 4,000 Russian Navy nuclear warheads. An additional 11 percent of the total 29 MTs weapons-grade highly enriched uranium will be converted to non-weapons grade low enriched uranium. Radiation detection equipment will be installed at 11 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials.

Since the September 11 attacks, NNSA has begun an aggressive new initiative to locate, consolidate and secure radiological material which could be used for a dirty bomb. The NNSA has currently identified 35 large radiological waste sites called RADON sites in Russia and the Former Soviet Union which may require security upgrades. In addition, it is estimated that Russia and the Former Soviet Union possess over 1,000 orphan or surplus radioactive sources which need to be located and consolidated at a secure facility. In FY 2004,

equipment will be installed that can secure and/or detect materials which can be used with explosives at an additional 18 RDD sites (increasing the total sites secured to 26) and an additional 225 orphan or surplus radioactive sources will be located, consolidated and secured.

**Russian Transition Initiatives**

The Russian Transition Initiatives program has completed the consolidation of the Initiatives for Proliferation Prevention and the Nuclear Cities Initiative programs. The consolidation has been directed by numerous reviews, including those of both the Administration and Congress. The staff is functioning as an integrated team focused on one essential goal – preventing adverse migration of former Soviet weapons of mass destruction expertise.

The Russian Transition Initiatives program counters the proliferation and terrorism threat posed by "brain drain" from the weapons complex of the former Soviet Union, to 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 program entirely on their own. They need fuel cycle technologies to get 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 oversized, decrepit, and in need of resources, is still dangerously capable of performing its core functions, and is an obvious source for these inputs.

Russian Transition Initiatives' programmatic efforts follow two strategic thrusts that support and strengthen each other. First, it removes functions and equipment from the former Soviet nuclear complex, reducing its physical footprint, and creating the business infrastructure needed to sustain developing business opportunities. Second, it provides meaningful, self-sustaining, civilian work opportunities for former Soviet weapons of mass destruction scientists, engineers and technicians by helping to fund technology-laden projects with commercially-attractive market opportunities. FY 2004 activities will focus primarily on work in the Russian nuclear complex, but will expand its efforts slightly both geographically and functionally, by pursuing one or two new projects in the non-nuclear arena, in response to growing concern about chemical, biological and missile technologies.

**HEU Transparency Implementation**

The HEU Transparency Implementation program provides appropriate confidence that nonproliferation objectives are being met for the February 1993 HEU Purchase Agreement between the U.S. and the Russian Federation by developing and implementing mutually agreed transparency measures. The Purchase Agreement involves the acquisition of low enriched uranium (LEU) derived from 500 metric tons of weapons-usable Russian highly enriched uranium over 20 years. In FY 2004, HEU Transparency Implementation program will conduct 22 allowed Special Monitoring Visits to the four Russian facilities, install a continuous Blend Down Monitoring Systems at one more site, and maintain Blend Down Monitoring System equipment and retrieve data from three sites. The FY 2004 funding request is $18 million, level with FY 2003.

## International Nuclear Safety and Cooperation

The International Nuclear Safety and Cooperation program identifies, evaluates, prioritizes, and addresses critical nuclear safety concerns through a process of safety analyses, corrective measures, and technical cooperation. This program receives an appropriation transfer from the Department of State for nuclear safety work outside Russia and the Former Soviet Union, along with an NNSA direct appropriation.

The International Emergency Management and Cooperation program provides assistance to foreign governments to ensure programs for preparation and response to possible foreign nuclear events are in place and workable. Efforts include connecting three Russian facilities to the Ministry of Atomic Energy (MinAtom) Situation and Crisis Center, continuing enhancements to training and emergency procedures, and supporting International Atomic Energy Agency with radiation detectors and technical assistance for their emergency program and address lost sources.

FY 2004 activities primarily involve safety upgrades and assistance in the shutdown of four high-risk research reactors in Russia, Uzbekistan, Romania, and Kazakhstan as well as the shutdown of the BN-350 breeder reactor in Kazakhstan.

## Elimination of Weapons Grade Plutonium Production

The Elimination of Weapons Grade Plutonium Production program is working cooperatively with the Russian Federation on a multi-year effort to shutdown Russia's remaining plutonium production reactors. 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.

These reactors will be replaced by fossil fuel energy plants to meet the energy requirements of the local communities. The reactors at Seversk are the highest priority for replacement and the fossil-fuel energy plant will be operational by 2008. The replacement for the reactor at Zheleznogorsk is planned to be operational in 2011.

FY 2003 efforts will involve a competitive Request for Proposal resulting in the selection of a U.S. contractor to oversee the design and construction by Russian contractors of the two fossil fuel plants. The FY 2004 funding request is $50 million and activities will primarily focus on design and equipment purchases at Seversk and design activities at Zheleznogorsk.

## Accelerated Materials Disposition

The Accelerated Materials Disposition program is a new line item in FY 2004 resulting from the March 2002 G8 Summit. President Bush and President Putin agreed to accelerate disposition of Russian nuclear material in several ways: (1) purchase additional HEU above the 500 metric tons in the 1994 HEU Purchase Agreement by 1.5 metric tons per year over 10 years or 15 metric tons; (2) purchase reactor fuel for use in U.S. research reactors (150 kilograms per year over 10 years or 1.5 metric tons); (3) accelerate United States and Russian efforts to develop research reactor fuel designs to convert research and test reactors from HEU to low enriched uranium (LEU) fuels over the next ten years; and (4) increase conversion of the HEU to LEU under the materials consolidation and conversion program by up to 5 metric tons per year. The acceleration of materials disposition will reduce the threat or potential diversion of weapons-usable materials by terrorists or rogue nations.

## Fissile Materials Disposition

The Office of Fissile Materials Disposition is responsible for disposing of inventories of surplus, U.S. weapons-grade plutonium and HEU, as well as providing technical support for, and implementation of, efforts to obtain reciprocal disposition of Russian surplus weapon-grade 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 metric tons of weapon-grade plutonium (68 metric tons total) in rough parallel. The 2004 budget supports the second year of a revised program for U.S. plutonium disposition under the FY 2000 Agreement, which focuses on irradiation of mixed oxide (MOX) fuel in commercial reactors. Beyond FY 2004, the Administration is committed to providing the resources necessary to fully support the plutonium disposition plan.

In FY 2004, the U.S. surplus plutonium disposition program will implement the revised strategy by completing the design of the Pit Disassembly and Conversion Facility and, contingent on parallel progress with the Russian disposition program, beginning construction of the MOX Fuel Fabrication Facility at Savannah River Site (SRS). The U.S. surplus highly enriched uranium disposition program will continue shipping surplus HEU from the Y-12 Plant to the United States Enrichment Corporation, and processing and shipping operations at SRS and Y-12 to support the down-blending of off-specification HEU. The Russian surplus fissile materials program will implement the details of the technical path forward for disposition that will be finalized in FY 2003, and complete the design and begin construction of the MOX facility using the U.S. MOX design.

# Funding the DNN Mission

Each of the broad areas of DNN's nonproliferation activities can be broken down into their constituent elements. Funding for each is provided below.

## Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| **Nonproliferation and Verification R&D** | | | | | |
| Proliferation Detection | 142,142 | 108,536 | 108,263 | -273 | -0.3% |
| Nuclear Explosion Monitoring | 76,407 | 88,559 | 89,277 | 718 | 0.8% |
| Supporting Activities | 5,052 | 6,712 | 6,333 | -379 | -5.6% |
| Construction | 35,806 | 0 | 0 | 0 | 0.0% |
| Total, Nonproliferation and Verification R&D | **259,407** | **203,807** | **203,873** | **66** | **0.0%** |
| **Nonproliferation and International Security** | | | | | |
| Nonproliferation Policy | 45,239[a] | 55,004 | 53,894 | -1,110 | -2.0% |
| International Safeguards | 31,739 | 18,752 | 29,254 | 10,502 | 56.0% |
| Export Control | 10,628 | 15,519 | 15,798 | 279 | 1.8% |
| Treaties and Agreements | 3,040 | 3,393 | 2,788 | -605 | -17.8% |
| Total, Nonproliferation and International Security | 90,646 | 92,668 | 101,734 | 9,066 | 0.0% |
| Less Use of prior-year balances | -7,500 | 0 | 0 | 0 | 0.0% |
| Total, Nonproliferation and International Security | **83,146** | **92,668** | **101,734** | **9,066** | **9.8%** |
| **International Nuclear Materials Protection and Cooperation** | | | | | |
| Navy Complex | 87,780 | 55,800 | 38,000 | -17,800 | -31.9% |
| Strategic Rocket Forces | 0 | 0 | 24,000 | 24,000 | 100.0% |
| MinAtom Weapons Complex | 31,173 | 48,000 | 34,000 | -14,000 | -29.2% |

[a]Does not reflect $10,000,000 from the FY 2002 Emergency Supplemental fund contained in P.L. 107-206 for the Accelerated Return of Domestic Sealed Sources in the Environmental Management program being funded under the Nonproliferation and International Security program as a one time activity.

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| Civilian Nuclear Sites | 34,617 | 21,707 | 11,000 | -10,707 | -49.3% |
| Material Consolidation and Conversion | 21,000 | 27,000 | 31,000 | 4,000 | 14.8% |
| Radiological Dispersion Devices | 20,285 | 16,293 | 36,000 | 19,707 | 121.0% |
| National Programs and Sustainability | 73,552 | 34,277 | 28,000 | -6,277 | -18.3% |
| Second Line of Defense | 46,185 | 24,000 | 24,000 | 0 | 0.0% |
| Total, International Nuclear Materials Protection and Cooperation | **314,592** | **227,077** | **226,000** | **-1,077** | **-0.5%** |
| **Russian Transition Initiatives** | **57,000** | **39,334** | **40,000** | **666** | **1.7%** |
| **HEU Transparency Implementation** | **13,950** | **17,229** | **18,000** | **771** | **4.5%** |
| **International Nuclear Safety and Cooperation**, DOE appropriation | 16,876 | 14,576 | 14,083 | -493 | 0.0% |
| Soviet-Designed Reactor Safety, (DOS/USAID transfer appropriation) | 37,085[a] | 0 | 0 | 0 | 0.0% |
| Total, International Nuclear Safety and Cooperation | **53,961** | **14,576** | **14,083** | **-493** | **-3.4%** |
| **Elimination of Weapons-Grade Plutonium Production** | **14,200** | **49,339** | **50,000** | **661** | **1.3%** |
| **Accelerated Materials Disposition** | | | | | |
| HEU/LEU Purchase and Stockpile | 0 | 0 | 25,000 | 25,000 | |
| HEU Reactor Fuel Purchase | 0 | 0 | 1,000 | 1,000 | |
| Accelerated Reduced Enrichment for Research & Test Reactor (RERTR) | 0 | 0 | 3,000 | 3,000 | |
| Accelerated Material Consolidation & Conversion | 0 | 0 | 1,000 | 1,000 | |
| Total, Accelerated Materials Disposition | **0** | **0** | **30,000** | **30,000** | |

[a]Reflects appropriation and unobligated balance transfers from the Department of State/U.S. Agency for International Development for Soviet-Designed Reactor Safety. DOS/USAID amounts for FY 2002 includes funding received for nuclear power plant safety for Ukraine, Armenia, and Kazakhstan ($37.1M). FY 2003 and FY 2004 DOS/USAID funds of $36M are tentatively planned.

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| **Fissile Materials Disposition** | | | | | |
| U.S. Surplus Fissile Materials Disposition | | | | | |
| Operations and Maintenance | 134,938 | 194,000 | 193,805 | -195 | -0.1% |
| Construction | 106,333 | 156,000 | 415,600 | 259,600 | 166.4% |
| Total, U.S. Surplus Fissile Materials Disposition | 241,271 | 350,000 | 609,405 | 259,405 | 74.1% |
| Russian Surplus Fissile Materials Disposition | | | | | |
| Russian Fissile Materials Disposition | | | | | |
| Operations and Maintenance | 55,936[a] | 97,000[b] | 47,100 | -49,900 | -51.4% |
| Advanced Reactor Technology | | | | | |
| Operations and Maintenance | 5,000 | 1,000 | 0 | -1,000 | -100.0% |
| Total, Russian Surplus Fissile Materials Disposition | 60,936 | 98,000 | 47,100 | -50,900 | -51.9% |
| Subtotal, Fissile Materials Disposition | 302,207 | 448,000 | 656,505 | 208,505 | 46.5% |
| Use of prior-year balances | -50,333[a] | -64,000 | 0 | 64,000 | -100.0% |
| Total, Fissile Materials Disposition | 251,874 | 384,000 | 656,505 | 272,505 | 71.0% |
| Total, Defense Nuclear Nonproliferation | **1,048,130** | **1,028,030** | **1,340,195** | **312,165** | **30.4%** |
| Return of Domestic Sealed Sources [c] | 10,000 | | | | |
| International Renewable Energy Program [d] | 300 | | | | |
| Total, Defense Nuclear Nonproliferation | **1,058,430** | **1,028,030** | **1,340,195** | **312,165** | **30.4%** |

[a]Includes prior year balances used from project 87-D-140 Consolidated Special Nuclear Materials Storage Facility ($5,340,000) and Project 01-D-142 Immobilization and Associated Processing Facility ($2,993,000); and $42,000,000 appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program ($200,000,000). These funds plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

[b]Includes $64,000,000 appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program. These funds plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

[c]Reflects $10,000,000 from FY 2002 supplemental funding in P.L. 107-206 for accelerated return of domestic sealed sources.

[d]Reflects transfer of $300,000 from U.S. AID to support uranium energy efficiency activities.

## DNN's Funding Distribution by Location

As mentioned in previous sections, the mission of DNN is highly technical, requiring the best scientific resources. The national laboratories, weapons laboratories and other sites provide DNN with the necessary expertise it needs to carry out its mission. The following table describes funding distribution by location and nonproliferation activity:

### Funding by Site

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| **CHICAGO OPERATIONS OFFICE** | | | | | |
| Ames Laboratory | | | | | |
| Nonproliferation and Verification R&D | 180 | 180 | 180 | 0 | 0.0% |
| Argonne National Laboratory (East) | | | | | |
| Nonproliferation and Verification R&D | 200 | 255 | 255 | 0 | 0.0% |
| Nonproliferation and International Security | 8,035 | 8,852 | 9,315 | 463 | 5.2% |
| International Nuclear Materials Protection | 8,408 | 3,682 | 2,700 | -982 | -26.7% |
| Russian Transition Initiatives | 3,043 | 3,097 | 3,152 | 55 | 1.8% |
| HEU Transparency Implementation | 800 | 800 | 800 | 0 | 0.0% |
| International Nuclear Safety and | 3,600 | 2,868 | 5,583 | 2,715 | 94.7% |
| Accelerated Material Disposition | 0 | 0 | 3,000 | 3,000 | 100.0% |
| Total, Argonne National Laboratory (East) | 24,086 | 19,554 | 24,805 | 5,251 | 26.9% |
| Argonne National Laboratory (West) | | | | | |
| International Nuclear Safety and | 1,920 | 1,132 | 2,100 | 968 | 85.5% |
| Fissile Materials Disposition | 37 | 0 | 0 | 0 | 0.0% |
| Total, Argonne National Laboratory (West) | 1,957 | 1,132 | 2,100 | 968 | 85.5% |
| Brookhaven National Laboratory | | | | | |
| Nonproliferation and Verification R&D | 0 | 400 | 400 | 0 | 0.0% |
| Nonproliferation and International Security | 962 | 2,384 | 3,036 | 652 | 27.3% |
| International Nuclear Materials Protection | 42,664 | 42,927 | 41,085 | -1,842 | -4.3% |
| Russian Transition Initiatives | 5,139 | 5,232 | 5,326 | 94 | 1.8% |
| HEU Transparency Implementation | 25 | 25 | 0 | -25 | -100.0% |
| International Nuclear Safety and | 500 | 300 | 300 | 0 | 0.0% |
| Accelerated Material Disposition | 0 | 0 | 2,000 | 2,000 | 100.0% |
| Total, Brookhaven National Laboratory | 49,290 | 51,268 | 52,147 | 879 | 1.7% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Nonproliferation and Verification R&D | 262 | 0 | 0 | 0 | 0.0% |
| Nonproliferation and International Security | 525 | 50 | 50 | 0 | 0.0% |
| Total, Chicago Operations Office | 787 | 50 | 50 | 0 | 0.0% |
| Environmental Measurements Lab (EML) | | | | | |
| Nonproliferation and Verification R&D | 1,100 | 100 | 100 | 0 | 0.0% |
| MOX Fuel Fabrication Facility (DCS) | | | | | |
| Fissile Materials Disposition | 65,993 | 93,000 | 402,000 | 309,000 | 332.3% |
| MOX Fuel Fabrication and Irradiation Facility | | | | | |
| Fissile Materials Disposition | 34,700 | 43,500 | 28,400 | -15,100 | -34.7% |
| National Renewable Energy Laboratory (NREL) | | | | | |
| Russian Transition Initiatives | 1,432 | 1,457 | 1,483 | 26 | 1.8% |
| New Brunswick Laboratory | | | | | |
| Nonproliferation and International Security | 560 | 571 | 581 | 10 | 1.8% |
| International Nuclear Materials Protection | 165 | 58 | 48 | -10 | -17.2% |
| HEU Transparency Implementation | 450 | 450 | 450 | 0 | 0.0% |
| Total, New Brunswick Laboratory | 1,175 | 1,079 | 1,079 | 0 | 0.0% |
| Pit Disassembly and Conversion Facility | | | | | |
| Fissile Materials Disposition | 11,000 | 33,000 | 13,600 | -19,400 | -58.8% |
| Total, Chicago Operations Office | 191,700 | 244,320 | 525,944 | 281,624 | 115.27% |
| **IDAHO OPERATIONS OFFICE** | | | | | |
| Idaho National Engineering and Environmental | | | | | |
| Nonproliferation and Verification R&D | 1,190 | 0 | 0 | 0 | 0.0% |
| Nonproliferation and International Security | 296 | 301 | 306 | 5 | 1.7% |
| International Nuclear Materials Protection | 73 | 0 | 0 | 0 | 0.0% |
| Russian Transition Initiatives | 1,137 | 1,157 | 1,178 | 21 | 1.8% |
| International Nuclear Safety and | 900 | 0 | 0 | 0 | 0.0% |
| Total, INEEL | 3,596 | 1,458 | 1,484 | 26 | 1.8% |
| Idaho Operations Office | | | | | |
| Nonproliferation and Verification R&D | 600 | 600 | 600 | 0 | 0.0% |
| Total, Idaho Operations Office | 4,196 | 2,058 | 2,084 | 26 | 1.3% |
| **KANSAS CITY SITE OFFICE** | | | | | |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Kansas City Plant | | | | | |
| Russian Transition Initiatives | 302 | 307 | 313 | 6 | 2.0% |
| Total, Kansas City Site Office | 302 | 307 | 313 | 6 | 2.0% |
| **LIVERMORE SITE OFFICE** | | | | | |
| Lawrence Livermore National Laboratory | | | | | |
| Nonproliferation and Verification R&D | 39,734 | 25,987 | 25,029 | -958 | -3.7% |
| Nonproliferation and International Security | 9,342 | 10,222 | 10,970 | 748 | 7.3% |
| International Nuclear Materials Protection | 37,771 | 30,395 | 33,261 | 2,866 | 9.4% |
| Russian Transition Initiatives | 11,281 | 5,484 | 5,690 | 206 | 3.8% |
| HEU Transparency Implementation | 5,800 | 5,800 | 5,950 | 150 | 2.6% |
| International Nuclear Safety and | 150 | 200 | 225 | 25 | 12.5% |
| Fissile Materials Disposition | 1,900 | 2,500 | 1,168 | -1,332 | -53.3% |
| Total, Lawrence Livermore National Lab | 105,978 | 80,588 | 82,293 | 1,705 | 2.1% |
| Livermore Site Office | | | | | |
| Nonproliferation and Verification R&D | 5,805 | 2,886 | 2,886 | 0 | 0.0% |
| Total, Livermore Site Office | 111,783 | 83,474 | 85,179 | 1,705 | 2.0% |
| **LOS ALAMOS SITE OFFICE** | | | | | |
| Los Alamos National Laboratory (LANL) | | | | | |
| Nonproliferation and Verification R&D | 62,205 | 64,547 | 65,588 | 1,041 | 1.6% |
| Nonproliferation and International Security | 24,847 | 24,261 | 27,003 | 2,742 | 11.3% |
| International Nuclear Materials Protection | 20,064 | 18,084 | 18,512 | 428 | 2.4% |
| Russian Transition Initiatives | 7,512 | 3,113 | 3,259 | 146 | 4.7% |
| HEU Transparency Implementation | 1,400 | 2,200 | 2,300 | 100 | 4.5% |
| International Nuclear Safety and | 35 | 50 | 125 | 75 | 150.0% |
| Fissile Materials Disposition | 43,270 | 43,000 | 40,907 | -2,093 | -4.9% |
| Total, LANL | 159,333 | 155,255 | 157,694 | 2,439 | 1.6% |
| Los Alamos Site Office | | | | | |
| Nonproliferation and Verification R&D | 2,110 | 0 | 0 | 0 | 0.0% |
| Total, Los Alamos Site Office | 161,443 | 155,255 | 157,694 | 2,439 | 1.6% |
| **NATIONAL ENERGY TECHNOLOGY** | | | | | |
| Elimination of Weapons-Grade Plutonium | 8,500 | 0 | 0 | 0 | 0.0% |
| Total, NETL | 8,500 | 0 | 0 | 0 | 0.0% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| **NEVADA SITE OFFICE** | | | | | |
| Nevada Site Office | | | | | |
| Nonproliferation and Verification R&D . . . . . | 0 | 8,650 | 8,650 | 0 | 0.0% |
| Nonproliferation and International Security . . | 17 | 19 | 19 | 0 | 0.0% |
| International Nuclear Materials Protection | 10,962 | 8,702 | 13,695 | 4,993 | 57.4% |
| Total, Nevada Site Office . . . . . | 10,979 | 17,371 | 22,364 | 4,993 | 28.7% |
| Remote Sensing Laboratory | | | | | |
| Nonproliferation and Verification R&D . . . . . | 4,315 | 50 | 50 | 0 | 0.0% |
| HEU Transparency Implementation . . . . . | 375 | 375 | 400 | 25 | 6.7% |
| International Nuclear Safety and | 75 | 250 | 325 | 75 | 30.0% |
| Total, Remote Sensing Laboratory . . . . . | 4,765 | 675 | 775 | 100 | 14.8% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Total, Nevada Site Office | 15,744 | 18,046 | 23,139 | 5,093 | 28.2% |
| **NNSA SERVICE CENTER** | | | | | |
| Atomic Energy of Canada, Ltd. | | | | | |
| Fissile Materials Disposition | 697 | 1,000 | 1,072 | 72 | 7.2% |
| General Atomics (GA) | | | | | |
| Fissile Materials Disposition | 4,500 | 1,000 | 1,125 | 125 | 12.5% |
| Lawrence Berkeley National Laboratory (LBNL) | | | | | |
| Nonproliferation and Verification R&D | 1,438 | 2,270 | 2,270 | 0 | 0.0% |
| Nonproliferation and International Security | 25 | 25 | 25 | 0 | 0.0% |
| Russian Transition Initiatives | 2,690 | 2,738 | 2,787 | 49 | 1.8% |
| Total, LBNL | 4,153 | 5,033 | 5,082 | 49 | 1.0% |
| NNSA Service Center (All Other Sites) | | | | | |
| Nonproliferation and Verification R&D | 35,806 | 0 | 0 | 0 | 0.0% |
| Nonproliferation and International Security | 3,362 | 3,423 | 3,485 | 62 | 1.8% |
| International Nuclear Materials Protection | 23,838 | 8,189 | 6,975 | -1,214 | -14.8% |
| Russian Transition Initiatives | 600 | 610 | 621 | 11 | 1.8% |
| HEU Transparency Implementation | 600 | 1,600 | 2,200 | 600 | 37.5% |
| Elimination of Weapons-Grade Plutonium | 0 | 49,339 | 50,000 | 661 | 1.3% |
| Fissile Materials Disposition | 5,900 | 5,500 | 5,875 | 375 | 6.8% |
| Total, NNSA Service Center (All Other Sites) | 70,106 | 68,661 | 69,156 | 495 | 0.7% |
| Nonproliferation and National Security Institute | | | | | |
| Nonproliferation and Verification R&D | 270 | 50 | 50 | 0 | 0.0% |
| Total, NNSA Service Center | 79,726 | 75,744 | 76,485 | 741 | 1.0% |
| **OAK RIDGE OPERATIONS OFFICE** | | | | | |
| Oak Ridge National Laboratory | | | | | |
| Nonproliferation and Verification R&D | 8,200 | 5,380 | 5,380 | 0 | 0.0% |
| Nonproliferation and International Security | 9,052 | 9,051 | 10,919 | 1,868 | 20.6% |
| International Nuclear Materials Protection | 56,477 | 32,016 | 33,086 | 1,070 | 3.3% |
| Fissile Materials Disposition | 11,150 | 17,800 | 18,237 | 437 | 2.5% |
| Subtotal, Oak Ridge National Laboratory | 84,879 | 64,247 | 67,622 | 3,375 | 5.3% |
| Oak Ridge Operations Office | | | | | |
| HEU Transparency Implementation | 35 | 35 | 0 | -35 | -100.0% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Y-12 Site Office | | | | | |
| Russian Transition Initiatives | 3,325 | 3,385 | 3,446 | 61 | 1.8% |
| Y-12 National Security Complex (Y-12) | | | | | |
| HEU Transparency Implementation | 2,770 | 3,879 | 4,000 | 121 | 3.1% |
| Accelerated Material Disposition | 0 | 0 | 25,000 | 25,000 | 100.0% |
| Fissile Materials Disposition | 13,236 | 48,000 | 44,900 | -3,100 | -6.5% |
| Total, Y-12 | 16,006 | 51,879 | 73,900 | 22,021 | 42.4% |
| Total, Oak Ridge Operations Office | 104,245 | 119,546 | 144,968 | 25,422 | 21.3% |
| **PANTEX SITE OFFICE** | | | | | |
| Pantex Plant | | | | | |
| Nonproliferation and International Security | 200 | 1,050 | 1,050 | 0 | 0.0% |
| International Nuclear Materials Protection | 185 | 0 | 0 | 0 | 0.0% |
| Fissile Materials Disposition | 7,805 | 8,640 | 8,275 | -365 | -4.2% |
| Total, Pantex Site office | 8,190 | 9,690 | 9,325 | -365 | -3.8% |
| **RICHLAND OPERATIONS OFFICE** | | | | | |
| Pacific Northwest National Laboratory | | | | | |
| Nonproliferation and Verification R&D | 16,004 | 14,035 | 13,354 | -681 | -4.9% |
| Nonproliferation and International Security | 6,147 | 8,073 | 10,338 | 2,265 | 28.1% |
| International Nuclear Materials Protection | 49,369 | 35,408 | 37,112 | 1,704 | 4.8% |
| Russian Transition Initiatives | 5,196 | 2,289 | 2,384 | 95 | 4.2% |
| HEU Transparency Implementation | 30 | 0 | 0 | 0 | 0.0% |
| International Nuclear Safety and | 44,756 | 7,401 | 3,750 | -3,651 | -49.3% |
| Elimination of Weapons-Grade Plutonium | 4,200 | 0 | 0 | 0 | 0.0% |
| Fissile Materials Disposition | 2,534 | 4,000 | 166 | -3,834 | -95.9% |
| Total, Richland Operations Office | 128,236 | 71,206 | 67,104 | -4,102 | -5.8% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| **SANDIA SITE OFFICE** | | | | | |
| Sandia National Laboratory (SNL) | | | | | |
| Nonproliferation and Verification R&D . . . . . | 70,525 | 68,810 | 69,853 | 1,043 | 1.5% |
| Nonproliferation and International Security . . | 19,643 | 16,076 | 16,102 | 26 | 0.2% |
| International Nuclear Materials Protection | 56,166 | 43,263 | 35,557 | -7,706 | -17.8% |
| Russian Transition Initiatives . . . . . | 6,061 | 2,170 | 2,281 | 111 | 5.1% |
| HEU Transparency Implementation . . . . . | 1,665 | 2,065 | 1,900 | -165 | -8.0% |
| International Nuclear Safety and | 225 | 1,050 | 1,125 | 75 | 7.1% |
| Fissile Materials Disposition . . . . . | 0 | 160 | 680 | 520 | 325.0% |
| Total, Sandia Site Office . . . . . | 154,285 | 133,594 | 127,498 | -6,096 | -4.6% |
| **SAVANNAH RIVER OPERATIONS OFFICE** | | | | | |
| Savannah River Operations Office | | | | | |
| Nonproliferation and International Security . . | 1,133 | 1,345 | 1,368 | 23 | 1.7% |
| International Nuclear Materials Protection | 370 | 261 | 181 | -80 | -30.7% |
| Fissile Materials Disposition . . . . . | 5,300 | 11,660 | 25,600 | 13,940 | 119.6% |
| Total, Savannah River Operations Office | 6,803 | 13,266 | 27,149 | 13,883 | 104.7% |
| Savannah River Site Office | | | | | |
| Elimination of Weapons-Grade Plutonium | 1,000 | 0 | 0 | 0 | 0.0% |
| Savannah River Site (SRS) | | | | | |
| Fissile Materials Disposition . . . . . | 51,300 | 65,300 | 63,100 | -2,200 | -3.4% |
| Savannah River Technical Center | | | | | |
| Nonproliferation and Verification R&D . . . . . | 4,411 | 2,895 | 2,895 | 0 | 0.0% |
| Nonproliferation and International Security . . | 2,141 | 1,021 | 1,039 | 18 | 1.8% |
| Russian Transition Initiatives . . . . . | 1,796 | 1,828 | 1,861 | 33 | 1.8% |
| Total, Savannah River Technical Center . . . . . | 8,348 | 5,744 | 5,795 | 51 | 0.9% |
| Total, Savannah River Operations Office . . . . . | 67,451 | 84,310 | 96,044 | 11,734 | 13.9% |
| **WASHINGTON HEADQUARTERS** | | | | | |
| Washington Headquarters | | | | | |
| Nonproliferation and Verification R&D . . . . . | 5,052 | 6,712 | 6,333 | -379 | -5.6% |
| Nonproliferation and International Security . . | 4,359 | 5,944 | 6,128 | 184 | 3.1% |
| International Nuclear Materials Protection | 8,080 | 4,092 | 3,788 | -304 | -7.4% |
| Russian Transition Initiatives . . . . . | 7,486 | 6,467 | 6,219 | -248 | -3.8% |

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Elimination of Weapons-Grade Plutonium | 500 | 0 | 0 | 0 | 0.0% |
| International Nuclear Safety and | 1,800 | 1,325 | 550 | -775 | -58.5% |
| Fissile Materials Disposition | 885 | 5,940 | 1,400 | -4,540 | -76.4% |
| Total, Washington Headquarters | 28,162 | 30,480 | 24,418 | -6,062 | -19.9% |
| Russian Federation | | | | | |
| Fissile Materials Disposition | 42,000 | 64,000 | 0 | -64,000 | -100.0% |
| Total, Washington Headquarters | 70,162 | 94,480 | 24,418 | -70,062 | -74.2% |
| Subtotal, Defense Nuclear Nonproliferation | 1,105,963 | 1,092,030 | 1,340,195 | 248,165 | 22.7% |
| Prior Year Balances | -57,833 | -64,000 | 0 | 64,000 | -100.0% |
| Total, Defense Nuclear Nonproliferation | 1,048,130 | 1,028,030 | 1,340,195 | 312,165 | 30.4% |
| | | | | | |
| Summary by Program: | | | | | |
| Nonproliferation and Verification R&D | 259,407 | 203,807 | 203,873 | 66 | 0.0% |
| International Nuclear Safety and | 53,961 | 14,576 | 14,083 | -493 | -3.4% |
| HEU Transparency Implementation | 13,950 | 17,229 | 18,000 | 771 | 4.5% |
| Elimination of Weapons-Grade Plutonium | 14,200 | 49,339 | 50,000 | 661 | 1.3% |
| Accelerated Material Disposition | 0 | 0 | 30,000 | 30,000 | |
| Nonproliferation and International Security | 90,646 | 92,668 | 101,734 | 9,066 | 9.8% |
| Russian Transition Initiatives | 57,000 | 39,334 | 40,000 | 666 | 1.7% |
| International Nuclear Materials Protection | 314,592 | 227,077 | 226,000 | -1,077 | -0.5% |
| Fissile Materials Disposition | 302,207 | 448,000 | 656,505 | 208,505 | 46.5% |
| Subtotal, Defense Nuclear Nonproliferation. | 1,105,963 | 1,092,030 | 1,340,195 | 248,165 | 22.7% |
| Prior Year Balances | -57,833 | -64,000 | 0 | 64,000 | -100.0% |
| Total, Defense Nuclear Nonproliferation | 1,048,130 | 1,028,030 | 1,340,195 | 312,165 | 30.4% |

## Global Partnership

The Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, formed at the Kananaskis Summit in June 2002 has recommitted the G8 nations (the United States, Canada, France, Germany, Italy, Japan, Russia, and the United Kingdom) to address nonproliferation, disarmament, counter-terrorism, and nuclear safety issues. The G8 leaders have pledged to devote up to $20 billion over ten years to support cooperative efforts, initially in Russia, and have invited other similarly motivated countries to participate in this partnership. President Bush has committed the U.S. to provide $10 billion over ten years to be matched by $10 billion from the other members, attesting to the belief that nonproliferation concerns are of the highest government priority; and therefore that this program's work is of paramount importance for the security of the nation and the world. While progress in these programs has proven to be more than a matter of devoting resources to the problems, the results achieved by President's Bush and Putin in their summit discussions are hopeful and positive signs of a future full and complete cooperation in these critical Weapons of Mass Destruction. The following table reflects the Department of Energy activities by country and program which are part of the government-wide activities totaling $1 billion in the years FY 2004-2008:

### U.S. Nonproliferation and Threat Reduction Assistance to Former Soviet States

**(dollars in millions)**

| Summary by Country | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 |
|---|---|---|---|---|---|
| Russia | 426.9 | 465.5 | 477.7 | 489.3 | 499.8 |
| Kasakhstan | 14.9 | 6.1 | 3.9 | 3.0 | 3.0 |
| Ukraine | 10.6 | 3.8 | 3.9 | 4.0 | 4.2 |
| Uzbekistan | 3.2 | 0.6 | 0.6 | 0.6 | 0.6 |
| Georgia | 2.1 | | | | |
| Armenia | 1.7 | | | | |
| Total, Russian & FSU | **459.4** [a] | **476.0** | **486.1** | **496.9** | **507.6** |

[a]Excludes $6,000,000 for Nuclear Assessment activities transferred to the Department of Homeland Security

| Summary by Program | FY 2004 | FY 2005 | FY2006 | FY 2007 | FY 2008 |
|---|---|---|---|---|---|
| Nonproliferation & International Security | 45.2 | 37.0 | 35.6 | 36.4 | 37.4 |
| International Materials Protection & Cooperation | 226.0 | 261.0 | 268.1 | 273.1 | 279.0 |
| Russian Transition Initiative | 40.0 | 41.0 | 42.0 | 43.0 | 43.0 |
| HEU Transparency Implementation | 18.0 | 18.0 | 18.0 | 19.0 | 19.1 |
| International Nuclear Safety and Cooperation | 3.1 | 2.9 | 2.4 | 1.4 | 1.4 |
| Elimination of Weapons-Grade Plutonium Production | 50.0 | 52.0 | 52.0 | 53.0 | 54.7 |
| Accelerated Materials Disposition | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Russian Fissile Materials Disposition | 47.1 | 64.1 | 68.0 | 71.0 | 73.0 |
| Total, Russia & FSU | **459.4** | **476.0** | **486.1** | **496.9** | **507.6** |

## Workforce Planning

The Federal staffing requirements have grown along with the added responsibilities associated with management and oversight of construction projects in the United States and Russia., accelerated materials disposition activities agreed to in the G8 Summit, and many other nuclear nonproliferation activities in Russia and the Former Soviet Union that have emerged since September 11, 2001. Defense Nuclear Nonproliferation received supplemental funding in FY 2002 to hire 24 additional staff and another 29 when Congress approved a reprogramming in early October 2002. The staffing level is now generally in alignment with the increased level of nonproliferation program activities. Funding for Federal staffing is included in the Office of the Administrator account. Below is a table reflecting the distribution of the Defense Nuclear Nonproliferation workforce:

(whole FTEs)

| | FY 2002 | FY 2003 | FY2004 |
|---|---|---|---|
| Chicago Operations Office | 5 | 8 | 8 |
| NNSA Service Center | 1 | 1 | 1 |
| Savannah River Site Office | 11 | 15 | 15 |
| Total, Field | 17 | 24 | 24 |
| International Offices | | | |
| Moscow | 3 | 5 | 5 |
| Vienna | 2 | 2 | 2 |
| Tokyo | 1 | 1 | 1 |
| Kiev | 1 | 2 | 2 |
| Paris | 1 | 1 | 1 |
| Total, International Offices | 8 | 11 | 11 |
| Headquarters | 168 | 209 | 209 |
| Total Defense Nuclear Nonproliferation | 193 [a] | 244 | 244 |

Chicago Operations Office: These full-time equivalents (FTEs) administer the Office of Fissile Materials Disposition contract with Duke, Cogema, Stone and Webster for the design of the MOX Fuel Fabrication Facility to be located at the Savannah River Site.

NNSA Service Center: This FTE supports the Advanced Reactor Technology work managed by the Headquarters Office of Fissile Materials Disposition.

Savannah River Site Office: These FTEs (which report directly to the Headquarters Office of Fissile Materials Disposition) manage and integrate site activities involving surplus plutonium and HEU, as well as crosscutting infrastructure support and coordinate the construction for the MOX FFF at the site through the Chicago Operations Office staff.

International Offices: These FTEs support critical international program implementation and provide services to the U.S. Embassy and NNSA and DOE travelers to these countries.

[a]Reflects actual FTE usage.

## Summary of DNN Five-Year Plan

The following summary of NNSA's Future Years Nuclear Security Program (FYNSP) incorporates the results from the Nuclear Posture Review and the Administration's recent review of non-proliferation assistance programs with Russia, as appropriate. Other important policy directions reflected in a number of programs include counterterrorism, nonproliferation, and homeland security as a result of the September 11th events.

### Future Years Nuclear Security Program

(dollars in millions)

| Program | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 |
|---|---|---|---|---|---|---|---|
| Defense Nuclear Nonproliferation | | | | | | | |
| Nonproliferation and Verification Research and Development | 204 | 204 | 210 | 219 | 225 | 234 | 239 |
| Nonproliferation and International Security | 93 | 102 | 104 | 100 | 102 | 102 | 104 |
| International Nuclear Materials Protection and Cooperation | 227 | 226 | 261 | 268 | 273 | 279 | 285 |
| Russian Transition Initiative | 39 | 40 | 41 | 42 | 43 | 43 | 44 |
| HEU Transparency Implementation | 17 | 18 | 18 | 18 | 19 | 19 | 19 |
| International Nuclear Safety and Cooperation | 15 | 14 | 14 | 15 | 15 | 15 | 16 |
| Elimination of Weapons-Grade Plutonium Production | 49 | 50 | 52 | 52 | 53 | 55 | 55 |
| Accelerated Materials Disposition[a] | 0 | 30 | 0 | 0 | 0 | 0 | 0 |
| Fissile Materials Disposition[b] | 384 | 657 | 656 | 657 | 659 | 575 | 585 |
| **Total, Defense Nuclear Nonproliferation** | **1,028** | **1,340** | **1,356** | **1,371** | **1,389** | **1,322** | **1,346** |

[a]Beyond FY 2004, the Administration is committed to providing the resources necessary to support the Accelerated Material Disposition program agreed to in the 2002 G8 summit.

[b]Beyond FY 2004, the Administration is committed to supporting the important Plutonium Disposition program for the long-term so that it remains on a trajectory to success.

# 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 to produce technologies that lead to prototype demonstrations and resultant detection systems, strengthening the U.S. response to current and projected threats to national security worldwide posed by the proliferation of nuclear, chemical, and biological weapons and the diversion of special nuclear material. The National Nuclear Security Administration (NNSA) Nonproliferation and Verification R&D program is the technical base which provides a wide range of operational agencies, including the Department of Defense and the Intelligence Community, with innovative systems and technologies to meet their nonproliferation and counterterrorism mission responsibilities.

NNSA is the only U.S. government agency investing in high risk technical solutions to proliferation and counterterrorism problems with a strategic view. The Nonproliferation and Verification R&D Program pushes the state-of-the-art in technology to detect and analyze proliferation activities, harnessing the technical excellence of the National Laboratories to develop prototypes and conduct technology demonstrations with other agencies who operationalize the systems for nonproliferation and counterterrorism missions. Those agencies have a short-term focus based on their operational missions, and the NNSA Nonproliferation and Verification R&D Program partners with these users to address near-term technology needs. At the same time, those agencies rely more and more on the NNSA to conduct the long-term R&D to provide innovative solutions for future systems to address their missions. The NNSA Nonproliferation and Verification R&D program has a long record of success in transitioning technology to end users.

The Nonproliferation and Verification R&D Program directly supports the NNSA mission and the goal in the NNSA Strategic Plan to "Detect, prevent, and reverse the proliferation of weapons of mass destruction while promoting nuclear safety worldwide". 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 and to meet U.S. nuclear explosion monitoring goals.

## Program Strategic Performance Goals

**NS2-1:** Enhance the capability to detect weapons of mass destruction (WMD), including nuclear and terrorists threats.

## Performance Indicators

Number of new technologies to remotely detect the early stages of a proliferant nation's nuclear weapon program demonstrated or tested.

Number of new technologies to identify the origins of nuclear materials, to monitor global fissile material production, to monitor Russian nuclear warhead dismantlement and to support cooperative threat reduction programs demonstrated or tested.

Percentage of progress on delivering the next operational satellite payloads to detect, locate, and identify nuclear explosions.

Number of ground-based nuclear explosion monitoring seismic stations calibrated.

Percentage of projects receiving a "Satisfactory" rating or higher by an independent peer review group.

Number of technology transfer/licensing agreements with DoD, Intelligence Agencies or industry.

Number of opportunities to advance scientific knowledge of proliferation detection through technical papers, symposium, publications and awards.

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed initial tests of new airborne radar and two different new airborne lidar systems. Deployed passive r&d hyperspectral system in support of Post-Sept. 11th operation. | Demonstrate or field test 4 prototype detection systems. | Demonstrate or lab test 9 prototype detection systems (including one airborne sensor for testing by DoD). |
| Conducted field tests for WMD detection concepts. | Demonstrate or test 14 new technologies (11 detection concepts for stand off detection of HEU and 3 prototype radiation systems for beta testing). | Test 13 new technologies (11 new detection concepts for fissile materials and 2 chemical detection systems). |
| Developed and delivered sensors and algorithms for detecting, locating, and identifying nuclear explosions when they occur in the atmosphere, in space, underground, or underwater, in partnership with monitoring agencies. | Reach 75% progress towards delivering the next operational satellite payload. | Complete the remaining 25% for a total of 100% progress towards delivering the next operational satellite payload. |
| | Provide calibration data for four (4) international seismic stations. | Provide calibration data for five (5) international seismic stations. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| | Achieve a "Satisfactory" rating or higher on 90% of the projects reviewed by an Independent peer group (40% of the proliferation detection program research portfolio and 100% of competitive awards reviewed this year). | Achieve a "Satisfactory" rating or higher on 90% of the projects reviewed by an Independent peer group (45% of the proliferation detection program research portfolio and 100% of competitive awards reviewed this year). |
| | Complete an additional 6 technology/licensing agreements. | Complete an additional 4 technology/licensing agreements. |
| | Achieve 49 opportunities to advance scientific knowledge of proliferation detection (45 papers, 3 symposium, and 1 award). | Achieve 80 opportunities to advance scientific knowledge of proliferation detection (75 papers, 4 symposium, and 1 award). |

## Significant Program Shifts

The Nonproliferation and Verification R&D Program activities are refocused into three program areas: proliferation detection, nuclear explosion monitoring, and supporting activities after transferring significant programmatic activities to the Department of Homeland Security. The activities being transferred in and therefore no longer displayed in this budget are the counter nuclear smuggling effort (formerly part of the Proliferation Detection Program) and the entire Chemical and Biological National Security Program.

The NNSA and the National Laboratories, with their nuclear weapons program experience, have unique insight into nuclear proliferation activities — the facilities and infrastructure that would be necessary and the observable signatures of nuclear weapon development and test activity — and the capability to develop technical solutions for the U.S. government to detect such proliferation activities in their early stages. The NNSA has also worked closely with homeland security agencies, including U.S. Customs, U.S. Coast Guard, and the Departments of Transportation and Justice to apply this technical base to detection of nuclear weapons and materials at U.S. borders. While the counter nuclear smuggling activities applied directly to such homeland security needs are planned to be transferred to the Department of Homeland Security, other programmatic activities in Proliferation Detection and Nuclear Explosion Monitoring which serve nonproliferation missions will remain in the NNSA. Activities in the Proliferation Detection program which are applicable to both nonproliferation and counterterrorism missions, will be managed to jointly serve the needs of both Departments, together with other relevant agencies.

The NNSA Nonproliferation R&D Program has also developed technologies and systems to improve the U.S. capability to prepare for and respond to domestic chemical and biological threats against civilian populations, complementing DOD's focus on the battlefield and military installations. As part its primary nuclear science and technology mission, NNSA and the National Laboratories have developed extensive capabilities in chemistry, biology, and materials and engineering sciences which formed the basis for the NNSA chemical and biological national security program. The NNSA has conducted research on the biological foundations necessary to establish signatures of biological threat agents and develop assays certified by the Centers for Disease Control for those agents, which are applied to develop detectors. The NNSA has conducted demonstration projects of prototype detector capabilities in partnership with other agencies which have operational missions, to illustrate possible system approaches for population protection. This responsibility for development of biological and chemical protection and response technologies is being transferred to the Department of Homeland Security.

# Funding Profile

(dollars in thousands)

| Nonproliferation and Verification R&D | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| Proliferation Detection | 142,142 | 108,536 | 108,263 | -273 | -0.3% |
| Nuclear Explosion Monitoring | 76,407 | 88,559 | 89,277 | 718 | 0.8% |
| Supporting Activities | 5,052 | 6,712 | 6,333 | -379 | -5.6% |
| Construction, 00-D-192, Nonproliferation and International Security Center, LANL | 35,806 | 0 | 0 | 0 | 0.0% |
| Total, Nonproliferation and Verification R&D | 259,407[a] | 203,807 | 203,873 | 66 | 0.0% |

**Public Law Authorization:**

Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003

[a]Reflects adjustment of $229,000 for government-wide rescission of funds in administrative and travel accounts required by section 1403 of the 2002 Supplemental Appropriations Act for Further Recovery From and Response to Terrorist Attacks on the United States (H.R. 4775).

# Funding by Site

(dollars in thousands)

| Nonproliferation and Verification R&D: | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Ames Laboratory | 180 | 180 | 180 | 0 | 0.0% |
| Argonne National Laboratory | 200 | 255 | 255 | 0 | 0.0% |
| Brookhaven National Laboratory | 0 | 400 | 400 | 0 | 0.0% |
| Chicago Operations Office | 262 | 0 | 0 | 0 | 0.0% |
| Environmental Measurements Laboratory | 1,100 | 100 | 100 | 0 | 0.0% |
| Total, Chicago Operations Office | 1,742 | 935 | 935 | 0 | 0.0% |
| Idaho Operation Office | | | | | |
| Idaho National Engineering and Environmental Laboratory | 1,190 | 0 | 0 | 0 | 0.0% |
| Idaho Operations Office | 600 | 600 | 600 | 0 | 0.0% |
| Total, Idaho Operations Office | 1,790 | 600 | 600 | 0 | 0.0% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory | 39,734 | 25,987 | 25,029 | -958 | -3.7% |
| Livermore Site Office | 5,805 | 2,886 | 2,886 | 0 | 0.0% |
| Total, Livermore Site Office | 45,539 | 28,873 | 27,915 | -958 | -3.3% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory | 62,205 | 64,547 | 65,588 | 1,041 | 1.6% |
| Los Alamos Site Office | 2,110 | 0 | 0 | 0 | 0.0% |
| Total, Los Alamos Site Office | 64,315 | 64,547 | 65,588 | 1,041 | 1.6% |
| Nevada Site Office | | | | | |
| Nevada Site Office | 0 | 8,650 | 8,650 | 0 | 0.0% |
| Remote Sensing Laboratory | 4,315 | 50 | 50 | 0 | 0.0% |
| Total, Nevada Site Office | 4,315 | 8,700 | 8,700 | 0 | 0.0% |
| NNSA Service Center | | | | | |
| Lawrence Berkeley National Laboratory | 1,438 | 2,270 | 2,270 | 0 | 0.0% |
| NNSA Service Center (All Other Sites) | 35,806 | 0 | 0 | 0 | 0.0% |
| Nonproliferation and National Security | 270 | 50 | 50 | 0 | 0.0% |

(dollars in thousands)

| **Nonproliferation and Verification R&D**: | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Total, NNSA Service Center | 37,514 | 2,320 | 2,320 | 0 | 0.0% |
| Oak Ridge Operations Office | | | | | |
| Oak Ridge National Laboratory | 8,200 | 5,380 | 5,380 | 0 | 0.0% |
| Total, Oak Ridge Operations Office | 8,200 | 5,380 | 5,380 | 0 | 0.0% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 16,004 | 14,035 | 13,354 | -681 | -4.9% |
| Total, Richland Operations Office | 16,004 | 14,035 | 13,354 | -681 | -4.9% |
| Sandia Site Office | | | | | |
| Sandia National Laboratories | 70,525 | 68,810 | 69,853 | 1,043 | 1.5% |
| Total, Sandia Site Office | 70,525 | 68,810 | 69,853 | 1,043 | 1.5% |
| Savannah River Operation Office | | | | | |
| Savannah River Technology Center | 4,411 | 2,895 | 2,895 | 0 | 0.0% |
| Total, Savannah River Operations Office | 4,411 | 2,895 | 2,895 | 0 | 0.0% |
| Washington Headquarters | 5,052 | 6,712 | 6,333 | -379 | -5.6% |
| Total, Nonproliferation and Verification R&D | 259,407 | 203,807 | 203,873 | 66 | 0.0% |

## Site Description

### Lawrence Berkeley National Laboratory

The 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.

### Livermore Site Office

The 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 proliferation 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.

### Los Alamos Site Office

The Los Alamos National Laboratory (LANL) provides 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 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.

### Oak Ridge National Laboratory

The Oak Ridge National Laboratory (ORNL) will conduct research against the nuclear threat from nuclear weapons and radiological dispersal 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 investigate new sensor concepts to detect and provide early warning of the presence of nuclear materials in the environment.

### 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

understand 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 illicit 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.

## Nevada Site Office

The Remote Sensing Test and Evaluation Center (RSTEC), which is managed by National Nuclear Security Administration (NNSA) Nevada Site Office, 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 and user-sponsored experiments for both government and industry. In addition, Bechtel Nevada provides for facility maintenance and equipment upgrades needed to support sensor testing and system calibration.

## Sandia Site Office

The Sandia National Laboratories (SNL) develops, demonstrates, and validates 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 supports the U.S. satellite-based program to detect nuclear detonations by providing systems engineering, the optical sensors, and the on-orbit processing technologies. SNL develops advanced Synthetic Aperture Radars and analysis methods for mapping and the detection of proliferation events. SNL develops an ultraviolet system for remote detection of effluents. SNL will continue operation of the multispectral thermal imager satellite.

## Savannah River Site Office

The Savannah River Technology Center (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

The NNSA Headquarters provides overall programmatic guidance, interagency and cross laboratory coordination, and in conjunction with the NNSA Service Center, provides for 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, and the Oak Ridge Institute for Science and Education, Kansas City Plant, Nonproliferation and National Security Institute, Pantex, Ames, Brookhaven National Laboratory and the Y-12 Plant for research and support activities.

# Proliferation Detection

## Mission Supporting Goals and Measures

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 goal is to maintain U.S. leadership in deterring nuclear proliferation by early detection and assessment of emerging threats including known or declared nuclear weapon proliferants and terrorist use of weapons of mass destruction. This is accomplished by developing and demonstrating technologies to inhibit nuclear materials diversion, and identify nuclear weapon activities in known and emerging states, and verify nuclear arms reductions. 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 advance 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 a 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 knowledge of weapon production phenomena to assess remotely observable signatures.
- Conduct modeling and testing to understand the fate and transport (environmental effects) of 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 identify 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 2004, the program will continue testing activities to evaluate R&D products as replacement systems that can significantly advance the nation's nuclear proliferation detection capability, the inclusion of terrorist scenarios, and 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 continue on new algorithms to exploit synthetic aperture radar imaging and other physical detection methods.

## Proliferation Detection Goals

Enhance the capability to detect weapons of mass destruction at the early stage of a country's (or group's) WMD development program, outside our boarders, even when cooperation or access is denied.

## Performance Indicators

Updated community-vetted WMD threat information will be used to guide the program for new/improved sensors to be developed from concept to prototype. Understanding likely WMD pathways including manufacturing processes and denial and deception methods to mask observables will prioritize which signatures and signal strengths that can be measured/monitored to detect and track this proliferation.

Increased sensitivity and utility of demonstrated technical approaches to monitor priority threat proliferation pathways notwithstanding deception practice of adversaries.

Successful transfer of proliferation monitoring technology to user agencies and US industry.

Improve methods and detection materials to detect fissile materials. Approximately ten concepts are being pursued.

Improve national capability on nuclear weapons and radiological material attribution.

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed initial tests of new airborne radar and two different new airborne lidar systems. Deployed passive R&D hyperspectral system in support of post-Sept. $11^{th}$ operation. | Conduct field trials on two (2) advanced standoff detection systems that have a proof of concept. | Conduct field trials on three (3) advanced standoff detection systems and demonstrate potential applications. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| | Sponsor one (1) Proliferation Detection Technology information exchange symposium. Issue one (1) updated report on threat signatures and technical approaches to address priority detection problems. | Sponsor one (1) Proliferation Detection Technology information exchange symposium. Issue one (1) updated report on threat signatures and technical approaches to address priority detection problems. |
| Conducted joint field tests with US Army Night Vision Lab on optical fluorescence detection concepts. | Four (4) laboratory demonstrations of microtechnology for use in prototype systems. One (1) experimental test on optical detection concept for fissile material. | Field test three (3) methods and concepts that improve the national capability to counter nuclear terrorism. |
| Conducted field experiments on gamma-ray imager. | Demonstrate four (4) cost effective radiation detector systems. | Demonstrate two (2) long-range detection concepts to track and monitor special nuclear materials in transit. |
| Transferred special software technology to industry to enhance commercially available detection system. | Demonstrate one (1) new handheld technology based on microtechnology to detect chemicals related to nuclear weapons production. | License two (2) micro technology prototypes to industry. License two (2) software upgrades to improve commercial radiation detection systems. |
| Initial Framework of threat signature report, consolidating and updating prior work, and extended to address first tier of new priority threats | Advanced analysis of first tier threats including signature identification and signal strength field tests for likely observables, and beginning of second tier threat analysis. | Completion of first tier threat signature development, and advanced analysis of second tier threats. |
| Conduct a flight test of an airborne remote sensing technology for improved sensitivity proliferation signature detection and characterization. Conduct joint interagency ground field trials of an improved standoff WMD warning and defense technology. | Complete payload and sensor integration of an experimental space sensor to validate improved sensitivity and detection of certain proliferation signatures. Conduct field test of ground based technology for standoff detection of proliferation signatures. | In collaboration with user agency, test a prototype standoff sensor that validates operational utility. Complete the five-year development of a national nuclear proliferation signature library. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Commercialization of two (2) high performance radiation detection systems will be completed. | Four (4) technical transfer to industry to improve commercialization of Cadmium Zinc Telluride (CZT). | Full field-testing of three (3) long-range stand off concepts to detect HEU. Transfer to industry two (2) improved laboratory methods for mass spectroscopy. |
| A modeling-driven selection process to develop systems and detectors that are potentially better than commercially available. Explore methods with increased stand off detection and with operational improvements such as lower cost and with real time isotopic selectivity. | Experimental testing of six (6) radiation detection materials for future commercial transfer. Establish two (2) agreements with industrial partners to exploit recent advances in new detection materials. | Using a model-driven selection process to initiate four (4) new radiation detection concepts that are potentially better than commercially available. Explore two (2) new methods to increase stand off detection of fissile materials. |
| Expand the existing partnerships with DOD and Intel agencies to conduct R&D to improve both tactical and strategic capabilities to determine of the threat and origin of nuclear materials and weapons from non-US sources. | Develop three (3) multiyear R&D technology plans to prioritize the research experimentation, and demonstration/transfer of detection and analytical methods to aid in assessments on foreign sources of fissile and radiological materials. Transfer to users one (1) particle and one (1) gas detection sampling method to support existing monitoring capability. | Proceed with first phase of a multi year plan to develop technology to enhanced science & technology on forensic capability to attribute sources fissile and radiological materials. Conduct six(6) field tests of prototype systems for DoD applications. |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Total, Proliferation Detection | 142,142 | 108,536 | 108,263 | -273 | -0.3% |

## Detailed Program Justification

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Proliferation Detection**

The Proliferation Detection program develops and demonstrates innovative remote sensing and ground-based technologies for detection and analysis of foreign nuclear weapon programs, global nuclear materials production, the diversion of special nuclear materials, and the early stages of emerging proliferation of weapons of mass destruction. The proliferation detection program is comprised of enabling technology, integrated products and systems, and demonstrations of concepts to support technology transfer to U.S. Government users.

The program develops enabling technologies through applied research on innovative concepts to advance the U.S. Government capability to counter the threat from weapons of mass destruction 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, hyperspectral imaging, optical trapping, radiation detection, and use of superconducting materials are examples that may contribute significant results or revolutionary improvements to current systems and 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 the nonproliferation and arms control communities.

The program develops integrated systems that are scientifically sound concepts to support high priority needs that 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, and 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 partnership with the user 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.

The program fields demonstrations in partnership with users, which 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. There will be technology transfer goals established during the demonstration development process.

| | | | |
|---|---|---|---|
| Total, Proliferation Detection . . . . . | 142,142 | 108,536 | 108,263 |

# Nuclear Explosion Monitoring

## Mission Supporting Goals and Measures

The mission of the Nuclear Explosion Monitoring Research and Engineering program is to develop, demonstrate, and deliver advanced technologies and systems to operational monitoring agencies to fulfill U.S. monitoring requirements and policies for detecting nuclear explosions.

The Nuclear Explosion Monitoring Research & Engineering 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 more important than ever in this time of high nuclear proliferation concern. It is certainly far better to detect a nuclear weapon in its development and testing phase and exert pressure to cease and desist on the proliferator than it is to counter an actual nuclear attack. The NNSA Nuclear Explosion Monitoring Research & Engineering program directly addresses this need.

The satellite-based systems part of this program is developing and demonstrating in space a new generation of high-sensitivity optical, electromagnetic-pulse, and x-ray sensors for Global Positioning System Block IIF satellites. Over the 42 years of this program, 138 NNSA satellite payloads have been launched, using U.S. Air Force and National Aeronautics and Space Administration boosters.

The ground-based systems part of this program focuses on integration of research and engineering products, such as calibration data for seismic, radionuclide, hydroacoustic, and infrasound stations, as well as other research 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 Knowledge Base configuring large data sets of monitoring information into useful electronic form for operational use, a modern infrasound prototype, and the previously developed R&D 100 award-winning radionuclide detector systems. One key benefit of the NNSA Knowledge Base to U.S. monitoring agencies is the improvement of U.S. monitoring capability realized by combining teleseismic information with regional monitoring methods to enable detection of very low yield events that might arise from proliferant nations or transnational groups.

### Nuclear Explosion Monitoring Goals

Enhance the capability to detect, locate, and identify nuclear explosions underground, underwater, in the atmosphere, and in space.

### Performance Indicators

Deliver operational satellite payloads and demonstrate new improved technologies to detect, locate, and identify nuclear explosions.

Deliver new releases of the NNSA Knowledge Base for enhanced operational capabilities for the ground-based nuclear explosion monitoring systems.

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Conducted an electromagnetic pulse sensor Critical Design Review, the last of a series of design reviews for the new generation of nuclear explosion monitoring sensors to be launched aboard Global Positioning System (GPS) Block IIF satellites. Started assembly of the actual operational sensor payloads for GPS Block IIF. | Complete design of one nuclear explosion monitoring payload for the next block of Global Positioning System satellites (GPS Block IIF). Support integration and launch of current generation nuclear explosion payloads on the replenishment GPS Block IIR satellites (three launches expected in FY03). Complete satellite integration of the advanced new high altitude nuclear monitoring payload validation experiment. | Complete sensor payload integration and deliver to the Air Force one operational nuclear explosion monitoring payload for the new block of Global Positioning System satellites (GPS Block IIF). Support integration and launch of current generation nuclear explosion monitoring payloads on the replenishment GPS Block IIR satellites (three launches expected in FY04). Adapt the high altitude nuclear monitoring payload validation experiment design into the follow on operational design. |
| Delivered the FY 2002 release of an integrated classified data base called the NNSA Knowledge Base Release 5, that will improve ground-based nuclear explosion monitoring, to the U.S. monitoring agencies. The data base contains calibration data sets for geographical regions of monitoring interest. It also includes advanced data processing tools and algorithms to expedite processing of the data from monitoring stations. Awarded four external research contracts for research issues. Jointly sponsored with the Defense Threat Reduction Agency the 24th annual Nuclear Explosion Monitoring Research Review and published the proceedings. | Deliver to the Air Force Technical Application Center Release 6 of NNSA's classified seismic calibration Knowledge Base, which contains calibration data for four stations to enhance the overall monitoring capabilities of the network. It also includes advanced data processing algorithms in the form of software tools to expedite processing data from monitoring stations. With the Air Force Research Laboratory, jointly solicit for external research on nuclear explosion monitoring and award two to six contracts. Jointly sponsor with the Air Force Research Laboratory the 25th annual Nuclear Explosion Monitoring Research Review and publish the proceedings. | Integrate into Release 7 of the NNSA Knowledge Base newly developed analytical techniques for enhancement of the overall monitoring system and, for five additional stations, integrate calibration parameters and reference data sets to enhance their contribution to the network's overall capability. With the Air Force Research Laboratory, jointly solicit for external research on nuclear explosion monitoring and award two to six contracts. Jointly sponsor with the Air Force Research Laboratory the 26th annual Nuclear Explosion Monitoring Research Review and publish the proceedings. |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Total, Nuclear Explosion Monitoring . . . . . | 76,407 | 88,559 | 89,277 | 718 | 0.8% |

## Detailed Program Justification

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Nuclear Explosion Monitoring**

The Nuclear Explosion Monitoring Research & Engineering program develops essentially all of the enabling technologies, operational hardware and software, and expertise for the U.S. to remotely detect, locate, and identify nuclear detonations. These technologies are either incorporated into satellite-based systems or ground-based systems.

Satellite-Based Systems provide satellite sensors for monitoring nuclear explosions in the Earth's atmosphere and in near-Earth space, supporting proliferation detection, treaty monitoring, and military goals. Specific activities include flight instrumentation design, fabrication, and testing. The equipment is used on U.S. Air Force Global Positioning System and Defense Support Program 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.

Ground-Based Systems provide classified, focused, applied research and engineering products integrated into a knowledge base, with appropriate testing, demonstration, and technical support for use by the Air Force in the U.S. National Data Center and U.S. Atomic Energy Detection System. NNSA has a memorandum of understanding with U.S. monitoring agencies to provide integrated state-of-the-art engineered systems for nuclear explosion monitoring. The NNSA ground-based systems integration function at the national laboratories will be supplied in part with products from research opportunities from open competition.

| | | | |
|---|---|---|---|
| Total, Nuclear Explosion Monitoring . . . . . | 76,407 | 88,559 | 89,277 |

# Supporting Activities

## Mission Supporting Goals and Measures

Supporting activities includes crosscutting costs of the Office of Nonproliferation Research and Engineering such as the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. In addition, supporting activities provide for technical support from the national laboratories for strategic initiatives such as technology roadmapping and assessment, outyear planning, and nonproliferation analysis and studies. Publication activities are also included to 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.

**Supporting Activities Goals**
Partner with private industry to complement DOE lab expertise to enhance capability to detect weapons of mass destruction, including nuclear, chemical, and biological

**Performance Indicators**
Involve the technical expertise of the academic and industrial communities with the National Laboratories in the execution of the Nonproliferation and Verification R&D Program.

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Funded small business initiatives through the SBIR and STTR programs with 2.65% of the total extramural research and development budget program. | Funded small business initiatives through the SBIR and STTR programs with 2.65% of the total extramural research and development budget program. | Funded small business initiatives through the SBIR and STTR programs with 2.65% of the total extramural research and development budget program. |
| Successfully completed the purchase of seismic instrumentation to support National Science Foundation program requirements for equipment acquisition for the Incorporated Research Institutions for Seismology (IRIS) PASSCAL Instrument Center. NNSA provided funds to the National Science Foundation, which administers and funds the IRIS-PASSCAL Instrument Center, to | Fund 15 grants to Small business initiatives through the Small Business Innovative Research and Small Business Technology Transfer programs; staff independent review panels and subject matter experts to enable the program to manage and prioritize work. | Fund 15 grants to Small business initiatives through the Small Business Innovative Research and Small Business Technology Transfer programs; staff independent review panels and subject matter experts to enable the program to manage and prioritize work. |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Total, Supporting Activities | 5,052 | 6,712 | 6,333 | -379 | -5.6% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Supporting Activities** | | | |
| Supporting activities includes crosscutting costs of the Office of Nonproliferation and Verification Research and Engineering. These activities provide for strategic initiatives such as technology roadmapping and assessment, outyear planning, nonproliferation analysis and studies, and fund the SBIR and STTR programs. 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. | | | |
| Total, Supporting Activities | 5,052 | 6,712 | 6,333 |

## Explanation of Funding Changes

| | | FY 2004 vs. FY 2003 ($000) |
|---|---|---|
| Nonproliferation and Verification R&D | | |
| # | *The FY 2004 decrease of $273,000 in the Proliferation Detection Program area will delay a field experiment.* . . . . . | -273 |
| # | *The FY 2004 increase of $718,000 accommodates delivery of regional Knowledge Base updates to support the Air Force's installation schedule of seismic monitoring stations* . . . . . | 718 |
| # | *The FY 2004 decrease of $379,000 in the Supporting Activities Program area will reduce our onsite technical support* . . . . . | -379 |
| Total Funding Change, Nonproliferation and Verification R&D . . . . . | | 66 |

# Capital Operating Expenses and Construction Summary

## Capital Operating Expenses

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| General Plant Projects | 4,507 | 0 | 0 | 0 | 0.0% |
| Capital Equipment | 8,000 | 6,400 | 6,400 | 0 | 0.0% |
| Total, Capital Operating Expenses | 12,507 | 6,400 | 6,400 | 0 | 0.0% |

# 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, and reduce the threat of WMD terrorism. It is the focal point within the National Nuclear Security Administration (NNSA) and the Department of Energy for activities that support U.S. nonproliferation and international security policies, goals and objectives, as well as those activities mandated by statute. The program provides policy and technical expertise and leadership for NNSA and the Department in interagency, bilateral and multilateral fora involving nonproliferation and international security matters. Five major outcomes achieve the program mission: 1) secure nuclear materials, technology and expertise; 2) limit the production, use, and traffic of weapons-usable fissile materials; 3) promote transparency in a wide range of nonproliferation and arms control efforts; 4) strengthen the nonproliferation regime; and 5) control sensitive exports. The major functional areas of the program include Nonproliferation Policy, International Safeguards, Export Controls, and Treaties and Agreements.

## Program Strategic Performance Goals

Prevent and reverse proliferation of weapons of mass destruction.

## Performance Indicators

Percentage of research reactors converted under the RERTR program and the kilograms of Soviet/Russian-supplied spent/fresh fuel that has been repatriated to Russia.

Percentage of progress on each phase of canning weapons grade plutonium bearing spent fuel for long-term storage (short-term pool storage; long-term container design; container fabrication; site equipment designs; sites equipment fabrication and packaging).

Number of U.S.- Russian nonproliferation and transparency monitoring visits completed number of technologies evaluated or developed.

Percentage of U.S. exports reviewed for proliferation risk.

Number of export control training courses provided to U.S. Customs officers.

Number of safeguards or physical protection training courses conducted.

Number of safeguards or physical protection reviews, evaluations, or upgrades completed.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Reached 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. | Initiate repatriation to Russia of 500 fresh and spent nuclear fuel assemblies and participate in two fact-finding missions to evaluate fuel inventory and conditions at six potential sites. | Complete conversion of 68% of candidate reactors under RERTR and repatriate approximately An additional 100 Kg of spent/fresh fuel to Russia. |
| | Secure a contract with cask manufacturer and begin cask fabrication. | Complete the final 50% of the BN-350 container design (100% total) and complete the first 50% of site and equipment design. |
| Secured a Russian commitment to discuss counter-terrorism cooperation under the Warhead Safety and Security Exchange (WSSX) Agreement. | Develop and negotiate at least five lab-to-lab contracts with Russia to provide access to technologies, which could support U.S. counter-terrorism efforts. | Complete 4 U.S.-Russian dismantlement transparency visits under PPRA (1 in U.S. and 3 in Russia) and complete the evaluation or further development of 6 new technologies (4 under WSSX and 2 under Future Initiatives.) |
| Conducted the first plutonium storage monitoring visit in Russia under the Plutonium Production Reactor Agreement (PPRA). | Demonstrate three Russian transparency technologies developed under lab-to-lab interactions. | |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| 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. | 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. | Review 100% of nuclear-related transfers, and 60% of missile technology and chemical/biological-related U.S. exports.<br><br>Complete 4 nuclear export control training courses for U.S. Customs officers. |
| Participated in executive meetings and a workshop in the United Arab Emirates (UAE) on transit control of dual-use commodities. | Conduct at least one nuclear export control enforcement training course to improve other countries' border controls, especially in high-traffic transit states. | |
| Signed bilateral agreements with the United Kingdom, Brazil and the Republic of Korea on safeguards cooperation at the International Atomic Energy Agency (IAEA) General Conference. | 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. | Conduct 9 physical protection training courses, including three IAEA-sponsored courses for international students<br><br>Perform physical protection reviews at 8 foreign nuclear sites and provide upgrades at three sites. |

## Significant Program Shifts

Recent events have caused us to modify the FY04 budget request to describe the work that needs to be done to deal with the nuclear threat on the Korean peninsula. The objectives of this work are to detect the Democratic Peoples Republic of Korea's (DPRK) undeclared nuclear activities and to verify the dismantlement of those activities.

The requirement to detect undeclared nuclear activities and to verify their dismantlement has in fact existed ever since the DPRK first committed to Non-Proliferation Treaty (NPT) obligations in 1985 and to comprehensive International Atomic Energy Agency (IAEA) safeguards in 1992.

There remains an ongoing and longstanding requirement to detect, understand, and verify dismantlement of the

DPRK nuclear program to comply with the 1985 Nonproliferation Treaty obligations. These activities must be done largely by the IAEA, and, furthermore, can be done only with a specially designed suite of tools and technologies that are still being developed. The requested funding will enable development of that "toolkit."

The DPRK nuclear program is a clear and present danger. No matter how the US Government addresses the problem, in the end, we will still have to determine how much fissile material the North Koreans developed and how they did it. This "toolkit" of verification technologies will answer those questions and is key to ensuring that the problem has been resolved. This particular toolkit is unique to the problem of the North Korean nuclear program, but North Korea is not the only proliferation problem. Related technologies in the form of other toolkits will be needed in the years to come in order to address other proliferant states and emerging terrorist threats.

Funding adjustments reflect:
**#** An increase in Nuclear Noncompliance Verification ($6 million in FY04).

## Funding Profile

(dollars in thousands)

| **Nonproliferation and International Security** | FY 2002 [a] Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| Nonproliferation Policy | 45,239 [b] | 55,004 | 53,894 | -1,110 | -2.0% |
| Export Control | 10,628 | 15,519 | 15,798 | 279 | 1.8% |
| International Safeguards | 31,739 | 18,752 | 29,254 | 10,502 | 56.0% |
| Treaties and Agreements | 3,040 [c] | 3,393 | 2,788 | -605 | -17.8% |
| Subtotal, Nonproliferation and International Security | 90,646 | 92,668 | 101,734 | 9,066 | 9.8% |
| Use of prior year balances | -7,500 | 0 | 0 | 0 | 0 |
| **Total, Nonproliferation and International Security** | **83,146** | **92,668** | **101,734** | **9,066** | **9.8%** |

**Public Law Authorization:**
Public Law 95-95, "Department of Energy Organization Act"
Public Law 107-314, "Bob Stump National Defense Authorization Act for FY 2003"

[a]Reflects $15,000,000 from FY 2002 emergency supplemental funding contained in Public Law 107-206. In addition, reflects the reprogramming of $8,309,000 from the Separated Civil Plutonium program, a Clinton administration initiative that has been discontinued.

[b]Does not reflect $10,000,000 from the FY 2002 emergency supplemental funding contained in Public Law 107-206 for the accelerated Return of Domestic Sealed Sources, an Environmental Management program being funded under the Nonproliferation and International Security program as a one time activity.

# Funding by Site

(dollars in thousands)

| Nonproliferation and International Security | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory | 8,035 | 8,852 | 9,315 | 463 | 5.2% |
| Brookhaven National Laboratory | 962 | 2,384 | 3,036 | 652 | 27.3% |
| Chicago Operations Office | 525 | 50 | 50 | 0 | 0.0% |
| New Brunswick National Laboratory | 560 | 571 | 581 | 10 | 1.8% |
| Total, Chicago Operations Office | 10,082 | 11,857 | 12,982 | 1,125 | 9.5% |
| Idaho Operations Office | | | | | |
| Idaho National Engineering and Environmental Laboratory | 296 | 301 | 306 | 5 | 1.7% |
| Total, Idaho Operations Office | 296 | 301 | 306 | 5 | 1.7% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory | 9,342 | 10,222 | 10,970 | 748 | 7.3% |
| Total, Livermore Site Office | 9,342 | 10,222 | 10,970 | 748 | 7.3% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory | 24,847 | 24,261 | 27,003 | 2,742 | 11.3% |
| Total, Los Alamos Site Office | 24,847 | 24,261 | 27,003 | 2,742 | 11.3% |
| Nevada Site Office | | | | | |
| Nevada Site Office | 17 | 19 | 19 | 0 | 0.0% |
| Total, Nevada Site Office | 17 | 19 | 19 | 0 | 0.0% |
| NNSA Service Center | | | | | |
| Lawrence Berkeley National Laboratory | 25 | 25 | 25 | 0 | 0.0% |
| NNSA Service Center (All Other Sites) | 3,362 | 3,423 | 3,485 | 62 | 1.8% |
| Total, NNSA Service Center | 3,387 | 3,448 | 3,510 | 62 | 1.8% |

(dollars in thousands)

| Nonproliferation and International Security | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Oak Ridge Operations Office | | | | | |
| Oak Ridge National Laboratory | 9,052 | 9,051 | 10,919 | 1,868 | 20.6% |
| Total, Oak Ridge Operations Office | 9,052 | 9,051 | 10,919 | 1,868 | 20.6% |
| Pantex Site Office | 200 | 1,050 | 1,050 | 0 | 0.0% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 6,147 | 8,073 | 10,338 | 2,265 | 28.1% |
| Total, Richland Operations Office | 6,147 | 8,073 | 10,338 | 2,265 | 28.1% |
| Sandia Site Office | | | | | |
| Sandia National Laboratories | 19,643 | 16,076 | 16,102 | 26 | 0.2% |
| Total, Sandia Site Office | 19,643 | 16,076 | 16,102 | 26 | 0.2% |
| Savannah River Operations Office | | | | | |
| Savannah River Operations Office | 1,133 | 1,345 | 1,368 | 23 | 1.7% |
| Savannah River Technology Center | 2,141 | 1,021 | 1,039 | 18 | 1.8% |
| Total, Savannah River Operations Office | 3,274 | 2,366 | 2,407 | 41 | 1.7% |
| Washington Headquarters | 4,359 | 5,944 | 6,128 | 184 | 3.1% |
| Subtotal, Nonproliferation and International Security | 90,646 | 92,668 | 101,734 | 9,066 | 9.8% |
| Use of prior year balances | -7,500 | 0 | 0 | 0 | 0.0% |
| **Total, Nonproliferation and International Security** | **83,146** | **92,668** | **101,734** | **9,066** | **9.8%** |

## Site Description

**Argonne National Laboratory**
More than half of the work performed by Argonne National Laboratory is in support of the Reduced Enrichment for Research and Test Reactors (RERTR) program. Approximately one fifth supports export control work in the areas of licensing and international cooperation. The relatively small remainder supports safeguards work, especially in the non-Russian republics of the former Soviet Union, fuel cycle analysis, and policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Brookhaven National Laboratory**
Almost half of the work performed by Brookhaven National Laboratory supports International Atomic Energy Agency (IAEA) safeguards cooperation and verification of the Democratic Peoples Republic of Korea (DPRK) nuclear weapons program dismantlement. Another two fifths of the work supports nuclear transparency efforts. The small remainder supports fuel cycle analysis, policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Idaho National Engineering and Environmental Laboratory**
All of the work performed by Idaho National Engineering and Environmental Laboratory supports policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Lawrence Berkeley National Laboratory**
All of the work performed by Lawrence Berkeley National Laboratory supports policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Lawrence Livermore National Laboratory**
Roughly one third of the work performed by Lawrence Livermore National Laboratory (LLNL) supports safeguards work, especially IAEA safeguards cooperation, and verification of the DPRK nuclear weapons program dismantlement. About one quarter supports the development of nuclear transparency measures. Another fifth of the work supports export control efforts (licensing operations, multilateral outreach, and international cooperation, primarily in the New Independent States (NIS) but increasingly in transit states as well). The remainder of the work performed supports regional security efforts, fuel cycle analysis, and policymaking and negotiations regarding various nonproliferation and arms control regimes, including the Chemical Weapons Convention, for which LLNL is designated as the backup OPCW lab. This funding fulfills a Senate condition to ratification that mandates the United States maintain a second laboratory for the analysis of samples taken in the United States.

**Los Alamos National Laboratory**
About two fifths of the work done by Los Alamos National Laboratory supports safeguards efforts, especially IAEA safeguards cooperation, verification of the DPRK nuclear weapons program dismantlement. Another third supports export control work, primarily in the area of licensing operations. The remainder is split between development of nuclear transparency measures, fuel cycle analysis, Kazakhstan spent fuel activities, and support to policy development in the areas of legal regimes and regional security.

**Nevada Site Office**
All of the work performed by the Nevada Site Office supports policymaking and negotiations regarding various arms control and nonproliferation regimes.

**New Brunswick Laboratory**
Roughly three quarters of the work performed by New Brunswick Laboratory supports verification of the DPRK nuclear weapons program dismantlement. The remainder of the work is done to support IAEA and international cooperation on safeguards.

**NNSA Service Center**
The work performed supports export control cooperative activities with international partners. Approximately two thirds of the work performed by NNSA Service Center supports the Russian Fuel Return program. The remainder supports Kazakhstan spent fuel activities and regional security efforts.

**Oak Ridge National Laboratory**
Almost half of the work performed by Oak Ridge National Laboratory supports safeguards work verification of the DPRK nuclear weapons program dismantlement. About one fifth supports licensing activities and export control cooperation with international partners. Another fifth of the work performed supports the development of nuclear transparency measures. The remainder of the work is split between Kazakhstan spent fuel activities, the Russian Fuel Return program, and support for policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Pacific Northwest National Laboratory**
Almost half of the work performed supports international safeguards cooperation verification of the DPRK nuclear weapons program dismantlement. About one fifth of the work performed supports the development of nuclear transparency measures. A small percentage of the work supports export control operations. The remainder is split between spent fuel activities, regional security, fuel cycle analysis, and policymaking and negotiations regarding various arms control and nonproliferation regimes.

**Pantex Site Office**
A majority of the work performed by Pantex supports development of nuclear transparency measures, although a small percentage supports export control licensing operations.

**Sandia National Laboratories**

More than one third of the work performed by Sandia National Laboratories supports regional security efforts. About a quarter supports international safeguards cooperation. Another fifth of the work performed supports development of nuclear transparency measures. The small remainder supports Kazakhstan spent fuel activities, the Russian Fuel Return program, fuel cycle analysis, policymaking and negotiations regarding various arms control and nonproliferation regimes, and export control activities.

**Savannah River Site and Technical Center**

Roughly two thirds of the work performed by the Savannah River Site supports DPRK and Kazakhstan spent fuel activities. A small percentage of the Savannah River Technical Center funding supports licensing operations and international export control cooperation, primarily in the NIS but increasingly in transit states as well. The remainder of the work performed is split between IAEA safeguards cooperation, development of nuclear transparency measures, and the Russian Fuel Return program.

# Nonproliferation Policy

## Mission Supporting Goals and Objectives

Nonproliferation Policy programs include fuel cycle activities, efforts to support global regimes, regional security and nonproliferation initiatives, and projects that promote warhead dismantlement and fissile material transparency. The mission is to reduce the threat of nuclear proliferation by securing at risk nuclear materials in regions of concern, eliminating the risk posed by civil commerce in HEU, strengthening regional security and global nonproliferation regimes, and assessing current and potential new technologies to improve the civil nuclear fuel cycle's resistance to proliferation. The program participates in U.S. Government policymaking and negotiations regarding arms control and nonproliferation regimes, limits on nuclear testing and fissile material production, and bilateral peaceful nuclear cooperation agreements. It strengthens regional security and nonproliferation in the Middle East, South Asia, Northeast Asia, and Central Asia, by working to develop technical solutions to regional security problems. Nonproliferation Policy promotes transparent and irreversible nuclear reductions by working with Russia to allow confirmation that Russian nuclear weapons are being dismantled and that excess fissile materials are not used in the production of new nuclear weapons.

## Subprogram Goals

Prevent and reverse the proliferation of weapons of mass destruction by converting international research reactor cores from HEU to LEU fuel; securing HE and weapons grade plutonium bearing spent fuel; and increasing global, regional, and bilateral engagements and transparency.

**Performance Indicator**

Percentage of research reactors converted under the RERTR program and the kilograms of Soviet/ Russian-supplied spent/fresh fuel that has been repatriated to Russia (number of fact-finding missions completed, number of action plans completed).

Percentage of progress on each phase of canning weapons grade plutonium bearing spent fuel for long-term storage (short-term pool storage; long-term container design; container fabrication; site equipment design; sites equipment fabrication and packaging).

Number of U.S.- Russian nonproliferation and transparency monitoring visits completed number of technologies evaluated or developed.

Number of nonproliferation/transparency workshops hosted; number of countries participating.

Number of key activities completed to ensure DOE compliance with U.S. nonproliferation and arms control treaty and agreement obligations

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Fuel Cycle Analysis: Initiated joint project with DOE-NE on proliferation resistant pyroprocessing.<br><br>Begin nonproliferation assessment methodology working group. | Fuel Cycle Analysis: Complete development of nonproliferation assessment methodology and initiate the nonproliferation assessment of Russian-provided SNF services.<br><br>Complete Phase I assessment and R&D roadmap for proliferation resistant pyroprocessing.<br><br>Begin Phase II technology demonstration for proliferation resistant pyroprocessing.<br><br>Begin joint focus group with DOE/NE to develop methods for evaluation of Generation IV systems with respect to proliferation resistance and physical protection. | Fuel Cycle Analysis: Begin Phase 1 assessment and research and development roadmap for proliferant resistant fast reactor. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Reduced Enrichment for Research and Test Reactors (RERTR): Conversion analysis begun for reactors in Uzbekistan and Ukraine and proposed for HFR reactor in the Netherlands.<br><br>Initial examinations of irradiated ultra-high density U-Mo monolithic plate fuel showed successful behavior at high burn up. | Reduced Enrichment for Research and Test Reactors (RERTR): Begin conversion studies for BR-2 reactor, and 2 Soviet-supplied reactors.<br><br>Begin irradiation of full-size 6 $g/cm^3$ LEU U-Mo elements in the HFR-Petten reactor.<br><br>Begin development of fuel fabrication process for ultra-high density monolithic U-Mo plate fuel (16 $g/cm^3$).<br><br>Complete fabrication of LEU test assemblies in WWR-CM reactor (Uzbekistan). | Reduced Enrichment for Research and Test Reactors (RERTR**)**: Complete conversion of 68% of candidate reactors under RERTR. |
| Russian Research Reactor Fuel Return (RRRFR**)**: Concluded a bilateral Agreement between DOE and MFA of Uzbekistan concerning cooperation in the area of nuclear nonproliferation.<br><br>Drafted and tabled a bilateral Agreement between the U.S. and RF Governments concerning Russian research reactor fuel transfer to Russia. | Russian Research Reactor Fuel Return (RRRFR**)**: Initiate shipment of HEU fuel from Uzbekistan to Russia.<br><br>Conduct fact-finding missions to 3 countries. | Russian Research Reactor Fuel Return (RRRFR**)**: Complete repatriation of approximately 100 Kg of spent and fresh fuel to Russia. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Kazakhstan Spent Fuel:<br>Began joint conceptual design study on USG dual-use cask proposal to assist Kazakhstan decision making. | Kazakhstan Spent Fuel:<br>Fabricate first dual-use cask for BN-350 fuel.<br><br>Complete system designs and procedures for transportation/ storage of BN-350 fuel.<br><br>Begin and complete construction of cask receiving site at BN-350. | Kazakhstan Spent Fuel:<br>Complete the final 50% of the BN-350 container design (100% total) and complete the first 50% of site and equipment design . |
| DPRK Spent Fuel:<br>Completed one maintenance visit. Negotiated a safety and security protocol for the spent fuel team. | DPRK Spent Fuel:<br>Conduct two maintenance visits to DPRK. | DPRK Spent Fuel:<br>Maintain capability to resume work. |
| Completed DPRK spent fuel disposition options and roadmap study. | Develop detailed DPRK fuel disposition program plan based on FY02 roadmap study. | |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Global Regimes:<br>Participated on U.S. delegations to all NPT-related discussions, consultations and negotiations, including the First Preparatory Committee Meeting for the 2005 NPT Review conference, and held two seminars to prepare the delegation.<br><br>Successfully implemented all requirements under the various Administrative Arrangements to the Agreements for Cooperation and completed seven subsequent arrangements<br><br>Developed proposals for international cooperation to counter bio-terrorism.<br><br>Ensured full DOE and National Laboratory compliance with the BWC and CWC. | Global Regimes:<br>Ensure successful NPT Preparatory Committee (participate in 100% of bilateral and multilateral meetings; direct simulation exercise to prepare delegation)<br><br>Reconcile nuclear material inventories with bilateral partners to 4 peaceful nuclear cooperation agreements (Euratom, Japan, Australia, Canada)<br><br>Ensure full DOE and National Laboratories compliance with the BWC and CWC (conduct annual surveys of lab activities and participate in 100% of related U.S. interagency activities).<br><br>Assess application of nuclear test monitoring technologies to possible future test limitations. | Global Regimes:<br>Complete 5 key activities to ensure DOE compliance with U.S. nonproliferation obligations (reconcile inventories for 5 peaceful nuclear cooperation agreements; participate in Annual Noncompliance Report activities; conduct one lab survey each on CWC and BWC related activities; attend Working Group B sessions; and participate in all NPT Preparatory Committee meetings). |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Regional Security:<br>Signed contract to create Cooperative Monitoring Center at Amman (CWC/A), Jordan.<br><br>Assessed opportunities for partnering with Centcom on regional security in Central Asia and Persian Gulf.<br><br>Briefed Indian Deputy Prime Minister and Pakistani Interior Minister; conducted workshop for Indian officials on stopping cross-border terrorism in India.<br><br>Conducted analysis of implications of possible state failure in Pakistan for nuclear weapons that was briefed to the President. | Regional Security:<br>Open CMC: analyze feasibility of opening other centers for promoting expertise on and application of cooperative monitoring concepts and techniques and dialogue among states on these issues<br><br>Conduct one international conference on regional security in the Persian Gulf<br><br>Hold workshop for Pakistan on border security, implement border monitoring.<br><br>Complete recommendations on economic and technical feasibility of regional electrical grid in Northeast Asia and on CBM's and bilateral inspections in North Korea<br><br>Complete Central Asian water monitoring project; conduct fact-finding trip to C. Asia | Regional Security:<br>Complete 8 workshops with 15 countries (CMC at Amman and regional partners; border monitoring w/South Asia; joint Mideast/South Asia workshop; 4 cooperative monitoring activities; and 1 Warhead Safety and Security Exchange workshop with Russia. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Warhead Dismantlement and Fissile Material Transparency (WDT): Developed and negotiated three lab-to-lab contracts with Russia to provide access to technologies, which can support U.S. counter-terrorism efforts.<br><br>Demonstrated 12 Russian transparency technologies developed under lab-to-lab interactions. | Warhead Dismantlement and Fissile Material Transparency (WDT**)**: Negotiate at least five lab-to-lab contracts with Russia to provide access to counter-terrorism technologies.<br><br>Continue development of confidence building measures that could potentially be used to confirm nuclear warhead and fissile material reductions in Russia.<br><br>Conduct at least two bilateral exchanges on nonproliferation and arms control technology.<br><br>Conduct monitoring visits to Russia (2 to plutonium storage facilities and 1 to the shutdown reactors). | Warhead Dismantlement and Fissile Material Transparency (WDT): Complete 4 U.S.-Russian dismantlement transparency visits under PPRA (1 in U.S. and 3 in Russia) and complete the evaluation or further development of 6 new technologies (4 under Warhead Safety and Security Exchange and 2 under Future Initiatives.) |

## Funding Schedule

(dollars in thousands)

| | FY 2002 [a] | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Fuel Cycle Activities | | | | | |
| Reduced Enrichment for Research and Test Reactors (RERTR) | 5,643 | 5,756 | 5,860 | 104 | 1.8% |
| Russian Research Reactor Fuel Return (RRRFR) | 1,000 [b] | 9,520 | 9,691 | 171 | 1.8% |
| Kazakhstan Spent Fuel Disposition | 15,945 | 8,124 | 8,270 | 146 | 1.8% |
| Democratic People's Republic of Korea (DPRK) Spent Fuel Disposition | 1,950 | 1,989 | 25 | -1,964 | -98.7% |
| Fuel Cycle Analysis | 1,000 | 1,020 | 1,038 | 18 | 1.8% |
| Subtotal, Fuel Cycle Activities | 25,538 | 26,409 | 24,884 | -1,525 | -5.8% |
| Global Regimes | 4,201 | 4,285 | 4,562 | 277 | 6.5% |
| Regional Security | 8,000 | 8,160 | 8,307 | 147 | 1.8% |
| Warhead Dismantlement and Fissile Material Transparency | 7,500 | 16,150 | 16,141 | -9 | -0.1% |
| Total, Nonproliferation Policy | **45,239** | **55,004** | **53,894** | **-1,110** | **-2.0%** |

[a] Does not reflect $10,000,000 from FY 2002 emergency supplemental funding contained in Public Law 107-206 for the accelerated return of domestic sealed sources.

[b] Reflects $779,000 from the FY 2002 reprogramming of funds from Separated Civil Plutonium program, a Clinton administration initiative that has been discontinued.

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Reduced Enrichment Research and Test Reactor (RERTR)** | 5,643 | 5,756 | 5,860 |

The *Reduced Enrichment Research and Test Reactor (RERTR)* program prevents proliferation of nuclear weapons by minimizing and, to the extent possible, eliminating the use of highly enriched uranium (HEU) in civil nuclear programs worldwide. It develops the technologies needed to substitute low enriched uranium (LEU) for HEU in research and test reactors, which use nearly all of the HEU in civil programs, without significant penalties in performance, economics, or safety. The FY 2004 base program will concentrate on development of new fuel types. The majority of funding for the Russian portion of this program can be found in the Accelerated Materials Disposition section. The RERTR FY 2004 goal is to:

**#** Develop two new fuel types to permit conversion of HEU-fueled research and test reactors.

| | | | |
|---|---|---|---|
| **Russian Research Reactor Fuel Return (RRRFR)** . . . . . | 1,000 | 9,520 | 9,691 |

The *Russian Research Reactor Fuel Return (RRRFR)* program prevents proliferation of nuclear weapons by repatriating to Russia civil HEU fuel from Russian-supplied research reactors throughout the world. The RRRFR FY 2004 goal is to:

**#** Repatriate to Russia 100 Kg of fresh or spent HEU research reactor fuel.

| | | | |
|---|---|---|---|
| **Kazakhstan Spent Fuel Disposition** . . . . . | 15,945 | 8,124 | 8,270 |

The *Kazakhstan Spent Fuel Disposition* program prevents proliferation of nuclear weapons by securing the nearly three tons of weapons-grade plutonium in the BN-350 spent fuel at Aktau, Kazakhstan - enough material for hundreds of nuclear weapons. Under this cooperative program, the spent fuel assemblies have been stabilized, packaged in theft resistant canisters, and placed under IAEA safeguards. The program also seeks to store the spent fuel in dual-use cask dry storage and provide physical protection support for all operations. The USG has been working with the Republic of Kazakhstan (ROK) for nearly two years on a long-term storage solution for the three tons of plutonium-bearing BN-350 fuel. The USG has already decided through an NSC-led interagency process that this project should proceed immediately because it will protect our national security interests within the volatile Central Asia region. This project will design, procure, and conduct licensing of the casks. Much of the equipment required for the project is complex and custom designed for special use. In addition, the design process is intricate and the lead-time for procurement is extensive. The Kazakhstan Spent Fuel Disposition FY 2004 goal is to:

**#** Implement the 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.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Democratic Peoples Republic of Korea (DPRK)** . . . . . 1,950 1,989 25

The *Democratic Peoples Republic of Korea (DPRK)* Spent Fuel Disposition program supports the disposition of weapons-grade plutonium-bearing spent fuel in stabilization canisters under continuous IAEA monitoring. This program reverses proliferation and reduces the immediate threat to U.S. national security interests posed by plutonium stored at DPRK nuclear weapons material production facilities. The USG has called on the DPRK to return its facilities and materials to their safeguarded status, at which time work will resume. In FY 2004 this program seeks to maintain the ability to:

**#** Conduct field missions to North Korea to return spent fuel in Nyongbyon to safe storage under seal and develop plans to remove fuel from North Korea.

**Fuel Cycle Analysis** . . . . . 1,000 1,020 1,038

Fuel Cycle Analysis includes nonproliferation assessments and proliferation resistant fuel cycle technology (PRFCT) policy and development. Nonproliferation assessments assist in the formulation of policy to minimize the use of weapons-usable materials and to identify opportunities to reduce the proliferation risk in civil fuel cycle activities. PRFCT strengthens the nonproliferation regime through comparative analysis of existing and proposed nuclear fuel cycle technologies and reduces the long-term threat to U.S. national security by providing state-of-the-art tools to evaluate and improve proliferation resistant technology. The Fuel Cycle Analysis FY 2004 goal is to:

**#** Advance development of the nonproliferation assessment methodology and assess proliferation-resistance of fuel cycle technologies and advance cooperative efforts with ongoing DOE nuclear technology R&D programs.

**Global Regimes** . . . . . 4,201 4,285 4,562

The *Global Regimes* program supports policy making and negotiations regarding the following arms control and nonproliferation regimes: Nuclear Nonproliferation Treaty (NPT); Biological Weapons Convention (BWC); Chemical Weapons Convention (CWC); Nuclear testing and fissile material production limits; 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 supports negotiation and implementation of bilateral peaceful nuclear cooperation agreements. The Global Regimes FY 2004 goal is to:

**#** 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.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Regional Security** . . . . . 8,000 8,160 8,307

The *Regional Security* program covers the following regions: Middle East; South Asia; East Asia; and Central Asia. The program applies policy and technical capabilities to support U.S. Government regional security objectives, with a primary focus on preventing the proliferation of weapons of mass destruction. It supports participation 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 also provides a large portion of the funding for Sandia National Laboratories' Cooperative Monitoring Center (CMC). The Regional Security FY 2004 goal is to:

**#** Strengthen security and reduce incentives for WMD in regions where proliferation has occurred by conducting eight workshops for 15 countries.

**Warhead Dismantlement and Fissile Material Transparency (WDT)** . . . . . 7,500 16,150 16,141

*Warhead Dismantlement and Fissile Material Transparency* program consists of U.S.-Russian Federation Plutonium Production Reactor Agreement implementation; U.S.-Russian Federation Warhead Safety and Security Exchange Agreement; U.S.-Russian Federation Highly Enriched Uranium (HEU) Purchase Agreement Transparency policy; and START I implementation and future arms control and nonproliferation initiatives. The initiatives promote transparent nuclear reductions, including the negotiation of legally binding agreements and transparency options to allow confirmation of Russian nuclear weapons reductions. The program develops methodologies that could be used for warhead and fissile material transparency and comprehensively evaluates the issues associated with potential monitoring regimes to ensure that there is no adverse impact on the U.S. requirement to maintain a safe, secure, and reliable nuclear weapons stockpile while safeguarding classified information. The WDT FY 2004 goal is to:

**#** Develop confidence building measures that potentially could be used to monitor 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 Highly Enriched Uranium (HEU) Purchase Agreement to ensure full implementation of agreed transparency measures.

**#** Ensure effective implementation of the agreed monitoring activities in the U.S. and Russia under the Plutonium Production Reactor Agreement.

**Total, Nonproliferation Policy** . . . . . **45,239 55,004 53,894**

# Export Control

## Mission Supporting Goals and Objectives

The mission of the Export Control program is to control sensitive exports by U.S., foreign, and multilateral organizations to regulate the export of items and technologies that could contribute to the proliferation of nuclear, chemical and biological weapons and missiles for their delivery. This is achieved by reviewing U.S. dual-use and nuclear technology exports and related transfers for proliferation concern, supporting U.S. export control diplomacy, and cooperating with partner governments to strengthen national export control systems in countries and regions of proliferation concern.

## Subprogram Goals

Prevent and reverse the proliferation of weapons of mass destruction-related items and technology transferred by the United States and other countries.

**Performance Indicators**

Percentage of U.S. exports reviewed for proliferation risk.

Support/training provided to U.S. Customs.

Percentage of anticipated export assistance request provided to other countries**.**

Percentage of targeted foreign organizations engaged in assistance activities.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Reviewed 3,570 dual-use export applications.<br><br>Reviewed 4,000 documents associated with the light water reactor construction project in North Korea.<br><br>Reviewed 2,400 Iraq Oil-For-Food contracts.<br><br>Reviewed 250 brain-drain projects and software transfers.<br><br>Conducted 7 industry compliance workshops in Russia and Ukraine.<br><br>Completed installation of a secure, export license review system in Kazakhstan.<br><br>Drafted U.S. proposals to strengthen the Nuclear Suppliers Group by addressing the threat of nuclear terrorism. | Review Approximately 4,500 nuclear and missile technology dual-use license applications.<br><br>Review 4,000 Iraq Oil-for-Food contracts, 400 brain-drain prevention projects, and 200 associated technical assessments, and ensure viability of the PINS export information system.<br><br>Support the NSG, Zangger Committee, and MTCR regimes and maintenance of the NSG Information Sharing System.<br><br>Commission up to 10 technical proliferation risk analyses involving countries and export trends of concern.<br><br>Support export control cooperative programs involving Russia, the NIS, South Asia, the Middle East, China, and selected transshipment countries. | Review 100% of U.S. nuclear-related transfers, and 60% of missile technology and chem/bio-related exports<br><br>Complete 4 nuclear export control training course for Customs officers<br><br>Review 50% of shipments referred by Customs for technical proliferation risk<br><br>Deliver final report on control list review to USG<br><br>30% of anticipated export control assistance requirements provided to Russia, Ukraine and Kazakhstan; 20% in NIS/other, Middle East, East Asia and South Asia<br><br>45% of targeted foreign technical institutes, industries, shippers, and border agencies engaged in assistance activities |

# Funding Schedule

(dollars in thousands)

| Export Control | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Export Control Operations | | | | | |
| Licensing Operations | 6,485 | 8,300 | 8,449 | 149 | 1.8% |
| Multilateral Activities | 2,253 | 3,819 | 3,888 | 69 | 1.8% |
| Subtotal, Export Control Operations | 8,738 | 12,119 | 12,337 | 218 | 1.8% |
| International Nuclear Export Control Cooperation | 1,890 | 3,400 | 3,461 | 61 | 1.8% |
| **Total, Export Control** | **10,628** | **15,519** | **15,798** | **279** | **1.8%** |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Export Control Operations** . . . . . | 8,738 | 12,119 | 12,337 |

*Export Control Operations* includes domestic licensing and multilateral activities.

*Licensing Operations* provides advice and recommendations on licenses for dual-use items and munitions that could have use in the development of nuclear or other weapons of mass destruction and delivery systems. 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. The program 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, and cooperates with U.S. Customs to support enforcement of U.S. controls. The program also administers Secretarial authorizations of U.S. nuclear technology transfers as required under the Atomic Energy Act and supports a range of activities to promote export control compliance across the DOE complex. This includes ensuring that nuclear-related equipment and materials are disposed of without risk of proliferation, assisting with reviews of foreign visitors and assignees to DOE/NNSA labs and sites for export control concerns, and addressing the problem of "deemed exports," i.e. the possible transfer of technology through scientific exchanges with foreign partners.

*Multilateral Activities* include support and technical assistance to groups such as the Nuclear Suppliers Group, the Zangger Committee, and the Missile Technology Control Regime, all of which formulate internationally-agreed upon definitions of materials and commodities and export control practices. Multilateral activities ensure that U.S. Government export control regulations meet multilateral standards and that other regime members' supply policies are consistent with multilateral obligations.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

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 with multilateral standards of conduct. Finally, the program conducts technical proliferation assessments to identify export control vulnerabilities and critical technology needs of countries of proliferation concern. The Export Control Operations FY 2004 goals are to:

- # Commission technical proliferation risk analyses involving countries and export trends of concern.
- # Review WMD-related dual-use license application cases.
- # Review Iraq Oil-for-Food contracts.
- # Review brain-drain prevention projects.
- # Review associated technical assessments.
- # Promote export control compliance across the DOE complex.
- # Support U.S. Customs in enforcement efforts.
- # Improve multilateral supplier controls on WMD-related items and technologies.

| | | | |
|---|---|---|---|
| **International Nuclear Export Control Cooperation** . . . . . | 1,890 | 3,400 | 3,461 |

The program works with partner governments in Russia, the NIS, South Asia, the Middle East, and East Asia to strengthen national systems of international nuclear export control in countries and regions of proliferation concern. The program targets established and emerging suppliers and high-traffic transit nations. The International Nuclear Export Control Cooperation FY 2004 goal is to:

- # Establish competent export control authorities, integrate technical expertise in the export control system, develop constituencies for export control, improve government-supplier communication, promote effective enforcement, and nurture an export control culture.

| | | | |
|---|---|---|---|
| **Total, Export Control** . . . . . | **10,628** | **15,519** | **15,798** |

# International Safeguards

## Mission Supporting Goals and Objectives

The International Safeguards program provides technology and expertise to strengthen International Atomic Energy Agency (IAEA) safeguards and the IAEA role in combating nuclear terrorism; sustains nuclear security improvements in the NIS/Baltics and other countries; supports U.S. initiatives to promote adherence to the Nuclear Non-Proliferation Treaty and IAEA safeguards agreements; oversees the implementation of IAEA safeguards at U.S. facilities; and cooperates with bilateral partners on safeguards, physical protection, and peaceful nuclear applications.

## Subprogram Goals

Prevent the proliferation of Weapons of Mass Destruction (WMD) by fostering improvements in systems, methods and technologies for use by the DOE/NNSA, IAEA, regional and national organizations to account for, protect, and detect weapons-usable nuclear materials and demonstrate by example the importance of nonproliferation.

**Performance Indicators**

Number of technologies for inspection, verification, or safeguards provided to the IAEA.

Number of safeguards or physical protection reviews, evaluations, or upgrades performed.

Number of safeguards or physical protection training courses conducted.

Number of cooperative agreements in place with foreign countries and organizations.

Number of actions completed to support International Atomic Energy Agency (IAEA) safeguards at U.S. facilities, number of IAEA inspections and tons of U.S. material under IAEA safeguards.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Conducted bilateral physical protection visits to Mexico, Sweden, and Turkey; completed physical protection improvements in Romania and the Czech Republic; participated in an IAEA IPPAS mission to Bulgaria and led an IPPAS mission to the Czech Republic.<br><br>Presented an IAEA-sponsored International Physical Protection Training Course for 32 students from 28 countries; presented similar courses in the Czech Republic and Egypt; conducted Design Basis Threat workshops in Kazakhstan, Slovenia, and Russia. | Conduct bilateral physical protection assessments in Japan, South Korea, Belgium, and Australia; participate in IAEA IPPAS missions in Lithuania, Ukraine, and Armenia. | Conduct 9 training courses in physical protection (one US-based, one in Europe, one in Asia and six in Former Soviet states.) |
| Finalized arrangements for safeguards cooperation agreement with South Africa.<br><br>Enhanced DOE capabilities for analyzing environmental samples; delivered and installed a calorimeter for small sample plutonium measurements in a EURATOM facility. | Maintain nine safeguards cooperation agreements with U.K., Euratom, ABACC, Argentina, Brazil, Japan (JAERI), Japan (JNC), South Korea and Australia; initiate new safeguards cooperation agreements with South Africa and Japan's Nuclear Material Control Center.<br><br>Implement seven sister laboratory arrangements for technical cooperation; initiate one new sister laboratory arrangement with Georgia. | Execute 19 cooperative agreements with foreign countries and organizations (safeguards cooperation and sister labs) and complete 15 tasks. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| | Complete Russian prototype information barrier verification tool for Trilateral Initiative.<br><br>Complete a report on inspection technologies to uncover suspected clandestine nuclear programs. | Provide two technologies to the IAEA (for detection of clandestine nuclear activities and materials) and five inspection experts per month (for Iraq inspections). |
| Delivered the first technology for verification activities associated with the US-DPRK Agreed Framework. | Certify plutonium canister counter for IAEA measurements of canned spent fuel as part of the verification of the DPRK nuclear program. | |
| Completed detailed vulnerability assessments of the physical security and safeguards systems in Ukraine, Kazakhstan and Latvia; provided physical security and material control and accounting training to personnel from Uzbekistan, Kazakhstan, and Ukraine. | Conduct on-site operational reviews at nine direct use (HEU and Pu) sites in the NIS/Baltics; expand the MPC&A program to five nuclear power plants in the NIS/Baltics. | Perform physical protection reviews at 8 foreign nuclear sites and provide upgrades at three sites. |
| | Conduct six workshops on Additional Protocol Entry into Force issues: perform alpha and beta test on Protocol Reporting System (PRS); develop data call plan for PRS; complete draft revised DOE order 142.2. | Complete one action (DOE expanded declaration for Additional Protocol) to enable IAEA analysis of U.S. facilities and nuclear materials, and ensure three facilities are under safeguards. |

# Funding Schedule

(dollars in thousands)

| International Safeguards | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| IAEA Safeguards and Nonproliferation Policy Support | 15,798 | 9,893 | 15,697 | 5,804 | 58.7% |
| International Cooperation | 6,259 | 5,104 | 5,196 | 92 | 1.8% |
| DPRK Safeguards | 7,408 | 0 | 0 | 0 | 0.0% |
| Nuclear Noncompliance Verification | 0 | 1,436 | 6,000 | 4,564 | 4.7% |
| Sustainability of Safeguards and Security Systems in the NIS/Baltics | 2,274 | 2,319 | 2,361 | 42 | 1.8% |
| **Total, International Safeguards** | **31,739** | **18,752** | **29,254** | **10,502** | **56.0%** |

## Detailed Program Justification

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**IAEA Safeguards and Nonproliferation Policy Support** . . . . . 15,798 9,893 15,697

The International Safeguards program provides policy and technical leadership to strengthen the nuclear nonproliferation regime, particularly through efforts to strengthen IAEA safeguards and to promote global nuclear material security. The program provides new safeguards approaches and technologies, such as environmental sampling and remote monitoring, to enable the IAEA to detect clandestine nuclear activities and safeguard declared nuclear material. (These approaches and technologies will support implementation of IAEA "strengthened safeguards" globally, whereas specialized tools developed under the "Nuclear Noncompliance Verification" budget item will be tailored to address the unique problems posed by certain proliferant states). The International Safeguards program also provides policy and technical assistance to support application of IAEA safeguards at DOE/NNSA sites (including inspections of excess material and preparations to implement the IAEA Additional Protocol), and with Russia and the IAEA to develop and implement new verification arrangements for excess materials. The program ensures that all countries possessing U.S.-origin nuclear material are adequately protecting this material against theft, sabotage, and nuclear smuggling; works with other countries to enhance the protection of vulnerable nuclear material; and supports IAEA programs to improve international physical protection of nuclear material. The IAEA Safeguards FY 2004 goals are to:

# Support IAEA inspections at three DOE/NNSA sites.
# Present IAEA-sponsored International Physical Protection Training Courses in U.S., Europe and Asia.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

- # Complete testing of a Russian prototype information barrier verification system for the U.S.-Russia-IAEA Trilateral Initiative.
- # Provide two new technologies for IAEA inspectors to detect clandestine nuclear programs in proliferant states.
- # Complete one action (DOE expanded declaration for Additional Protocol.)
- # Conduct four bilateral physical protection assessments; support three IAEA physical protection assessment missions; and promote upgrades based on assessment results.

**International Cooperation** . . . . . 6,259 5,104 5,196

DOE/NNSA reduces the threat of nuclear proliferation through the negotiation and implementation of cooperative agreements and arrangements that support Non-Proliferation Treaty (NPT) goals, promote effective safeguards and physical protection of nuclear materials. The International Cooperation program promotes the peaceful application of nuclear technology through non-binding bilateral "Sister Laboratory" arrangements in support of U.S. treaty obligations under the NPT. The program transfers advanced safeguards technologies for IAEA strengthened safeguards through bilateral safeguards cooperation agreements. The program also supports the nonproliferation regime through planning and preparations for the NPT Review Conferences. The International Cooperation FY 2004 goals are to:

- # Execute eleven safeguards cooperation agreements, including safeguards cooperation agreements with South Africa and the Nuclear Materials Control Center of Japan.
- # Execute eight sister laboratory arrangements for technical cooperation, including one "Sister Lab" arrangement with Georgia.

**DPRK Safeguards** . . . . . 7,408 0 0

Since the first submission of this document, we have modified the FY04 budget text to more correctly describe the work that needs to be done to deal with the nuclear threat on the Korean peninsula. The objectives of this work are to detect the Democratic Peoples Republic of Korea's (DPRK) undeclared nuclear activities and to verify the dismantlement of those activities.

The requirement to detect undeclared nuclear activities and to verify their dismantlement has in fact existed ever since the DPRK first committed to Non-Proliferation Treaty (NPT) obligations in 1985 and to comprehensive International Atomic Energy Agency (IAEA) safeguards in 1992.

There remains an ongoing and longstanding requirement to detect, understand, and verify dismantlement of the DPRK nuclear program to comply with the 1985 Nonproliferation Treaty obligations. These activities must be done largely by the IAEA, and, furthermore, can be done only with a specially designed suite of tools and technologies that are still being developed. The requested funding will enable development of that "toolkit."

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

Development of the detection and verification tools needed for the DPRK and for other proliferation and terrorist threats will be carried out under a new budget item within the International Safeguards Program, entitled "Nuclear Noncompliance Verification."

**Nuclear Noncompliance Verification** . . . . . 0 1,436 6,000

The objectives of work to be performed under this item are to detect undeclared nuclear programs in the Democratic Peoples Republic of Korea (DPRK) and other proliferant states and to verify the dismantlement of those programs. These Nuclear Noncompliance Verification activities must be done largely by the International Atomic Energy Agency (IAEA), and, furthermore, can be done only with specially designed tools and technologies that are still being developed. The requested funding will enable development of those tools.

In the DPRK, the requirement for the IAEA to detect undeclared nuclear activities and to verify their dismantlement has in fact existed ever since the DPRK first committed to Non-Proliferation Treaty (NPT) obligations in 1985 and to comprehensive IAEA safeguards in 1992. There remains an ongoing and longstanding requirement to detect, understand, and verify dismantlement of the DPRK nuclear program to comply with the 1985 Treaty.

The DPRK nuclear program is a clear and present danger. No matter how the US Government addresses the problem, in the end, we will still have to determine how much fissile material the North Koreans developed and how they did it. The toolkit of nuclear detection and verification technologies now under development will answer those questions and is key to ensuring that the problem has been resolved. However, FY 2004 activities include development of this particular toolkit unique to the problem of the North Korean nuclear program, and does not address issues posed by other proliferant states, or emerging terrorist threats. Related technologies in the form of other toolkits will be needed in the years to come in order to address other proliferant states and emerging terrorist threats.

**Sustainability of Safeguards and Security Systems in the NIS/Baltics** . . . . . 2,274 2,319 2,361

DOE/NNSA reduces the threat of nuclear proliferation and nuclear terrorism by improving and sustaining the security and accountability of 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 and implement appropriate systems and procedures to sustain the security of the protected nuclear material. The program performs site surveys annually, notes deficiencies for remediation, and implements upgrades. The program ensures long-term sustainability of these systems by developing national infrastructures and a culture of international cooperation. The program provides technical advice and assistance to facilities and governments in the region to support their adherence to IAEA safeguards requirements, international physical protection standards, and the IAEA Additional Protocol. The FY 2004 goals of the program are to:

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|

# Conduct on-site operational reviews at four direct use (HEU and Pu) sites in the NIS/Baltics
# Conduct six MPC&A workshops in the NIS/Baltics.

**Iraq Inspection Support** . . . . . 0 0 0

The Office of Nonproliferation and International Security redirected FY 2001 Separated Civil Plutonium funds in the amount of $6,000,000 for work in FY 2003 in response to the President's directive that the United States agencies provide necessary support to United Nations and IAEA inspections in Iraq. The need for future funding will be determined based on results of IAEA and UNMOVIC inspections currently underway.

| | | | |
|---|---|---|---|
| **Total, International Safeguards** . . . . . | **31,739** | **18,752** | **29,254** |

# 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.

## Subprogram Goal

# Prevent and reverse the proliferation of weapons of mass destruction.

**Performance Indicators**

**#** Effectiveness and timeliness of response to requests of an immediate nature.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed testing and certification of forensic lab to support Chemical Weapons Convention. | Satisfy three unanticipated or emergency requirements related to specific bilateral or multilateral agreements to secure WMD materials, technology or expertise. | Satisfy three unanticipated or emergency requirements related to specific bilateral or multilateral agreements to secure WMD materials, technology or expertise. |
| Complete development of computer codes to analyze nuclear reactor histories. | Support unexpected verification activities in the U.S. or other countries. | Support unexpected requirements to evaluate or remedy deficiencies in the security of materials, technology or expertise. |
| Tested, calibrated and demonstrated a newly-developed tool for technical analysis of nuclear core. | Provided immediate support to the IAEA, Nuclear Suppliers Group, and other multilateral regime, that responds to anticipated U.S. national security needs of an urgent nature. | Provide immediate support to the IAEA, Nuclear Suppliers Group, or other legal regime that responds to anticipated U.S. national security needs of an urgent nature. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Published handbooks to assist Customs Officials in recognizing dual-use technology at border checkpoints.<br><br>Developed dual-use metal analyzers to help Customs and border officials detect specialty metals needed for nuclear programs. | | |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % |
|---|---|---|---|---|---|
| Treaties and Agreements | 3,040 | 3,393 | 2,788 | -605 | -17.8% |
| **Total, Treaties and Agreements** | **3,040** | **3,393** | **2,788** | **-605** | **-17.8%** |

## Detailed Program Justification

Treaties and Agreements 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. The goals of this program are to:

- Support verification activities in other nations as needed, and
- Respond to nonproliferation requirements of an immediate nature based on unanticipated U.S. national security needs.

## Explanation of Funding Changes

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **Nonproliferation Policy** | |
| # Decrease of funds in *Fuel Cycle Activities* (primarily DPRK Spent Fuel in the amount of $1,964,000). In light of recent events on the Korean peninsula, particularly the dismissal of IAEA inspectors from North Korea, and given FY 2003 resources ($1.989 million), the Department expects to be able to maintain a capability to resume spent fuel management in the DPRK. Notwithstanding, the recent destruction by the DPRK of IAEA seals and the removal of surveillance cameras from nuclear facilities and material, as of the time of this budget submission, our view is that North Korea must abide by the terms of its safeguards agreement with the IAEA, irrespective of the status of the Agreed Framework. | -1,525 |
| # Increase in *Global Regimes* funds the certification of the second Chemical Weapons Convention (CWC) Lab for the testing and evaluation of chemical samples. | 277 |
| # Increase in *Regional Nonproliferation* will enable the program to keep its planned schedule for cooperative monitoring and regional engagement. | 147 |
| # Decrease in *Warhead Dismantlement and Fissile Material Transparency* is due to management decision to fund certification of the CWC lab; funding is sufficient for planned work. | -9 |
| **Total, Nonproliferation Policy** | **-1,110** |
| **Export Control** | |
| # Increase of funds in *Export Control Operations* will enable the program to implement statutorily and policy-mandated responsibilities to review U.S. exports and related transfers for proliferation concern, as well as research and other technical programs to support U.S. export control diplomacy and nonproliferation interests. | 218 |
| # Increase in *International Nuclear Export Control Cooperation* will sustain targeted programs of assistance in countries and regions of proliferation concern. | 61 |
| **Total, Export Control** | **279** |

## Explanation of Funding Changes

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **International Safeguards** | |
| # Increase of funds in *IAEA Safeguards and Nonproliferation Policy Support* is to support preparations to implement the Additional Protocol at DOE/NNSA through an expanded declaration of nuclear fuel cycle-related research and development, manufacturing, and other activities. | 5,804 |
| # Increase of funds in *International Cooperation* will promote the application of nuclear technology for peaceful purposes through bilateral "Sister Laboratory" arrangements and IAEA technical assistance programs. | 92 |
| # Increase in *Nuclear Noncompliance Verification* will provide funding for delivery of tools to meet the ongoing and longstanding requirement to detect, understand, and verify dismantlement of foreign clandestine nuclear programs. | 4,564 |
| # Increase in *Sustainability of Safeguards and Security Systems* will support improving and sustaining the security and accountability of nuclear material and performing safeguards in the NIS and Baltic states. | 42 |
| **Total, International Safeguards** | **10,502** |
| **Treaties and Agreements** | |
| # The decrease will reduce *Treaties and Agreements* by roughly twenty percent. The program will continue to respond to unanticipated requirements arising from nonproliferation regimes or arms control obligations. | **-605** |
| **Total Funding Change, Nonproliferation & International Security** | **9,066** |

# International Nuclear Materials Protection and Cooperation

## Program Mission

The International Nuclear Materials Protection and Cooperation (MPC&A) program works in Russia, the Former Soviet Union (FSU), and other countries of concern to secure nuclear weapons, weapons-usable nuclear materials and radiological sources by upgrading security at nuclear sites, consolidating these materials to sites where installation of enhanced security systems have already been completed, and improving nuclear smuggling detection capabilities at international borders.

To accomplish this mission the MPC&A program plans to conduct several vitally important activities. First, physical security and accountancy upgrades appropriate for the level of material attractiveness and the threat of theft will be installed at nuclear sites in Russia, the Former Soviet Union and nuclear sites outside of Russia and the FSU. Weapons-usable nuclear materials will be consolidated into fewer buildings and at fewer sites. Excess weapons-grade highly enriched uranium (HEU) will be converted into low enriched uranium (LEU) in order to reduce the number of theft targets. Radiological materials which could be used for dirty bombs will be located, consolidated and secured. The detection of illicit trafficking of nuclear and radiological materials will be enhanced through the installation of radiation detection equipment at strategic transit and border crossing locations. The MPC&A program will also foster the capabilities and commitment to sustain MPC&A improvements in partner countries after U.S. cooperation ends.

The MPC&A Program actively participated in the recent Office of Management and Budget's Program Assessment using the Program Assessment Rating Tool (PART). In this assessment the program achieved a perfect score on purpose and design because it has a clear purpose that addresses a specific need. It also and achieved a perfect score in strategic planning because the Department has established specific, measurable goals and time frames. OMB has therefore assigned to this program its highest rating of "Effective".

## Program Strategic Performance Goals

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

### Performance Indicators

Percentage of Russian weapons-usable nuclear material placed under MPC&A comprehensive upgrades

Percentage of Russian Navy nuclear warheads placed under MPC&A comprehensive upgrades

Percentage of Highly Enriched Uranium (HEU) converted to Low Enriched Uranium (LEU)

Number of orphan or surplus radioactive sources located, consolidated and secured

Number of sites with completed installations of radiation detection equipment

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed MPC&A comprehensive upgrades on an additional 2% of the 600 MTs of the weapons-usable nuclear material (increasing the total amount of the weapons-usable nuclear material under comprehensive upgrades to 17% of the 600 MTs). | Complete MPC&A comprehensive upgrades on an additional 5% of the 600 MTs of the weapons-usable nuclear material (increasing the total amount of the weapons-usable nuclear material under comprehensive upgrades to 22% of the 600 MTs). | Complete MPC&A comprehensive upgrades on an additional 4% of the 600 MTs of the weapons-usable nuclear material (increasing the total amount of the weapons-usable nuclear material under comprehensive upgrades to 26% of the 600 MTs). |
| Completed MPC&A comprehensive upgrades on an additional 22% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 40%). | Complete MPC&A comprehensive upgrades on an additional 20% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 60%). | Complete MPC&A comprehensive upgrades on an additional 30% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 90%). |
| Converted an additional 3% of the total 29 MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 11%). | Convert an additional 4% of the total 29 MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 15%). | Convert an additional 11% of the total 29 MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 26%). |
| Initiated activities to locate, consolidate and secure 9 orphan or surplus radioactive sources stored at one site in Georgia. | Locate, consolidate and secure 180 orphan or surplus radioactive sources, (for a total of 189 orphan or surplus radioactive sources secured). | Locate, consolidate and secure 225 orphan or surplus radioactive sources, (for a total of 414 orphan or surplus radioactive sources secured). |
| Installed radiation detection equipment at 12 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 20). | Install radiation detection equipment at 26 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 46). | Install radiation detection equipment at 11 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 57). |

## Significant Program Shifts

The NNSA has identified one hundred five nuclear sites in Russia and the Former Soviet Union (FSU), which through cooperation with NNSA may require security upgrades (63 Ministry of Defense, 11 MinAtom Weapons Complex, and 31 Civilian (18 Russian and 13 FSU)). Fifty two of these sites are Ministry of Defense nuclear warhead storage sites, (42 Russian Navy and 10 Strategic Rocket Force), the remaining 11 Ministry of Defense sites are Russian Navy Fuel Storage sites. By the end of FY 2004, comprehensive upgrades are projected to be completed at 56 of the 105 sites (25 Navy, 2 MinAtom and 29 Civilian sites (16 Russian and all 13 FSU)). Since the September 11 attacks, NNSA has identified aggressive steps to accelerate and expand its nuclear security cooperation. At this time, NNSA estimates that all 53 material sites will be completed by 2008. NNSA estimates all 42 Navy warhead sites that require further MPC&A upgrades can be completed by 2006. The Ministry of Defense has provided 2 Strategic Rocket Forces sites to date for MPC&A upgrades and might ask for more sites to be upgraded. NNSA believes that all 10 Strategic Rocket Forces could be completed by 2008. This program acceleration and expansion has been significantly enhanced by the additional $150 million in FY 2002 supplemental funds.

NNSA estimates that there are approximately 600 metric tons (MTs) of weapons attractive nuclear material (10% at Navy sites, 83% at MinAtom Weapons Complex sites, and 7% at Civilian sites), enough for approximately 41,000 nuclear devices. By the end of FY 2004, NNSA plans to have begun MPC&A upgrades on all of this material. In addition, NNSA estimates that there are approximately 4,000 warheads located at the 42 Russian Navy nuclear warhead storage sites and several thousand warheads at 10 Strategic Rocket Force sites in need of security upgrades.

By the end of FY 2004, NNSA plans to have rapid upgrades completed on about 60% of the total 600 MTs; comprehensive upgrades completed on about 26% of the total 600 MTs and 90% of the 4,000 Navy warheads; and converted 7.45 MTs of HEU to LEU. These accomplishments directly contribute to the NNSA Strategic goal of protecting or eliminating weapons usable nuclear materials by upgrading security at nuclear sites in Russia , FSU and other countries of concern.

The FY 2002 supplemental funding has also allowed the MPC&A program to significantly expand the Second Line of Defense (SLD) program and begin a new initiative called Radiological Dispersion Devices (RDD). Since the September 11 attacks, NNSA has begun this aggressive new initiative in order to locate, consolidate and secure radiological material which could be used for dirty bombs. The NNSA has currently identified 35 large radiological waste sites called RADON sites in Russian and the Former Soviet Union which require security upgrades. In addition, Russia and the FSU contain over 1,000 orphan or surplus radioactive sources which need to be located and consolidated to a secure facility. The NNSA is working with the International Atomic Energy Agency (IAEA), Russian Federation and other countries to identify and prioritize additional radiological sources.

The National Programs Office (Protective Force Project) made an immediate impact on reduction of risk of theft or diversion of nuclear material by assessing and very quickly placing rapid upgrades to protective forces at nineteen sites in FY 2002 that MinAtom designated as most critical and vulnerable. 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.

# Funding Profile

(dollars in thousands)

| International Nuclear Materials Protection and Cooperation | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| Navy Complex | 87,780 | 55,800 | 38,000 | -17,800 | -31.9% |
| Strategic Rocket Forces | 0 | 0 | 24,000 | 24,000 | N/A |
| MinAtom Weapons Complex | 31,173 | 48,000 | 34,000 | -14,000 | -29.2% |
| Civilian Nuclear Sites | 34,617 | 21,707 | 11,000 | -10,707 | -49.3% |
| Material Consolidation and Conversion | 21,000 | 27,000 | 31,000 | 4,000 | 14.8% |
| Radiological Dispersion Devices | 20,285 | 16,293 | 36,000 | 19,707 | 121.0% |
| National Programs and Sustainability | 73,552 | 34,277 | 28,000 | -6,277 | -18.3% |
| Second Line of Defense[a] | 46,185 | 24,000 | 24,000 | 0 | 0.0% |
| **Total, International Nuclear Materials Protection and Cooperation** | 314,592[bcd] | 227,077 | 226,000 | -1,077 | -0.5% |

**Public Law Authorization and Other Agreements:**
Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003

[a]Formerly part of Assessment, Detection and Cooperation, the Nuclear Assessment portion of which will be transferred to the Department of Homeland Security.

[b] Reflects $120 million from FY 2002 emergency supplemental funding contained in Public Law 107-117, and reflects a $208K adjustment for government-wide rescission of funds in administrative and travel accounts required by section 1403 of the 2002 Supplemental Appropriations Act for Further Recovery From and Response to Terrorist Attacks on the United States (H.R. 4775).

[c]Reflects $ 30.0 million from FY 2002 emergency supplemental funding contained in Public Law 107-206.

[d]FY 2002 funding does not reflect an appropriation transfer to Program Direction for an office move and additional staffing and travel in the amount of $1.805 million approved by Congress in early FY 2003.

# Funding by Site

(dollars in thousands)

| International Nuclear Materials Protection and Cooperation | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory (East) | 8,408 | 3,682 | 2,700 | -982 | -26.7% |
| Brookhaven National Laboratory | 42,664 | 42,927 | 41,085 | -1,842 | -4.3% |
| New Brunswick Laboratory | 165 | 58 | 48 | -10 | -17.2% |
| Total, Chicago Operations Office | 51,237 | 46,667 | 43,833 | -2,834 | -6.1% |
| Idaho Operations Office | | | | | |
| Idaho National Engineering and Environmental Laboratory | 73 | 0 | 0 | 0 | 0.0% |
| Total, Idaho Operations Office | 73 | 0 | 0 | 0 | 0.0% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory | 37,771 | 30,395 | 33,261 | 2,866 | 9.4% |
| Total, Livermore Site Office | 37,771 | 30,395 | 33,261 | 2,866 | 9.4% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory | 20,064 | 18,084 | 18,512 | 428 | 2.4% |
| Total, Los Alamos Site Office | 20,064 | 18,084 | 18,512 | 428 | 2.4% |
| Nevada Site Office | | | | | |
| Nevada Site Office | 10,962 | 8,702 | 13,695 | 4,993 | 57.4% |
| Total, Nevada Site Office | 10,962 | 8,702 | 13,695 | 4,993 | 57.4% |
| NNSA Service Center | | | | | |
| NNSA Service Center | 23,838 | 8,189 | 6,975 | -1,214 | -14.8% |
| Total, NNSA Service Center | 23,838 | 8,189 | 6,975 | -1,214 | -14.8% |
| Oak Ridge Operations Office | | | | | |
| Oak Ridge National Laboratory | 56,477 | 32,016 | 33,086 | 1,070 | 3.3% |
| Total, Oak Ridge Operations Office | 56,477 | 32,016 | 33,086 | 1,070 | 3.3% |
| Pantex Site Office | | | | | |
| Pantex Site Office | 185 | 0 | 0 | 0 | 0.0% |
| Total, Pantex Site Office | 185 | 0 | 0 | 0 | 0.0% |

(dollars in thousands)

| **International Nuclear Materials Protection and Cooperation** | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory ..... | 49,369 | 35,408 | 37,112 | 1,704 | 4.8% |
| Total, Richland Operations Office ..... | 49,369 | 35,408 | 37,112 | 1,704 | 4.8% |
| Sandia Site Office | | | | | |
| Sandia National Laboratories | 56,166 | 43,263 | 35,557 | -7,706 | -17.8% |
| Total, Sandia Site Office ..... | 56,166 | 43,263 | 35,557 | -7,706 | -17.8% |
| Savannah River Operations Office | | | | | |
| Savannah River Operations Office ..... | 370 | 261 | 181 | -80 | -30.7% |
| Total, Savannah River Operations Office ..... | 370 | 261 | 181 | -80 | -30.7% |
| Washington Headquarters ..... | 8,080 | 4,092 | 3,788 | -304 | -7.4% |
| **International Nuclear Materials Protection and Cooperation** | 314,592 | 227,077 | 226,000 | -1,077 | -0.5% |

# Site Description

## Argonne National Laboratory-East

Argonne National Laboratory-East (ANL-East) 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. The LLNL supports international MPC&A activities at several Navy, Civilian and MinAtom Weapons Complex sites and 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. Los Alamos Site Office 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.

## Nevada Site Office

Nevada Site Office provides support for the RDD initiative and the Second Line of Defense activities.

## 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.

## NNSA Service Center

The NNSA Service Center provides technical support to the International Nuclear Material Protection and 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.

## 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, 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; 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.

## 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 and 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. The SNL also provides expertise in advising Russian institutes and enterprises as they develop physical protection regulations and training programs, and 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. 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 typically completed within six months, a comprehensive upgrades phase requiring 12-18 months to complete 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, consolidation of target nuclear materials into fewer locations, 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.

**Subprogram Goal**
Secure approximately 60 MTs of weapons-usable nuclear materials and approximately 4,000 nuclear warheads at up to 53 Russian Federation Navy sites by 2006.

**Performance Indicators**
Percentage of weapons-usable nuclear material placed under MPC&A rapid upgrades

Percentage of weapons-usable nuclear material placed under MPC&A comprehensive upgrades

Percentage of weapons-usable nuclear material sites with completed MPC&A comprehensive upgrades

Percentage of nuclear warheads placed under MPC&A rapid upgrades

Percentage of nuclear warheads placed under MPC&A comprehensive upgrades

Percentage of nuclear warhead sites with completed MPC&A comprehensive upgrades

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed MPC&A rapid upgrades on all of the ~60 MTs of weapons-usable nuclear material at 11 fuel sites and an additional 1% of the estimated 4,000 Russian Navy nuclear warheads at 42 sites. | Complete MPC&A rapid upgrades on all of the remaining Russian Navy nuclear warheads as required at 42 sites. | |
| Completed MPC&A comprehensive upgrades on an additional 1% of the ~60 MTs of weapons-usable nuclear material at 11 fuel sites (increasing the total under comprehensive upgrades to 98%). | Complete MPC&A comprehensive upgrades on the final 2% of the ~60 MTs of weapons-usable nuclear material at 11 fuel sites. | |
| Completed MPC&A comprehensive upgrades on an additional 22% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 40%). | Complete MPC&A comprehensive upgrades on an additional 20% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 60%). | Complete MPC&A comprehensive upgrades on an additional 30% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total under comprehensive upgrades to 90%). |
| Completed MPC&A comprehensive upgrades at an additional 2 of the 42 nuclear warhead sites increasing the total number of sites completed to 16 of the 53 sites, (7 of the 42 nuclear warhead sites and 9 of the 11 fuel sites). | Complete MPC&A comprehensive upgrades at an additional 2 of the 42 nuclear warhead sites and at the final 2 of the 11 fuel sites increasing the total number of completed to 20 of the 53 sites, (9 of the 42 nuclear warhead sites and 11 of the 11 fuel sites). | Complete MPC&A comprehensive upgrades at an additional 5 of the 42 nuclear warhead sites increasing the total number of completed sites to 25 of the 53 sites (14 of the 42 nuclear warhead sites and 11 of the 11 fuel sites). |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Navy Complex | 87,780 | 55,800 | 38,000 | -17,800 | -31.9% |
| Total, Navy Complex | 87,780 | 55,800 | 38,000 | -17,800 | -31.9% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Navy Complex** | 87,780 | 55,800 | 38,000 |

Complete MPC&A comprehensive upgrades at an additional 30% of the estimated 4,000 Russian Navy nuclear warheads (increasing the total warheads under comprehensive upgrades to 90%). These upgrades will include physical protection and material control enhancements to Russian Navy sites that store or handle nuclear warheads. Upon completion of these upgrades, sustainability activities will begin at these warhead sites.

MPC&A comprehensive upgrades were completed on 100% of the 11 Navy material sites in FY 2003, no new work is planned at those sites. However, sustainability and training efforts will continue to ensure that equipment provided is effective in protecting the material.

| | | | |
|---|---|---|---|
| **Total, Navy Complex** | **87,780** | **55,800** | **38,000** |

# Strategic Rocket Forces

## Mission Supporting Goals and Objectives

The Strategic Rocket Forces (SRF) subprogram improves security of Russian Federation (RF) warheads by installing improved MPC&A systems at RF Strategic Rocket Forces nuclear warhead sites. It is unknown how many sites that the Russian Federation will propose for cooperation. For planning purposes, NNSA is assuming that approximately 10 SRF nuclear warhead sites will be proposed. The process for working with the Strategic Rocket Forces will be based upon the refined process currently in place with the Russian 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 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..

**Subprogram Goal**
Secure nuclear warheads at approximately 10 Russian Strategic Rocket Forces sites.

**Performance Indicators**
Number of nuclear warhead sites with completed MPC&A rapid upgrades

Number of nuclear warhead sites with completed MPC&A comprehensive upgrades

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| N/A | N/A | Initiate MPC&A rapid upgrades at 4 of the approximately 10 SRF sites.<br><br>Complete MPC&A rapid upgrades at 2 of the approximately 10 SRF sites, (total 2 complete).<br><br>Initiate MPC&A comprehensive upgrades at 2 of the SRF sites. |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Strategic Rocket Forces | 0 | 0 | 24,000 | 24,000 | N/A |
| Total, Strategic Rocket Forces | 0 | 0 | 24,000 | 24,000 | N/A |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Strategic Rocket Forces** | 0 | 0 | 24,000 |

Initiate MPC&A rapid upgrades at 4 of the approximately 10 strategic rocket forces sites and complete MPC&A rapid upgrades at 2 of the approximately 10 SRF sites, (total 2 complete). Initiate MPC&A comprehensive upgrades at 2 of the SRF sites.

| | | | |
|---|---|---|---|
| **Total, Strategic Rocket Forces** | **0** | **0** | **24,000** |

# 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 500 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. The NNSA works closely with MinAtom and the respective sites to obtain proper assurances for all U.S. sponsored upgrades. Proper assurances are required to ensure that the upgrades for the sensitive sites are cost-effective and meeting U.S. national security objectives. An access agreement signed in September 2001 has allowed significant access and acceleration of physical protection systems as well as material control and accounting 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.

**Subprogram Goal**
Secure approximately 500 MTs weapons-usable nuclear material at 11 Russian Federation MinAtom Weapons Complex sites by 2008.

**Performance Indicators**
Percentage of weapons-usable nuclear material placed under MPC&A rapid upgrades

Percentage of weapons-usable nuclear material placed under MPC&A comprehensive upgrades

Number of weapons-usable nuclear material sites with completed MPC&A comprehensive upgrades

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed MPC&A rapid upgrades on an additional 6% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of the weapons-usable nuclear material under rapid upgrades to 20%). | Complete MPC&A rapid upgrades on an additional 10% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under rapid upgrades to 30%). | Complete MPC&A rapid upgrades on an additional 20% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under rapid upgrades to 50%). |
| Completed MPC&A comprehensive upgrades on an additional 1% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under comprehensive upgrades to 4%). | Complete MPC&A comprehensive upgrades on an additional 3% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under comprehensive upgrades to 7%). | Complete MPC&A comprehensive upgrades on an additional 5% of the ~500 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under comprehensive upgrades to 12%). |
| | Complete comprehensive MPC&A upgrades at 1 of the 11 sites (bringing the total number of completed sites to 1). | Complete comprehensive MPC&A upgrades at 1 additional site of the 11 sites (bringing the total number of completed sites to 2). |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Minatom Weapons Complex ..... | 31,173 | 48,000 | 34,000 | -14,000 | -29.2% |
| Total, Minatom Weapons Complex ..... | 31,173 | 48,000 | 34,000 | -14,000 | -29.2% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Minatom Weapons Complex** ..... | 31,173 | 48,000 | 34,000 |

MPC&A upgrades at Mayak will focus on the RT-1 fuel reprocessing plant and several sensitive areas within Plant 20. MPC&A upgrades at the Mayak RT-1 reprocessing plant will be completed and comprehensive physical protection and material control and accounting upgrades at Mayak Plant 20 will continue once the final list of proliferation vulnerabilities have been identified and the MPC&A system designs are completed. Upgrades and sustainability for Protective Force and secure transportation will continue.

At Tomsk-7, comprehensive physical protection and material control and accounting upgrades will continue at the Conversion Plant, Uranium Enrichment Plant, Radiochemical Plant, and the Chemical Metallurgical Plant.

At Krasnoyarsk-26, construction of the new Plutonium storage facility will be complete, and the associated MPC&A upgrades will be in progress. Other upgrades include the completion of a central alarm station and implementation of material accounting measurements to track the nuclear material inventory.

At Arzamas-16, rapid upgrades for several existing storage vaults will be completed and MPC&A upgrades for new central storage facility to consolidate material on site will be in progress.

Taking advantage of recently negotiated access and assurances procedures for the Research and Technological Complex and Site 8 at Chelyabinsk-70, comprehensive upgrades will continue to be implemented at these two locations. MPC&A upgrades for a new central storage facility to consolidate material on site will be in progress.

Complete MPC&A comprehensive upgrades at Sverdlovsk-44 and transition to sustainability activities.

| | | | |
|---|---|---|---|
| **Total, Minatom Weapons Complex** ..... | **31,173** | **48,000** | **34,000** |

# Civilian Nuclear Sites

## Mission Supporting Goals and Objectives

This program installs MPC&A systems at 31 civilian nuclear sites (18 Russia and 13 Non-Russian). The civilian sites contain approximately 40 MTs of the most vulnerable, material of proliferation concern. 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 those sites with completed MPC&A comprehensive upgrades.

**Subprogram Goal**
Secure approximately 40 MTs of weapons-usable material at 31 Civilian Nuclear Sites in Russia, the former Soviet Union (FSU), and other regions of concern by 2007.

**Performance Indicators**
Percentage of weapons-usable nuclear material placed under MPC&A rapid upgrades

Percentage of weapons-usable nuclear material placed under MPC&A comprehensive upgrades

Number of weapons-usable nuclear material sites with completed MPC&A comprehensive upgrades

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed MPC&A rapid upgrades on an additional 1% of the ~40 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under MPC&A rapid upgrades to 98%). | Complete MPC&A rapid upgrades on an additional 1% of the ~40 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under MPC&A rapid upgrades to 99%). | Complete MPC&A rapid upgrades on the final 1% of the ~40 MTs of weapons-usable nuclear material. |
| Completed MPC&A comprehensive upgrades on an additional 5% of the ~40 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under MPC&A comprehensive upgrades to 54%). | Complete MPC&A comprehensive upgrades on an additional 44% of the ~40 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under MPC&A comprehensive upgrades to 98%). | Complete MPC&A comprehensive upgrades on an additional 1% of the ~40 MTs of weapons-usable nuclear material (increasing the total amount of weapons-usable nuclear material under MPC&A comprehensive upgrades to 99%). |
| Completed MPC&A comprehensive upgrades at 1 additional site (increasing the total number of completed sites to 11of the 18 Russian sites and all 13 of the 13 Non-Russian sites | Complete MPC&A comprehensive upgrades at an additional 3 of the 31 sites (increasing the total number of completed sites to 14 of the 18 Russian sites and all 13 of the 13 Non-Russian sites). | Complete MPC&A comprehensive upgrades at an additional 2 of the 31 sites (increasing the total number of completed sites to 16 of the 18 Russian sites and all 13 of the 13 Non-Russian sites |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Civilian Nuclear Sites | 34,617 | 21,707 | 11,000 | -10,707 | -49.3% |
| Total, Civilian Nuclear Sites | 34,617 | 21,707 | 11,000 | -10,707 | -49.3% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Civilian Nuclear Sites** | 34,617 | 21,707 | 11,000 |

Install MPC&A rapid upgrades on the final 1% of the 40 MTs of weapons-usable nuclear material. Complete MPC&A comprehensive upgrades on an additional 1% of nuclear material (increasing the total amount of nuclear material under comprehensive upgrades to 99%). Complete MPC&A comprehensive upgrades at an additional 2 of the 31 sites, which includes the All Russian Scientific Research Institute of Atomic Reactors (Dimitrovgrad) and The Research Institute of Scientific Instruments (Lytkarino), (increasing the total number of sites completed to 16 of the 18 Russian sites and 13 of the 13 FSU sites). Continue upgrades at the remaining 2 sites which include the Elektrostal Machine Building Plant and the All Russian Scientific Research Institute of Inorganic Materials (Bochvar). Provide training, procedures, critical spare parts, and performance testing to the sites with completed MPC&A upgrades in order to ensure the sustainability of installed MPC&A upgrades.

| | | | |
|---|---|---|---|
| **Total, Civilian Nuclear Sites** | **34,617** | **21,707** | **11,000** |

# Material Consolidation and Conversion

## Mission Supporting Goals and Objectives

Material Consolidation and Conversion (MCC) reduces the complexity and the long-term costs of securing 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 material (HEU and Plutonium) to less proliferant attractive form, which reduces its attractiveness to would-be proliferators. By the end of FY 2009, it is planned that the MCC project will convert ~29 MTs of HEU to LEU and remove all proliferation concern material from 55 buildings. This program will also allow NNSA to identify and upgrade nuclear facilities located outside of Russia and the FSU in need of security enhancements.

**Subprogram Goal**
Convert approximately 29 MTs of HEU to LEU and remove all proliferation concern material from approximately 55 buildings by 2010, and secure weapons-usable nuclear material at nuclear sites in Russian, the FSU and other regions of concern.

**Performance Indicators**
Percentage of HEU converted to LEU

Percentage of buildings cleared of all weapons usable material

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Converted an additional 3% of the total 29MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 11%). | Convert an additional 4% of the total 29MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 15%).<br><br>Clear an additional 4% of the 55 buildings to be cleared of all weapons-usable material consolidating it to other secured buildings (increasing the total percentage of buildings cleared to 42%). | Convert an additional 11% of the total 29MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium, (for a total percentage converted of 26%).<br><br>Clear an additional 11% of the 55 buildings to be cleared of all weapons-usable material consolidating it to other secured buildings (increasing the total percentage of buildings cleared to 53%). |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Material Consolidation and Conversion ..... | 21,000 | 27,000 | 31,000 | 4,000 | 14.8% |
| Total, Material Consolidation and Conversion ..... | 21,000 | 27,000 | 31,000 | 4,000 | 14.8% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Material Consolidation and Conversion** ..... | 21,000 | 27,000 | 31,000 |

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 less proliferant attractive form (i.e. HEU to LEU), rendering it less attractive to would-be proliferators. Convert an additional 11% of the total 29 MTs of weapon-grade highly enriched uranium to be converted to non-weapons grade low enriched uranium,(for a total percentage converted of 26%). Clear an additional 11% of the 55 buildings to be cleared of all weapons-usable material consolidating it to other secured buildings (increasing the total percentage of buildings cleared to 53%).

| | | | |
|---|---|---|---|
| **Total, Material Consolidation and Conversion** ..... | **21,000** | **27,000** | **31,000** |

# Radiological Dispersion Devices

## Mission Supporting Goals and Objectives

The Radiological Dispersion Devices (RDD) program identifies and pursues actions that can be taken to reduce the threat of a radiological attack against the United States. Given the large number of radiological sources and facilities storing these materials world-wide, the RDD program is continuing to refine a prioritization of those materials which pose the greatest risk. Also, considered are threat environment and impacts on U.S. National security. The RDD program security upgrades will be based upon similar methodology used by the MPC&A program to design security enhancements for nuclear warheads and weapons-usable nuclear material.

The NNSA has identified 35 nuclear waste sites, called RADON sites, located within Russia and former Soviet states which may require immediate security improvements. In addition, there are highly radioactive sources at numerous agricultural research institutes, research reactors, medical clinics, industrial sites and defense installations throughout the FSU. Many of these sites may need security upgrades as well. RDD sites will be secured either through the completion of security upgrades or through the recovery and consolidation of sources which could be used as an RDD. Another NNSA high priority is to locate and consolidate over 1,000 orphan or surplus radioactive sources scattered throughout parts of Russia and the Former Soviet Union. The NNSA is providing support to and working with the International Atomic Energy Agency (IAEA) to identify and secure sites and sources within Russia, the former Soviet states, and other regions of concern.

**Subprogram Goal**
Secure radiological materials in Russia, the former Soviet states, and other regions of concern which could be used as a dirty bomb.

**Performance Indicators**
Number of RDD sites secured

Number of orphan or surplus radioactive sources located, consolidated and secured

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed an initial assessment to determine the viability, threat and probable impact of an RDD incident. | Complete security upgrades at 8 RDD sites: 4 RADON sites in Russia, 3 research sites in Uzbekistan, and 1 research site in Georgia, (for a total of 8 sites secured). | Complete security upgrades at 18 RDD sites: 10 sites in Russia, (8 RADON, 2 research/medical), and 8 sites in the States of the Former Soviet Union, (4 RADON, 4 research /medical), (for a total of 26 sites secured). |
| Initiated security upgrades at 8 RDD sites: 4 RADON sites in Russia, 3 research sites in Uzbekistan, and 1 research site in Georgia. | Initiate security upgrades at 18 RDD sites: 10 sites in Russia, (8 RADON, 2 research/medical), and 8 sites in former Soviet states, (4 RADON, 4 research /medical). | Initiate security upgrades at 24 RDD sites: 12 sites in Russia, (4 RADON, 8 research/ medical/ industrial/defense), 12 sites in former Soviet states, (6 RADON, 6 research/ medical/ industrial/defense). |
| Initiated activities to locate, consolidate and secure 9 orphan or surplus radioactive sources stored at one site in Georgia. | Locate, consolidate and secure 180 orphan or surplus radioactive sources, (for a total of 189 orphan or surplus radioactive sources secured). | Locate, consolidate and secure 225 orphan or surplus radioactive sources, (for a total of 414 orphan or surplus radioactive sources secured). |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Radiological Dispersion Devices ..... | 20,285 | 16,293 | 36,000 | 19,707 | 121.0% |
| Total, Radiological Dispersion Devices ..... | 20,285 | 16,293 | 36,000 | 19,707 | 121.0% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Radiological Dispersion Devices** ..... | 20,285 | 16,293 | 36,000 |

As candidate RDD sites and orphan or surplus radioactive sources are identified, the RDD Program installs a suite of upgrades that will significantly enhance the protection of nuclear material at the site to an acceptable level. These upgrades will be installed in two phases: (1) rapid upgrades and (2) comprehensive upgrades. Rapid upgrades consist of low tech upgrades that can be installed quickly and at relatively low cost and have the effect of significantly reducing the risk of theft of nuclear material. If the decision is made to proceed with comprehensive upgrades, they will be based on an independent Vulnerability Assessment (VA). Comprehensive upgrades may include: installation of vehicle inspection areas; hardened access control and guard buildings; detection, assessment, and access control systems; exterior access delay systems; and additional response force upgrades if necessary. In FY 2004, the RDD program plans to complete the installation of equipment to secure radiological materials at an 18 RDD sites, (increasing the total number of sites secured to 26). Initiate security upgrades at 24 additional RDD sites. Locate, consolidate and secure an additional 225 orphan or surplus radioactive sources, (increasing the total of orphan or surplus radioactive sources secured to 414).

| | | | |
|---|---|---|---|
| **Total, Radiological Dispersion Devices** ..... | **20,285** | **16,293** | **36,000** |

# 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 partner countries Russian Federation (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 partner countries where they will operate and sustain them for the long-term. The National Programs Office is dedicated to ensuring the MPC&A upgrades implemented through the Navy, MinAtom and Civilian Nuclear Sites programs continue to reduce the risk of theft or diversion of nuclear material by facilitating the establishment of a partner countrys' national, regional and site level MPC&A support infrastructure.

The National Program establishes the requirement for MPC&A systems through development of technically sound, internally consistent regulatory requirements that are suited to partner country 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 partner countries through a jointly developed partner country 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 partner country MPC&A professionals. Development of an in country 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 within and between sites.

In FY 2002, the MPC&A program began the MPC&A Operations Monitoring Project to install unattended monitoring systems that will allow the partner country and U.S. Government officials to ensure sites continue to operate installed MPC&A systems on an ongoing basis. This project is responsive to a GAO recommendation to develop a system, to monitor, on a long-term basis, the security systems installed at partner country 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.

**Subprogram Goal**
Facilitate the establishment of a self-sustaining Russian MPC&A system support infrastructure.

**Performance Indicators**
Percentage of trucks, railcars and overpacks hardened

Percentage of completed MPC&A operational monitoring systems

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Hardened an additional 9% of the 638 trucks, 24% of the 143 railcars and provided an additional 13% of the 488 secure transportation overpacks (increasing the total percentages 22% for trucks, 41% for railcars and 40% for overpacks). | Harden an additional 9% of the 638 trucks, 12% of the 143 railcars and provide an additional 13% of the 488 secure transportation overpacks (increasing the total percentages to 31% for trucks, 53% for railcars and 53% for overpacks). | Harden an additional 8% of the 638 trucks, 7% of the 143 railcars and provide an additional 6% of the 488 secure transportation overpacks (increasing the total percentage completed to 39% for trucks, 60% for railcars and 59% for overpacks). |
| Completed installation of 3% of the 90 MPC&A operations monitoring systems (increasing the total percentage of installed systems to 3% of the 90 MPC&A operations monitoring systems). | Complete installation of an additional 7% of the 90 MPC&A operations monitoring systems (increasing the total percentage of installed systems to 10% of the 90 MPC&A operations monitoring systems). | Complete installation of an additional 4% of the 90 MPC&A operations monitoring systems (increasing the total percentage of installed systems to 14% of the 90 MPC&A operations monitoring systems). |
| Initiate needs assessment and design activities for an MPC&A technical and training support facility in the Kola region. | Begin construction for the MPC&A technical & training support center in Kola region. | Begin operation of the MPC&A technical & training support center in the Kola region. |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| National Programs and Sustainability ..... | 73,552 | 34,277 | 28,000 | -6,277 | -18.3% |
| Total, National Programs and Sustainability ..... | 73,552 | 34,277 | 28,000 | -6,277 | -18.3% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **National Programs and Sustainability** ..... | 73,552 | 34,277 | 28,000 |

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. Development of Russian national level MPC&A regulations for the Ministry of Defense, Ministry of Transportation and the Ministry of Shipbuilding will begin in FY 2004.

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; MPC&A inspections; equipment testing, maintenance, repair, and metrology; nuclear reference standards and procedures to support material measurements; and higher education in the MPC&A field.

Operate and maintain regional technical support facilities to provide equipment repair, maintenance, calibration assistance, operations assistance, configuration control, warranty service, spare parts inventories, and training for critical MPC&A systems and components. In FY 2004, a Technical Support Center for Gosatomnadzor (GAN), Second Line of Defense (SLD) and MinAtom activities will be completed in the Urals and Siberian region.

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 activities such as: hardening railcars and trucks to provide additional protection for guards escorting material shipments. Harden an additional 8% of the trucks, 7% of the railcars and provide an additional 6% of the secure transportation overpacks (increasing the total percentages to 39% for trucks, 60% for railcars and 59% for overpacks).

Complete installation of an additional 4% of the MPC&A operations monitoring systems (increasing the total percentage of installed systems to 14%). 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.

| | | | |
|---|---|---|---|
| **Total, National Programs and Sustainability** ..... | **73,552** | **34,277** | **28,000** |

# Second Line of Defense

## Mission Supporting Goals and Objectives

The Second Line of Defense Program provides integrated sustainable systems to significantly 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 and radiological 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 and radiological material across Russian and other international borders which may include strategic transit and border sites such as border crossings, air and sea transhipment hubs. 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.

The SLD Program closely coordinates its efforts with Department of State (DOS), Nonproliferation Bureau to ensure effective political support and accord in implementing the program in the international arena. DOS provides significant input on priorities for both core program implementation and maintenance of existing equipment systems.

The SLD Program is fully integrated into the United States Custom Service (USCS) in-country representatives' country plans for each country's nonproliferation program plan. SLD coordinates closely with USCS headquarter management on program application to transshipment ports.

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.

**Subprogram Goal**
Detect the illicit trafficking of special nuclear and radiological materials across Russian and other international ports and borders.

**Performance Indicators**
Number of radiation equipment systems installed

Number of sites with completed installations of radiation detection equipment.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Installed an additional 130 radiation detection equipment systems at 15 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 20 of the estimated 391 sites requiring installations). | Install an additional 230 radiation detection equipment systems at 26 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 46 of the estimated 393 sites requiring installations). | Install an additional 46 radiation detection equipment systems at 11 additional strategic transit and border sites to detect and deter illicit trafficking in nuclear materials, (increasing the total sites with completed installations to 57 of the estimated 393 sites requiring installations). |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Second Line of Defense[a] | 46,185 | 24,000 | 24,000 | 0 | 0.0% |
| Total, Second Line of Defense | 46,185 | 24,000 | 24,000 | 0 | 0.0% |

## Detailed Program Justification

[a]Formerly part of Assessment, Detection and Cooperation, the Nuclear Assessment portion of which will be transferred to the Department of Homeland Security.

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Second Line of Defense** | 46,185 | 24,000 | 24,000 |

The SLD program deploys special nuclear material detectors at strategic border crossing sites in order to establish a capability to detect illicit trafficking in special nuclear materials and other radioactive materials. Sites are selected through a site prioritization and selection methodology established to effectively plan and utilize program resources. The methodology incorporates various prioritization factors and allows for the development of a prioritized list of sites which can be selected for the effective application of resources to the most important locations. In FY 2004, 46 radiation detection systems equipment systems will be installed at a total of 11 sites, 7 Russian border sites, 1 Ukranian border sites, and 3 Kazakhstan border sites to detect and prevent nuclear proliferation, increasing the total sites with completed installations to 58. Additionally, the program continues to maintain previously deployed Department of State equipment in 19 other key countries.

| | | | |
|---|---|---|---|
| **Total, Second Line of Defense** | **46,185** | **24,000** | **24,000** |

# Explanation of Funding Changes

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **Navy Complex** | |
| # Decrease due to the completion of the last weapons-usable material site in FY 2003 and the completion of initiation of MPC&A comprehensive upgrades on all of the estimated remaining 42 nuclear warhead sites in FY 2003.. ..... | -17,800 |
| **Strategic Rocket Forces** | |
| # Increase due to the establishment and ramp-up of a new program with the Russian Strategic Rocket Forces to complete MPC&A comprehensive upgrades at a total of 2 of the approximately 10 nuclear warhead sites. ..... | 24,000 |
| **MinAtom Weapons Complex** | |
| # Decrease due to the completion of MPC&A comprehensive upgrades at Krasnoyarsk-45 in FY 2003 and the ramp down of MPC&A comprehensive upgrades at Sverdlovsk-44 which will be completed in FY 2004.. ..... .. | -14,000 |
| **Civilian Nuclear Sites** | |
| # Decrease due to the completion of MPC&A comprehensive upgrades at the Institute of Physics and Power Engineering (IPPE) and Novosibirsk in FY 2003 and the completion of nearly all MPC&A rapid and comprehensive upgrades on the 40 MTs of nuclear material in FY 2003. ..... | -10,707 |
| **Material Consolidation and Conversion** | |
| # Increase due to an increase in the annual percentage of HEU converted to LEU from 4% to 11% and an increase in the annual percentage of buildings cleared of all weapons-usable materials from 4% to 11% of the total number of building to be cleared due to a need to consolidate this material as soon as possible to secure this material from theft. .... ..... | 4,000 |

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **Radiological Dispersion Devices** | |
| # Increase due to the increased understanding in partner countries as to the urgency to secure their radiological materials and the ramp-up of the RDD program as partner countries in cooperation with the U.S., identify additional RDD sites requiring security upgrades and sites where orphan and surplus radioactive sources must be located, consolidated and secured. In FY 2004 an additional 18 RDD sites will be secured and an additional 225 orphan or surplus radioactive sources will be located, consolidated and secured verses the FY 2003 level... ..... | 19,707 |
| **National Programs and Sustainability** | |
| # Decrease due to the completion of the construction of the first material protection control and accounting technical support and training facility in the Kola region in FY 2003.... ..... | -6,277 |
| **Second Line of Defense** | |
| # No change, formerly part of Assessment, Detection and Cooperation, the Nuclear Assessment portion of which will be transferred to the Department of Homeland Security. ..... | 0 |
| Total Funding Change, International Nuclear Materials Protection and Cooperation ..... | -1,077 |

# Russian Transition Initiatives

## Program Mission

The mission of the Russian Transition Initiatives is to counter the proliferation threat posed by the threat of adverse migration of WMD expertise from the weapons complex of the former Soviet Union, to 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: (1) fuel cycle technologies in order to create the fissile materials for a weapon (or steal or buy the fissile materials); (2) weapons design information, and; (3) weapons assembly expertise. The Russian nuclear weapons complex, which is vastly oversized, decrepit, and starving for resources is still dangerously capable of performing these core functions, and is an obvious source for these requirements. The Russian Transition Initiatives program is focused on preventing adverse migration of this WMD expertise through two mechanisms. First, it removes functions and equipment from the weapons complex, reduces the physical footprint, and creates sustainable, non-weapons work within functioning city economies. Second, it provides meaningful, sustainable, non-weapons-related work for former Soviet WMD scientists, engineers, and technicians through technology-laden projects that have commercially-viable market opportunities.

## Program Strategic Performance Goals

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

## Performance Indicators

Number of former Soviet Union weapons scientists, engineers and technicians employed.

Percentage of progress in meeting all former Soviet Union nuclear complex reduction targets (personnel, facilities and equipment removed from military activity**.**

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Signed Closure Agreement with Russia, which publicly commits MinAtom to cease nuclear weapons work at Avangard by 2003. Attracted $50 million of venture capital funding for commercializing five Initiatives for Proliferation Prevention projects. | Accelerate three Russian Technology development efforts in Russia nuclear cities that have a clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives. | Employ 6000 former Soviet weapons scientists, engineers and technicians<br><br>Meet 53% of all former Soviet Union nuclear complex reduction targets at 6 weapons facilities and complete all targets at 2 of 6 sites. |

## Significant Program Shifts

The Russian Transition Initiatives program facilitates continued access to NIS facilities and establishes self-sustaining commercial entities that support independent commercial projects. This commercialization 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. It will also continue to reduce the size of the weapons complex in the Russian closed cities by removing functions and equipment from the weapons sites, reducing the physical footprint of the weapons complex, and by creating sustainable, alternative non-weapons work for former Soviet WMD experts. An important part of RTI's efforts is aimed at improving the physical and business infrastructure in the closed cities, laying the necessary groundwork for economic diversification, and complementing and strengthening the prospects for our commercialization efforts.

# Funding Profile

(dollars in thousands)

| | FY 2002 Comparable | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| **Russian Transition Initiatives** | 57,000[a] | 39,334 | 40,000 | 666 | 1.7% |

**Public Law Authorization:**

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

Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003.

a/Reflects $15,000,000 from FY 2002 emergency supplemental funding contained in Public Law 107-117.

# Funding by Site

(dollars in thousands)

| Russian Transition Initiatives | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory | 3,043 | 3,097 | 3,152 | 55 | 1.8% |
| Brookhaven National Laboratory | 5,139 | 5,232 | 5,326 | 94 | 1.8% |
| National Renewable Energy Laboratory | 1,432 | 1,457 | 1,483 | 26 | 1.8% |
| Total, Chicago Operations Office | 9,614 | 9,786 | 9,961 | 175 | 1.8% |
| Idaho Operations Office | | | | | |
| Idaho National Engineering and Environmental Laboratory | 1,137 | 1,157 | 1,178 | 21 | 1.8% |
| Total, Idaho Operations Office | 1,137 | 1,157 | 1,178 | 21 | 1.8% |
| Kansas City Site Office | | | | | |
| Kansas City Plant | 302 | 307 | 313 | 6 | 2.0% |
| Total, Kansas City Site Office | 302 | 307 | 313 | 6 | 2.0% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory | 11,281 | 5,484 | 5,690 | 206 | 3.8% |
| Total, Livermore Site Office | 11,281 | 5,484 | 5,690 | 206 | 3.8% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory | 7,512 | 3,113 | 3,259 | 146 | 4.7% |
| Total, Los Alamos Site Office | 7,512 | 3,113 | 3,259 | 146 | 4.7% |
| NNSA Service Center | | | | | |
| Lawrence Berkeley National Laboratory | 2,690 | 2,738 | 2,787 | 49 | 1.8% |
| NNSA Service Center (All Other Sites) | 600 | 610 | 621 | 11 | 1.8% |
| Total, NNSA Service Center | 3,290 | 3,348 | 3,408 | 60 | 1.8% |

(dollars in thousands)

| Russian Transition Initiatives | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Oak Ridge Operations Office | | | | | |
| Y-12 Site Office | 3,325 | 3,385 | 3,446 | 61 | 1.8% |
| Total, Oak Ridge Operations Office | 3,325 | 3,385 | 3,446 | 61 | 1.8% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 5,196 | 2,289 | 2,384 | 95 | 4.2% |
| Total, Richland Operations Office | 5,196 | 2,289 | 2,384 | 95 | 4.2% |
| Sandia Site Office | | | | | |
| Sandia National Laboratories | 6,061 | 2,170 | 2,281 | 111 | 5.1% |
| Total, Sandia Site Office | 6,061 | 2,170 | 2,281 | 111 | 5.1% |
| Savannah River Operations Office | | | | | |
| Savannah River Technology Center | 1,796 | 1,828 | 1,861 | 33 | 1.8% |
| Total, Savannah River Operations Office | 1,796 | 1,828 | 1,861 | 33 | 1.8% |
| Washington Headquarters | 7,486 | 6,467 | 6,219 | -248 | -3.8% |
| **Total, Russian Transition Initiatives** | **57,000** | **39,334** | **40,000** | **666** | **1.7%** |

## Site Descriptions

**Argonne National Laboratory**
Argonne National Laboratory supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Brookhaven National Laboratory**
Brookhaven National Laboratory supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Idaho National Engineering and Environmental Laboratory**
Idaho National Engineering and Environmental Laboratory supports RTI commercialization efforts in the former Soviet Union.

**Kansas City Plant**
Kansas City Plant supports RTI's commercialization efforts in the former Soviet Union.

**Lawrence Berkeley National Laboratory**
Lawrence Berkeley National Laboratory supports RTI's commercialization efforts in the former Soviet Union.

**Lawrence Livermore National Laboratory**
Lawrence Livermore National Laboratory supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Los Alamos National Laboratory**
Los Alamos National Laboratory supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**National Renewable Energy Laboratory**
The National Renewable Energy Laboratory supports RTI commercialization efforts in the former Soviet Union.

**National Energy Technology Laboratory**
The National Energy Technology Laboratory supports RTI efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**NNSA Service Center**
The NNSA Service Center supports Russian Transition Initiatives (RTI) efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Y-12 Site Office**
The Y-12 Site Office supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Pacific Northwest National Laboratory**
Pacific Northwest National Laboratory supports RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Sandia National Laboratories**
Sandia National Laboratories support RTI commercialization efforts in the former Soviet Union and efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

**Savannah River Site**
The Savannah Site supports RTI efforts to downsize the Russian nuclear weapons complex and help create business opportunities for displaced weapons workers.

# Russian Transition Initiatives

## Mission Supporting Goals and Measures

The Russian Transition Initiatives program provides meaningful, sustainable, non-weapons-related work for former Soviet weapons of mass destruction (WMD) scientists, engineers, and technicians in the NIS through commercially viable market opportunities. It does so by providing seed funds for the identification and maturation of technology and facilitates interactions between U.S. industry and NIS institutes for developing industrial partnerships, joint ventures, and other mutually beneficial arrangements. It also reduces the size of the weapons complex in the closed cities, by removing functions and equipment from the weapons sites, reducing the physical footprint, and creating sustainable, alternative non-weapons work. RTI works closely with other U.S. Government programs foreign partners, as well as the private sector, to convert weapons facilities, develop commercial infrastructure and business partnerships, and enable the development of self-sustaining non-weapons commercial enterprises.

**Subprogram Goal**

Prevent the adverse migration of former Soviet Union weapons of mass destruction expertise by downsizing complex and commercializing technologies.

**Performance Indicators**

Number of former Soviet Union weapons scientists, engineers and technicians employed.

Number of technologies commercialized and businesses created.

Percentage of progress in meeting all former Soviet Union nuclear complex reduction targets (personnel, facilities and equipment removed from military activity**.**

Amount of non-USG leveraged funding and revenue generated (an indicator of potential self-sustainability)**.**

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Signed Closure Agreement with Russia, which publicly commits MinAtom to cease nuclear weapons work at Avangard by 2003. Attracted $50 million of venture capital funding for commercializing five Initiatives for Proliferation Prevention projects. | Accelerate three Russian Technology development efforts in Russian closed cities that have a clear counter-terrorism or terrorism response applications under the Russian Transition Initiatives. | Obtain non USG funding contributions in revenue generated equal to 60% of RTI project funds ($24 million).<br><br>Employ 6000 former Soviet Union weapons scientists, engineers and technicians<br><br>21 technologies commercialized or businesses created<br><br>Meet 53% of all former Soviet Union nuclear complex reduction targets at 6 weapons facilities and complete of all targets at 2 of 6 sites |

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| **Russian Transition Initiatives** | **57,000** | **39,334** | **40,000** | **666** | **1.7%** |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Russian Transition Initiatives** | 57,000 | 39,334 | 40,000 |

RTI 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. It focuses on applied research projects with high commercial potential. The program's growing emphasis on commercialization establishes self-sustaining commercial entities that will support future independent commercial projects, and facilitates continued access to NIS facilities and technologies. This focus on commercialization 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. A second goal of the program is to reduce the size of the Russian weapons complex, by removing functions and equipment from the weapons sites, reducing the physical footprint, and creating sustainable, alternative non-weapons work for former Soviet WMD experts. An important part of the program's effort is aimed at making physical and business infrastructure improvements that lay the necessary groundwork for economic diversification and supporting the commercialization efforts. The FY 2004 goals are:

- # Prevent WMD technology transfer and provide commercial opportunities for former Soviet WMD scientists and engineers
- # Engage 6,000 NIS scientists.
- # Expand chemical weapons institute engagement, including two CW counter-terrorism projects
- # Begin directed engagement of former Soviet missile institutes (two projects, two institutes).
- # Begin engagement of institutes and facilities in the Caucasus (two projects --Armenia is first priority)
- # Begin 2-3 projects at Open Computing Center in Snezhinsk
- # Remove plutonium processing equipment from the production facility in Zheleznogorsk.
- # All nuclear weapons related work ceased at Avangard.

| | | | |
|---|---|---|---|
| **Total, Russian Transition Initiatives** | 57,000 | 39,334 | 40,000 |

## Explanation of Funding Changes

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **Russian Transition Initiatives** | |
| # Increase will enable the program to expand engagement in chemical weapons institutes . | 666 |
| **Total Funding Change, Russian Transition Initiatives** | **666** |

# HEU Transparency Implementation

## Program Mission

The mission of the Highly Enriched Uranium (HEU) Transparency Implementation program is to enhance national security by preventing nuclear and radiological events worldwide through the elimination of weapons-usable nuclear material.

Under the NNSA Office of International Nuclear Safety and Cooperation, the HEU Transparency Implementation program works to reduce the global stockpile of weapons-usable nuclear materials which reduces the likelihood of terrorists acquiring weapons of mass destruction.

The HEU Transparency Implementation Program (HEU TIP) accomplishes this objective by actively supporting the Purchase Agreement to acquire low enriched uranium (LEU) over twenty years from the Russian Federation that is derived from 500 metric tons of HEU from dismantled Russian nuclear weapons. The HEU Purchase agreement, which has an estimated value of $12 billion, is planned for completion by 2013. The HEU TIP develops and implements transparency measures that permit the United States to have confidence that the four nuclear nonproliferation goals of the HEU Purchase 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; then (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.

The overall 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. The program also provides technical expertise and leadership for NNSA and DOE in interagency, bilateral, and multilateral fora involving weapons-usable material elimination matters.

### Program Strategic Performance Goals

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

### Performance Indicators

Percentage of the 24 annually allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities to monitor the 30 MTs per year of HEU converted to LEU conducted.

### Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Conducted 18 or 75% of 24 allowed Special Monitoring Visits (SMVs) to the four Russian uranium processing facilities. 171.3 MT of HEU has been converted to LEU from 1995 to Dec. 2002. | Conduct 18 or 75% of 24 allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities. (Note: Only 18% were budgeted in favor of resources to build a second continuous Blend-Down Monitoring System.) Monitor conversion of an additional 30 MT of HEU to LEU. | Conduct 22 or 92 percent of 24 allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities. Monitor conversion of an additional 30 MT of HEU to LEU. |

## Significant Program Shifts

No major program shift for the HEU Transparency Implementation Program (HEU TIP).

# Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| HEU Transparency Implementation | 13,950[a] | 17,229 | 18,000 | 771 | 4.5% |

**Public Law Authorizations:**

Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003
U.S./R.F. HEU Purchase Agreement, Feb. 1993,
and associated protocol and memorandum of understanding

[a] FY 2002 funding does not reflect an appropriation transfer to Program Direction for an office move and additional staffing and travel in the amount of $70,000 approved by Congress in early FY 2003.

# Funding by Site

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory (ANL - East) | 800 | 800 | 800 | 0 | 0.0% |
| Brookhaven National Laboratory (BNL) | 25 | 25 | 0 | -25 | -100.0% |
| New Brunswick Laboratory (NBL) | 450 | 450 | 450 | 0 | 0.0% |
| Total, Chicago Operations Office | 1,275 | 1,275 | 1,250 | -25 | -2.0% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory (LLNL) | 5,800 | 5,800 | 5,950 | 150 | 2.6% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory (LANL) | 1,400 | 2,200 | 2,300 | 100 | 4.5% |
| Nevada Site Office | | | | | |
| Remote Sensing Laboratory (RSL) | 375 | 375 | 400 | 25 | 6.7% |
| NNSA Service Center | | | | | |
| NNSA Service Center | 600 | 1,600 | 2,200 | 600 | 37.5% |
| Oak Ridge Operations Office | | | | | |
| Oak Ridge Operation Office | 35 | 35 | 0 | -35 | -100.0% |
| ORNL/ Y-12 / K-25 | 2,770 | 3,879 | 4,000 | 121 | 3.1% |
| Total, Oak Ridge Operations Office | 2,805 | 3,914 | 4,000 | 86 | 2.2% |
| Sandia Site Office | | | | | |
| Sandia National Laboratory (SNL) | 1,665 | 2,065 | 1,900 | -165 | -8.0% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory (PNNL) | 30 | 0 | 0 | 0 | 0.0% |
| Total, HEU Transparency Implementation | 13,950 | 17,229 | 18,000 | 771 | 4.5% |

[1] On December 20, 2002, the National Nuclear Security Administration (NNSA) disestablished the Albuquerque, Oakland, and Nevada Operations Offices, renamed existing area offices as site offices, established a new Nevada Site Office, and established a single NNSA Service Center to be located in Albuquerque. Other aspects of the NNSA organizational changes will be phased in and consolidation of the Service Center in Albuquerque will be completed by September 30, 2004. For budget display purposes, DOE is displaying non-NNSA budgets by site in the traditional pre-NNSA organizational format.

# 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 provides the HEU Transparency Implementation Program with technical experts to serve as permanent and special monitors at the Russian HEU processing facilities; technical assistance in the coordination, staffing and operation of the Transparency Monitoring Office (TMO) with expert monitors and monitoring activities at uranium processing plant(s) in Russia; and technical support in analysis of transparency data and information. ANL also maintains a small staff in the Washington, DC area to support the HEU TIP program.

## Lawrence Livermore National Laboratory

The Lawrence Livermore National Labatory (LLNL), located in Livermore, CA, which provides the HEU Transparency Implementation Program with technical experts to serve as U.S. permanent presence and special monitors at the Russian HEU processing facilities; 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; development and provision of advanced, portable Non Destructive Analysis (NDA) equipment used for measuring the enrichment of uranium in closed material containers at the 4 uranium processing plants; exchange of information with the Russians on the use of LEU delivered to the U.S.; leadership in the collection, archival and analysis of transparency information obtained from monitoring activities; technical and logistical support for inventorying Russian natural uranium storage; support for the bilateral Transparency Review Committee meetings, meetings dealing with transparency issues, and logistical and technical support to Russian monitoring teams in the U.S.. LLNL has developed and will maintain the automated Data Archive, Retrieval, and Transfer system, to effectively manage all accumulated transparency monitoring data. LLNL also maintains a small staff in the Washington, DC area that provides expert technical support to the program.

## Los Alamos National Laboratory

The Los Alamos National Laboratory (LANL) which is located in Los Alamos, NM, and is a DOE weapons and multi-program national laboratory. LANL 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 at the Russian facilities and technical experts to maintain and support this equipment. LANL supports engineering efforts to modify current BDMS designs, as well as Russian plant modifications, to develop future BDMS equipment for fabrication and installations. 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 on site 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.

## NNSA Service Center

The NNSA Service Center provides contract procurement and administrative for the HEU Transparency program and specifically for the management of a contract with the Pragma Corporation of McLean, VA that has an office in Yekaterinburg, Russia, to support U.S. personnel assigned to the Transparency Monitoring Office (TMO) in Novouralsk, any future TMO, e.g. Seversk, Russia, and assistance to U.S. personnel serving on special monitoring visits to Russian processing facilities. The NNSA Service Center 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. The NNSA Service Center manages a technical support contract with SAIC that supports HEU TIP operations in the U.S. and Russia., and a contract for Russian / English translation services and support with the Russian & Graphics company.

## New Brunswick Laboratory

New Brunswick Laboratory (NBL) is a DOE nuclear material standards laboratory in Argonne, IL that provides technical experts to the HEU Transparency Implementation Program 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.

## Oak Ridge - Oak Ridge National Laboratory and Y-12 plant

Oak Ridge is a DOE weapons and R&D site located in Oak Ridge, TN. Technical expert personnel from each of these organizations support the HEU Transparency Implementation Program by serving as U.S. permanent and special monitors at the Russian HEU processing facilities; conduct the training at the Y-12 plant of U.S. 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 provide engineering expertise 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; they 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 and Paducah Gaseous Diffusion Plants. 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.

## Remote Sensing Laboratory

The Remote Sensing Laboratory (RSL) located in Las Vegas, NV, which provides technical experts to the HEU Transparency Implementation Program to serve as monitors at the Russian HEU processing facilities. RSL also supports LLNL in the development and field testing of the next generation of portable nondestructive

assay (NDA) instruments. These advanced NDA instruments, once field tested, will be fabricated to replace the aging NDA instruments used by U.S. monitors at the four Russian uranium processing facilities.

## Sandia National Laboratory

Sandia National Laboratories (SNL), a DOE weapons research laboratory which is located in Albuquerque, NM and provides technical experts to the HEU TIP to serve as permanent presence and special monitors at the Russian uranium processing facilities; provides for the procurement, installation, replacement, and disposal of radioactive sources required for operating the BDMS equipment installed in the Russian HEU dilution facilities. SNL manages a contract with the "All Russian Technical Institute for Physics" ( VNIITF at C-70) in Schnezinsk, Russia. SNL also constructs secure housings for the enrichment monitoring equipment used in the BDMS; participates in technology development activities to enhance current and future transparency equipment and monitoring procedures; participates in transparency data analysis operations; 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 U.S. 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.

# HEU Transparency Implementation Program

## Mission Supporting Goals and Objectives

The Highly Enriched Uranium (HEU) Transparency Implementation Program (HEU-TIP) provides appropriate confidence that the U.S. nuclear nonproliferation objectives are being met for the February 1993 HEU Purchase Agreement between the United States and the Russian Federation by developing and implementing mutually-agreeable transparency measures.

The Purchase Agreement covers the purchase of low enriched uranium (LEU) over 20 years 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 which has an estimated value of $12 billion, conversion of the HEU components into LEU is performed in Russian facilities located in "closed" Russian cities.

The HEU TIP puts into place and implements transparency measures that permit the United States to have confidence that the four nuclear nonproliferation goals of the HEU Purchase 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; then (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 nonproliferation 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 Paducah Gaseous Diffusion Plant in KY for subsequent sale and shipment to U.S. commercial reactor fuel fabrication facilities. This changed in July 2002, when LEU was previously delivered to the Portsmouth GDP.
- Four U.S. based fuel fabrication facilities receive LEU from USEC to fabricate commercial power reactor fuel elements for delivery to utilities.
- All of these facilities are involved in transparency operations under the HEU Purchase Agreement.

From initial delivery in 1995 through December 2002, over 171.3 metric tons of HEU were converted to LEU. Delivery of LEU product to USEC is on schedule. This quantity of HEU represents enough material for approximately 6,400 nuclear devices! Transparency monitoring procedures and operations have been implemented and measuring equipment installed in Russia to assure that stated nonproliferation objectives associated with this material are being achieved. A total of over $2.5 billion has been provided to Minatom through 2002 for this material and they should receive about $475 million from USEC for each additional 30 metric tons of HEU converted to LEU and delivered. In addition to the funding, Minatom is also remunerated an equivalent amount of Natural Uranium (NU) for the quantity of uranium in the LEU delivered. Approximately 9,000 MT of NU is delivered per 30 MT of HEU converted.

**Permanent Monitoring in Russia**

HEU-TIP staffs and maintains the U.S. Transparency Monitoring Office (TMO) in Novouralsk, Russia with U.S. technical experts who have routine access to the Ural Electrochemical Integrated Plant (UEIP). In FY 2004, plans are to initiate detailed negotiations with Minatom to establish a second TMO in Russia, with a recommended location at the Siberian Chemical Enterprise (SChE) in Seversk. As the SChE facility performs all major HEU to LEU processing steps from weapon component receipt through HEU to LEU blending, a TMO 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.

**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 September, 2002, the program performed over 8,000 monitor-days at the four Russian uranium processing facilities. In FY 2004, we plan to perform 22 of the 24 permitted special monitoring trips in addition to TMO operations.

In 2001, the HEU Transparency Program initiated a new monitoring activity by conducting an annual inventory of natural uranium (NU) feedstock returned to Russia as part of its compensation for the sale to USEC of the HEU-derived LEU. Under the 1999 Feed Agreement, an equivalent amount of natural uranium to that associated with the LEU 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 equivalent. In order to provide confidence that the terms of the Feed Assurances Agreement are being implemented, which directly affects uranium markets, the U.S. conducts an annual inventory of the uranium in storage and disposition of any NU material returned to Russia as stated by the annual report from Minatom.

**Russian Monitoring in U.S. and Negotiation Support**

This program 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 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 and is shifting the RF monitoring office to the Paducah Gaseous Diffusion Plant in FY 2003.

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 and we expect to support at least one major TRC meeting per year. Technical and logistical support for additional technical meetings with Minatom are performed each year that are critical to transparency monitoring operations and Program activities.

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

**Monitoring Equipment**

The HEU Transparency Program has 13 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. More reliable and rugged instruments are being fabricated and field tested and will be used to replace older units in FY 2003.

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 continuous 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 detailed BDMS data complements and helps to verify Russian plant processing and nuclear material accountability data and reports.

In January 1999, BDMS equipment was installed 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. Additional Minatom coordination, full equipment calibration, and adaptation to actual plant UEIP operating conditions was completed in December 2000. Retrieval of BDMS output report data occurs bimonthly and is current. In 2002, we expected to install the BDMS equipment on the blending system pipes at a second site - the Electro Chemical Plant (ECP) in Zelenogorsk with equipment operating by December, 2002. However, ECP ceased blending operations on September 28, 2002 thereby precluding BDMS installation until February 2003. The equipment is in storage at ECP. This is a high priority action for the program and consistent with recommendations from the GAO.

The program started technical discussions with the SChE technical staff leading to detailed engineering discussions for adapting BDMS type equipment for SChE installation. Actual BDMS equipment designs, fabrication, delivery and licensing should be completed in FY 2004, with installation and operation completed by FY 2005. This will complete a major Program milestone of 100% monitoring coverage of HEU to LEU blending operations at all three Russian blending facilities and substantially enhance the HEU-to-LEU transparency confidence.

Maintenance of installed BDMS equipment is an integral element of Program operations. Radioactive sources ( Co-57 and Cf-252) used by the equipment must be replaced on a regular (annual and biannual) basis and the equipment re-calibrated. Fabrication, handling, and disposal of radioactive sources is contracted through VNIITF C-70 and their support is integrated with U.S. team efforts to perform the required maintenance work. Replacement of any malfunctioning equipment or replacement with advanced hardware and software is also completed during these trips.

**Technical Support Activities**

Efforts include detailed logistical support system to manage 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 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. 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. 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.

The Presidential Summit meeting in May 2002 in Moscow resulted in the creation of Expert Groups to identify opportunities to expand efforts to eliminate additional quantities of fissile material (HEU and Pu) from excess Russian inventories. The HEU Transparency Implementation program has been providing support for this initiative through management and technical efforts to complete bilateral agreements and implementing

Protocols. These programmatic efforts are included under the Accelerated Material Disposition (AMD) part of the FY 2004 Congressional budget request.

**Subprogram Goal:**

Reasonably assure that the LEU being purchased under the Russian HEU purchase agreement is derived from dismantled nuclear weapons, by developing and performing mutually agreeable transparency measures, to permanently process 500 MT of HEU into non-weapons materials by 2013.

**Performance Indicators**

Number of Blend-Down Monitoring Systems operational and the annual percent of operation during the HEU blend-down process.

Percentage of the 24 annually allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities to monitor 30 MT per year of HEU converted to LEU completed.

Number of on-site Transparency Monitoring Offices (TMOs). Annual percent of their operation during the plant open period.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| One Blend-Down Monitoring System operational at the Ural Electrochemical Plant (UEIP). Annual percent of operation was 90 percent. | Two Blend-Down Monitoring Systems operational (one at the UEIP and one at the Electro Chemical Plant [ECP] in Zelenogorsk). Annual rate of operation targeted for 92 percent after installation. | Two Blend-Down Monitoring Systems operational (one at the UEIP and one at the Electro Chemical Plant [ECP] in Zelenogorsk). Annual rate of operation targeted for 94 percent. |
| Conducted 18 or 75% of 24 allowed Special Monitoring Visits (SMVs) to the four Russian uranium processing facilities. 171.3 MT of HEU has been converted to LEU from 1995 to Dec. 2002. | Conduct 18 or 75% of 24 allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities. (Note: Only 18% were budgeted in favor of resources to build a second continuous Blend-Down Monitoring System.) Monitor conversion of an additional 30 MT of HEU to LEU. | Conduct 22 or 92 percent of 24 allowed Special Monitoring Visits (SMVs) to the four Russian HEU-to-LEU processing facilities. Monitor conversion of an additional 30 MT of HEU to LEU. |
| One Transparency Monitoring Office (TMO) at Novouralsk near the Ural Electrochemical Plant (UEIP). UEIP was staffed and operated for 30 weeks of the 50 weeks, or 60 percent, of the related plant operation cycle. | One near UEIP. Target TMO coverage for plant operation at 70 percent. | One near UEIP. Target TMO coverage for plant operation at 75 percent. |

# Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| HEU Transparency Implementation | 13,950 [a] | 17,229 | 18,000 | 771 | 4.5% |
| Total, HEU Transparency Implementation | 13,950 | 17,229 | 18,000 | 771 | 4.5% |

[a] FY 2002 funding does not reflect an appropriation transfer to Program Direction for an office move and additional staffing and travel in the amount of $70,000 approved by Congress in early FY 2003.

## Detailed Program Justification

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**HEU Transparency Implementation . . . . . 13,950 17,229 18,000**

Annually monitor the conversion of 30 metric tons (MT) of weapons-grade Highly Enriched Uranium (HEU) at 4 Russian Processing facilities into approximately 900 MT of Low Enriched Uranium (LEU) to assure that the LEU being purchased under the HEU Purchase agreement is derived from dismantled nuclear weapons. Develop and perform mutually agreeable (US/RF) transparency measures, including:

Conduct 18 Special Monitoring Visits (SMVs) to Russia in FY 2003 and 22 in FY 2004, involving the 4 Russian processing plants. The 20 visits require approximately 154 technical monitors. Provide Permanent Monitoring in Russia by staffing the Transparency Monitoring Office (TMO) in Novouralsk, Russia with 14 technical experts performing bimonthly rotations allowing daily access to the Ural Electrochemical Integrated Plant (UEIP) processing and down blending operations. In FY 2004, initiate discussions for a second TMO in Russia, with a recommended location at the Siberian Chemical Enterprise (SChE) in Seversk (requiring an additional 24 bimonthly rotations of technical experts) which would offer expanded access to the full complement of activities where 2/3 of the total HEU material is processed.

Maintain the installed Blend Down Monitoring System (BDMS) equipment that provides continuous and independent measurements of uranium hexaflouride ($UF_6$) at blend-points in two dilution facilities (UEIP and Electro Chemical Plant, ECP) in FY 2003. Complete fabrication of BDMS equipment for SChE in FY 2004, with installation scheduled for FY2005. Procure, replace, and dispose of radioactive sources (Co-57 and Cf -252) critical to the BDMS operations. The Co-57 sources have a 1 year half-life which require annual replacement and equipment re-calibration.

Maintain portable Non Destructive Assay (NDA) instruments shipped to Russian sites for U.S. monitor use. Complete field testing and then fabricate advanced portable NDA instruments to replace the initial NDA units by FY 2004. 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 natural uranium in the LEU purchased.

Reimburse Russian facilities for costs of goods and services provided to U.S. monitors. Provide planning, logistical support and coordination with Minatom for monitoring activities. Train monitors in both technical and procedural requirements. Compile, archive and analyze all transparency monitoring data. Prepare monthly, annual, and ad hoc reports on HEU processing and HEU to LEU conversion rates and quantities. Provide technical and project management insights to enhance transparency operations. Maintain Worker Health and Safety with 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.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

Accommodate Russian monitoring in the U.S. by maintaining a Permanent Presence Office (PPO) for Russian monitors, assisting them in monitoring operations at U.S. facilities, and providing LEU accountability documents. Provide interpreters, translators, and logistical support for Transparency Review Committee and other negotiating sessions in Russia and elsewhere.

*The $771,000 net increase in FY 04 reflects the costs to complete the fabrication of a Blend Down Monitoring System for the Siberian Chemical Enterprise (SChE), and the increase from 18 to 22 of 24 allowable Special Monitoring Visits (SMVs) to the four Russian HEU processing facilities.*

| | | | |
|---|---|---|---|
| **Total, HEU Transparency Implementation . . . . . .** | **13,950** | **17,229** | **18,000** |

# Explanation of Funding Changes

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **HEU Transparency Implementation** | |
| ? The $771,000 net increase in FY 04 reflects the cost to complete the fabrication of a Blend Down Monitoring System for the Siberian Chemical Enterprise (SChE), and the increase from 18 to 22 allowable Special Monitoring Visits (SMVs) to the four Russian HEU processing facilities. . . . . | +771 |
| **Total Funding Changes, HEU Transparency Implementation Program . . . . . .** | +771 |

# International Nuclear Safety and Cooperation

## Program Mission

The mission of the International Nuclear Safety and Cooperation program is to enhance national security through prevention and mitigation of nuclear and radiological events outside the United States by improving the safety and the emergency preparedness and response capabilities of foreign nuclear facilities, operations, and activities. The program provides a means for protecting the public and the environment and ensures that nuclear power remains a viable element of U.S. national security.

The program provides leadership and technical expertise in interagency and international nuclear safety and emergency management activities.

Program elements are: (1) Nuclear Safety and (2) International Emergency Management and Cooperation. Nuclear Safety carries out projects to resolve specific nuclear safety issues and to address high priority needs at nuclear facilities to include: a) Research reactor safety and/or shutdown, b) Kazakhstan BN-350 breeder reactor shutdown, c) nuclear power plant protection from sabotage/terrorist attacks, d) safety cooperation with China, and e) cooperation with international nuclear safety organizations. International Emergency Management and Cooperation works with international organizations and foreign governments to ensure that emergency plans and procedures, and training, preparedness and response programs and capabilities are in place and effective. The Nuclear Safety and Emergency Cooperation program supports, enhances and complements activities of the International Atomic Energy Agency and other international organizations such as the Nuclear Energy Agency (NEA), European Union (EU), G8 Global Partnership Initiative, and the G8 Nuclear Safety and Security Working Group.

The DOE-funded Soviet-Designed Reactor Safety program is being successfully completed and closed out in FY03 with the completion of major projects to improve safety at Soviet-designed nuclear power plants.

The program is coordinated with the U.S. Department of State (DOS) to ensure that it supports foreign policy objectives. Some program efforts are supplemented with country-specific funding from the Foreign Operations Appropriations Act.

## Program Strategic Performance Goal

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

## Program Goal

Reduce the risk of international nuclear and radiological events by improving nuclear safety and assist in the development of emergency management programs to protect the public, workers, and the environment.

## Performance Indicators

Percentage of progress towards permanent shutdown of the Kazakhstan BN-350 breeder reactor.

Number of Russian nuclear sites connected to their emergency management center (the Situation and Crisis Center); number of emergency exercises conducted; and number of Russian agencies cooperating on emergency preparedness.

### Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Nuclear Safety: Completed 20% of the work towards shutting down BN-350 in FY06 (Fabricate, install and operate cesium traps to decontaminate coolant). | Nuclear Safety: Complete an additional 20%, increasing the total to 40%, of the work towards shutting down BN-350 in FY06 (Install and operate sodium drain, deliver fire protection equipment, design sodium processing facility (SPF)). | Nuclear Safety: Complete an additional 20%, increasing the total to 60%, of the work towards shutting down BN-350 in FY06 (Complete sodium draining). |
| International Emergency Management and Cooperation: Connected an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 4 sites); conduct an additional emergency exercise; and liaison/ cooperate with 2 Russian agencies responsible for nuclear emergency preparedness. | International Emergency Management and Cooperation: Connect an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 7 sites); conduct an additional emergency exercise; and liaison/cooperate with 3 Russian agencies responsible for nuclear emergency preparedness. | International Emergency Management and Cooperation: Connect an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 10 sites); conduct an additional emergency exercise; and liaison/cooperate with 4 Russian agencies responsible for nuclear emergency preparedness. |

## Significant Program Shifts

The International Nuclear Safety and Cooperation program manages a set of projects focused on specific nuclear safety issues and high priority needs. Major safety assistance projects have been completed at Soviet-designed nuclear power plants, and some work continues in coordination with the IAEA and the G8 Nuclear Safety and Security Working Group. FY03 work will continue the multi-lateral Kazakhstan BN-350 Breeder Reactor Shutdown while strengthening efforts for Nuclear Power Plant Protection from Sabotage/Terrorist Attacks and to address IAEA's request for assistance in Research Reactor Safety and Shutdown. FY04 efforts begin to address safety and infrastructure issues in China's burgeoning nuclear power program as part of the IAEA's Extra Budgetary Program for Asia and the U.S.-China Peaceful Uses of Nuclear Technology Agreement.

# Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request |
|---|---|---|---|
| International Nuclear Safety and Cooperation (DOE appropriation) | 16,876[ab] | 14,576 | 14,083 |
| Soviet-Designed Reactor Safety (DOS/USAID appropriation transfer) | 37,085 [c] | 0 | 0 |
| International Nuclear Safety and Cooperation | 53,961 | 14,576 | 14,083 |

**Public Law Authorizations:**

Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003
Atomic Energy Act of 1954, as amended
International Atomic Energy Agency Participation Act of 1957
Energy Reorganization Act of 1974
Nuclear Nonproliferation Act of 1978
National Defense Authorization Act for FY 2000
U.S./China Peaceful Uses of Nuclear Technologies, 1998

[a] Reflects $10.0 million from FY 2002 emergency supplemental funding contained in Public Law 107-117, less $4.2 million which is represented in the Elimination of Weapons Grade Plutonium Production program as a comparability adjustment into the FY 04 structure to reflect full incorporation of safety upgrades to the three plutonium production reactors into that program

[b] Reflects comparability adjustment of $1.1 million to reflect the transfer of International Emergency Cooperation activity from the International Nuclear Materials Protection and Cooperation program.

[c] Reflects appropriation transfer from DOS/U.S. Agency for International Development (USAID). DOS/USAID amounts for FY 2002 include funding received for Ukraine, Armenia, and Kazakhstan ($37.085 million). FY 2003 and FY 2004 DOS/USAID funds of $36 million are planned.

# Funding by Site

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory-East | 3,600 | 2,868 | 5,583 | 2,715 | 94.7% |
| Argonne National Laboratory-West | 1,920 | 1,132 | 2,100 | 968 | 85.5% |
| Brookhaven National Laboratory | 500 | 300 | 300 | 0 | 0.0% |
| Total, Chicago Operations Office | 6,020 | 4,300 | 7,983 | 3,683 | 85.7% |
| Idaho Operations Office | | | | | |
| Idaho National Engineering and Environmental Laboratory | 900 | 0 | 0 | 0 | 0.0% |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory | 150 | 200 | 225 | 25 | 12.5% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory | 35 | 50 | 125 | 75 | 150.0% |
| Nevada Site Office | | | | | |
| Remote Sensing Laboratory | 75 | 250 | 325 | 75 | 30.0% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 44,756 | 7,401 | 3,750 | -3,651 | -49.3% |
| Sandia Site Office | | | | | |
| Sandia National Laboratory | 225 | 1,050 | 1,125 | 75 | 7.1% |
| Washington Headquarters | 1,800 | 1,325 | 550 | -775 | -58.5% |
| Total, International Nuclear Safety and Cooperation | 53,961 | 14,576 | 14,083 | -493 | -3.4% |

## 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 another in Idaho. ANL supports Kazakhstan BN-350 reactor shutdown activities and research reactor shutdown and safety improvements. It also provides experts to mentor host country organizations in the performance of safety analyses and risk assessments.

### 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. BNL also supports projects involving research reactors and the IAEA Contact Expert Group.

### Idaho National Engineering and Environmental Laboratory

Idaho National Engineering and Environmental Laboratory (INEEL) is one of DOE's multi-program national laboratories. INEEL provides expert advice on the computer codes used for safety analysis.

### Lawrence Livermore National Laboratory

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

### Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) is located in Los Alamos, NM and is a DOE weapons and multi-program national laboratory. LANL supports the International Emergency Management and Cooperation activities with emergency planning, preparedness, and technical support.

### Pacific Northwest National Laboratory

Pacific Northwest National Laboratory (PNNL) in Richland, WA is one of DOE's multi-program national laboratories. PNNL provides technical, contracting, and administrative program support for international nuclear safety activities. PNNL supports cooperative efforts with China and international nuclear safety organizations. It also supports the International Emergency Management and Cooperation activities with exercise development, execution, and evaluation and provides training support and assistance.

### Remote Sensing Laboratory

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

### Sandia National Laboratory

Sandia National Laboratory is a DOE weapons research laboratory located in Albuquerque, NM that supports International Emergency Management and Cooperation activities through cooperative monitoring efforts early identification and warning of radiological releases. It also provides technical support for nuclear safety in the event of sabotage/terrorist attacks outside the U.S..

# International Nuclear Safety and Cooperation

## Mission Supporting Goals and Objectives

The International Nuclear Safety and Cooperation program is the DOE/NNSA focal point for international nuclear safety and emergency management policies and program efforts. The program provides technical expertise and leadership to support International Atomic Energy Agency (IAEA) activities. DOE/NNSA provides support to nuclear facilities and emergency response centers in coordination with DOS policy and U.S. Nuclear Regulatory Commission regulatory support activities. The program collaborates with the Organization for Economic Cooperation and Development's Nuclear Energy Agency (NEA), the G-8 Nuclear Safety and Security Working Group, the G8 Global Partnership Initiative, foreign governments, and non-governmental organizations to ensure that issues are identified and resolved using a coordinated approach among donor countries and organizations. The goal is to cooperatively develop a sustainable safety and emergency management culture at key locations to support U.S. national security interests.

In the Nuclear Safety area, the DOE-funded Soviet-Designed Reactor Safety program is being successfully completed and closed out in FY03 with the completion of major projects to improve safety at Soviet-designed nuclear power plants. Other activities will support the IAEA's nuclear safety goals and objectives as well as those for the G8 Global Initiative and the G8 Nuclear Safety and Security Working Group. The program will focus on five activities: (1) Soviet-designed research reactor safety and shutdown, (2) Kazakhstan BN-350 breeder reactor shutdown, (3) nuclear power plant protection from sabotage/terrorist attacks, (4) safety cooperation with China, and (5) cooperation with international nuclear safety organizations.

The program provides technical support to either shutdown and/or implement safety upgrades to high-risk research reactors. The program also continues to support the multinational effort to shutdown the BN-350 breeder reactor in Kazakhstan. The permanent deactivation of this facility will eliminate a potential source of weapons usable fissile material in Central Asia. Program activities also include addressing the vulnerability of nuclear power plants to sabotage or terrorist attacks. These efforts involve the identification and protection of vital areas inside a nuclear power plant facility, and they complement the activities of other DOE/NNSA offices which focus on control and accounting of weapons usable nuclear materials, and physical security at site perimeters. As part of the U.S.-China Peaceful Uses of Nuclear Technology agreement and the IAEA's Extra Budgetary Program for Asia, the program supports development of the nuclear safety infrastructure in China. The program also interfaces with and supports other international organizations in support of nuclear safety issues. These groups include the IAEA Contact Expert Group (CEG), the G8 Global Initiative, the newly formed G-8 Nuclear Safety and Security Working Group, and the World Association of Nuclear Operators (WANO).

In the area of International Emergency Management and Cooperation, the program provides assistance to foreign governments to ensure that programs for preparation and response to possible foreign nuclear events are in place and effective. 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 in order to protect the public and the environment. 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. Projects also support safety and nonproliferation efforts to inventory and control radioactive sources and to provide information and procedures for safe and responsible handling of sources. The program represents NNSA interests and policy in international fora on emergency management and cooperation issues. Cooperative exercises to review emergency programs and make improvements for response to an accident involving radioactive sources are also conducted. Activities include:

- Support the Department as a leader in international emergency management regimes, promoting the Department's emergency policy interests in international fora.
- Cooperation with Russia, Ukraine, and other governments in emergency/crisis center enhancement and networking to ensure a central command center to nuclear incidents/events.
- 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
- Foreign government technical assistance, and advice for establishing an effective emergency program.

These nuclear safety and emergency cooperation activities implement the Atomic Energy Act of 1954, as amended, the International Atomic Energy Agency Participation Act of 1957, the Energy Reorganization Act of 1974, the Nuclear Nonproliferation Act of 1978, the National Defense Authorization Act for FY 2000 (which established the NNSA) and other legislation, Executive Order 12656, Federal Emergency Plans, and International Agreements.

## Subprogram Goals:

**Soviet-Designed Reactor Safety - DOE**
Cooperatively correct safety deficiencies and improve the safety of Soviet-designed nuclear reactors.

**Research Reactor Safety and Shutdown**
Provides technical support to either shutdown and/or implement safety upgrades to high-risk research reactors.

**Kazakhstan BN-350 Breeder Reactor Shutdown**
Provide assistance for the irreversible shutdown of the BN-350 breeder reactor.

**International Emergency Management and Cooperation**
Strengthen world-wide emergency preparedness and response capability to respond to possible foreign nuclear events.

## Performance Indicators

Complete safety projects on assessment, equipment upgrade, procedures, training, and maintenance of Soviet-designed nuclear power plants.

Number of Soviet-designed research reactors where safety improvements or assistance with permanent shutdown has been provided.

Percentage of progress towards permanent shutdown of the BN-350 breeder reactor.

Number of international partners cooperating on nuclear/radiological emergency preparedness and the number of emergency exercises and training courses conducted.
Number of Russian nuclear sites connected to their emergency management center (the Situation and Crisis Center); number of emergency exercises conducted; and number of Russian agencies cooperating on emergency preparedness.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Soviet-Designed Reactor Safety - DOE: Completed a full scope simulator and a safety parameter display system (SPDS) in Russia. Complete one SPDS in Lithuania. | Soviet-Designed Reactor Safety - DOE: Upgrade two Russian safety parameter display systems (SPDS). Deliver Mechanical Stress Improvement Process technology to two Russian plants. Complete G8 review of Russian safety assessment of Kursk reactor. | Soviet-Designed Reactor Safety - DOE: Complete major Soviet-designed nuclear power plant safety activities. |
| Research Reactor Safety and Shutdown: Developed research reactor project plan, create and disseminate self-evaluation documents for facilities, and conduct three technical evaluation visits | Research Reactor Safety and Shutdown: Reach agreement on conducting cooperative work projects (either safety upgrades or assistance with reactor shutdown) at three sites, conduct three technical evaluation visits. | Research Reactor Safety and Shutdown: Complete work at three sites (agreed to in FY03), conduct technical evaluations and obtain agreement to perform work projects (either safety upgrades or assistance with reactor shutdown) at three additional sites. |

| | | |
|---|---|---|
| Kazakhstan BN-350 Breeder Reactor Shutdown: Completed 20% of the work towards shutting down BN-350 in FY06 (Fabricate, install and operate cesium traps to decontaminate coolant). | Kazakhstan BN-350 Breeder Reactor Shutdown: Complete an additional 20%, increasing the total to 40%, of the work towards shutting down BN-350 in FY06 (Install and operate sodium drain, deliver fire protection equipment, design sodium processing facility (SPF)). | Kazakhstan BN-350 Breeder Reactor Shutdown: Complete an additional 20%, increasing the total to 60%, of the work towards shutting down BN-350 in FY06 (Complete sodium draining). |
| International Emergency Management and Cooperation: Cooperated with 5 international partners and conduct/participate in 2 additional emergency exercises and develop/conduct 4 training courses. | International Emergency Management and Cooperation: Cooperate with 8 international partners and conduct/participate in 2 additional emergency exercises and develop/conduct 8 training courses (4 of them newly developed). | International Emergency Management and Cooperation: Cooperate with 8 international partners and conduct/participate in 2 additional emergency exercises and develop/conduct 10 training courses (2 of them newly developed). |
| International Emergency Management and Cooperation: Connected an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 4 sites); conduct an additional emergency exercise; and liaison/ cooperate with 2 Russian agencies responsible for nuclear emergency preparedness. | International Emergency Management and Cooperation: Connect an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 7 sites); conduct an additional emergency exercise; and liaison/cooperate with 3 Russian agencies responsible for nuclear emergency preparedness. | International Emergency Management and Cooperation: Connect an additional 3 Russian nuclear sites to the Situation and Crisis Center (increasing the total to 10 sites); conduct an additional emergency exercise; and liaison/cooperate with 4 Russian agencies responsible for nuclear emergency preparedness. |

# Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Soviet-Designed Reactor Safety (DOE) | 10,700 | 4,000 | 0 | -4,000 | -100.0% |
| Soviet-Designed Reactor Safety (DOS/USAID)[b] | 37,085 | 0 | 0 | 0 | 0.0% |
| Nuclear Safety Analyses | 600 | 800 | 0 | -800 | -100.0% |
| Corrective Measures and Technical Cooperation | 2,100 | 5,236 | 10,983 | 5,747 | 109.8% |
| International Emergency Management and Cooperation[a] | 1,100 | 2,300 | 2,350 | 50 | 2.2% |
| Technical Support Activities | 2,376 | 2,240 | 750 | -1,490 | -66.5% |
| **Total, International Nuclear Safety and Cooperation** | **53,961** | **14,576** | **14,083** | **-493** | **-3.4%** |

[a] Reflects FY 2002 comparability adjustment to reflect the transfer of International Emergency Cooperation activity from the International Nuclear Materials Protection and Cooperation program ($1.100 million)

[b] Reflects appropriation transfers from DOS/ USAID. DOS/USAID amounts for FY 2002 includes funding received for Ukraine, Armenia, and Kazakhstan ($37.085 million). FY 2003 and FY 2004 DOS/USAID funds of $36 million are planned.

# Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Soviet-Designed Reactor Safety - DOE** . . . . . | **10,700** | **4,000** | **0** |

In FY2003, close out the Soviet-Designed Reactor Safety Program with the completion of the following projects: international review of the Russian safety assessment for the Kursk reactor, validation of the U.S. computer codes used in analyzing Russian reactors, training and engineering support for U.S.-provided simulators. Assist in the dissemination of the final results of U.S.-supported safety analyses, data for component failure estimation, and materials data for operational safety analysis work at the Russian International Nuclear Safety Center.

Transfer technology to three Russian plants to support the IAEA program to address intergranular stress corrosion cracking problems in reactor piping.

In Lithuania, provide U.S. expert participation in the nuclear safety commission, and upgrade two safety systems at Ignalina unit 2.

*The FY04 decrease of $4,000,000 reflects completion of DOE-funding for safety upgrades to Soviet-designed Nuclear Power Plants.*

| | | | |
|---|---|---|---|
| **Soviet-Designed Reactor Safety - State/USAID** . . . . . | **37,085** | **0** | **0** |

Conduct projects to improve reactor safety and emergency preparedness in Ukraine, Armenia and Kazakhstan.

In Ukraine, complete full-scope simulators for Zaporizhzhya unit 1 and Rivne unit 2 in 2002, and at Zaporizhzhya unit 3 in 2004. Continue in-depth safety assessments for all nuclear power plants. Completed three initial probabilistic risk assessments addressing equipment and operator failures in 2002, and complete deterministic safety analyses in FY 2003. In FY 2004, include the effects of internal and external hazards (including fire and flooding) in these analyses. To date, several instances of faulty systems, equipment, or operating practices have been identified as a result of the on-going analyses. These deficiencies are corrected immediately when found, resulting in a significant improvement in safety. Continue efforts in physical security upgrades, operational safety, capacity factor improvements, emergency management, and nondestructive examination technologies.

Support the Ukraine Nuclear Fuel Qualification Project, which is a cooperative program to transfer technology and expertise in nuclear fuel design for Ukraine's VVER-1000 reactors. Previously, expertise and infrastructure for Ukrainian reactor and fuel design were centralized in Russia. Ukraine is 45% dependent on nuclear power for electricity and, thus, heavily reliant on Russia for its energy needs. This program will aid Ukraine in its development of an alternate fuel supply for its reactors.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

In Armenia, provide equipment and operational safety upgrades and physical security improvements at the Armenia nuclear power plant, which provides about 40 percent of the country's electricity and plans to operate until the 2008-2015 timeframe when secure replacement electrical capability can be completed.

In Kazakhstan, provide technical support for the safe and irreversible shutdown of the BN-350 fast-breeder reactor. Activities include decontaminating, draining and deactivating the reactor's sodium coolant.

*FY 2003 and FY 2004 country-specific appropriation and the subsequent State/USAID annual allocation decisions for nuclear safety projects are not determined, but are roughly estimated at $36 million for planning purposes.*

**Nuclear Safety Analyses** . . . . . **600** **800** **0**

In FY 2003, close out Nuclear Safety Analyses program with the completion of the following projects: assessment of safety issues at nuclear fuel cycle facilities around the world, maintenance of database of facilities and detailed safety-related information, and support for the U.S. International Nuclear Safety Center at Argonne National Laboratory.

*The FY04 decrease of $800,000 reflects completion of analysis projects.*

**Corrective Measures and Technical Cooperation**

This Corrective Measures and Technical Cooperation has been broken out into additional sub-elements to aid in clarification, justification, and transparency:

**#** Research Reactor Safety and Shutdown . . . . . 0 1,868 3,333

Perform safety upgrades or provide assistance for the shutdown and decommissioning of four high-risk research reactors in Russia, Uzbekistan, Romania, and Kazakhstan. (Three of these projects will be completed in FY 2004.) Reach agreement to conduct work at three of four possible sites (Ukraine, Latvia, Bulgaria, and Poland). 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. They are also a proliferation threat in that many of them use highly enriched uranium. Safety upgrades will include modernization of reactor control systems and addition of emergency electrical supply systems.

*The FY04 increase of $1,465,000 allows ability to provide support to two additional research reactors.*

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| # Kazakhstan BN-350 Breeder Reactor Shutdown . . . . . | 1,000 | 868 | 2,000 |

Continue to participate in multinational efforts to permanently shutdown the BN-350 fast-breeder reactor in Kazakhstan. In FY 2004, the sodium coolant will be drained from the system. In subsequent years, a facility will be constructed to process the sodium and render it chemically inert. The deactivation of this facility will eliminate the primary source of fissile material production in Central Asia.

*The FY04 increase of $1,132,000 allows design of the sodium process facility to render the reactor coolant inert.*

| | | | |
|---|---|---|---|
| # Nuclear Power Plant Protection from Sabotage/Terrorist Attacks . . . . . | 0 | 1,400 | 3,300 |

Develop a methodology that can be used by foreign countries to help them perform terrorist threat vulnerability analysis. This methodology will enable them to assess the vulnerability of their own facilities to attempted sabotage from individuals inside the security perimeter.
Implement sabotage prevention measures for two facilities. These include establishing access control and physical boundaries for locations within the reactor facility itself that are critical to safe plant operation. These measures supplement physical protection of a site, as they are designed to prevent hostile individuals inside the security perimeter from performing sabotage on or improperly operating systems vital to the safe operation of a nuclear facility.

*The FY04 increase of $1,900,000 allows implementation of prevention measures at two foreign nuclear facilities.*

| | | | |
|---|---|---|---|
| # Safety Cooperation with China . . . . . | 0 | 0 | 750 |

Initiate cooperative efforts with China to improve its safety infrastructure as its nuclear industry expands. Conduct meetings/workshops in the U.S. and China to address high priority needs in the areas of operational safety, risk analyses, emergency management, and nuclear power plant protection from sabotage and terrorist threats..

*The FY04 increase of $750,000 supports program start-up activities and initial workshops.*

| | | | |
|---|---|---|---|
| # Cooperation with international nuclear safety organizations . . . . . | 1,100 | 1,100 | 1,600 |

Provide technical expertise and leadership to support IAEA activities. Provide U.S. support to nuclear facilities in coordination with DOS policy and U.S. Nuclear Regulatory Commission regulatory support activities. Provide support to the IAEA Contact Expert Group (CEG) on issues related to nuclear safety, spent nuclear fuel, and radioactive waste. The CEG coordinates approximately 100 nuclear security projects being performed by eight countries and six international organizations. Provide support to IAEA extrabudgetary program on nuclear safety in Asia.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

Collaborate with the Organization for Economic Cooperation and Development's Nuclear Energy Agency (NEA), the G8 Nuclear Safety and Security Working Group, the G8 Global Partnership Initiative, the European Bank for Reconstruction and Development, the World Association of Nuclear Operators, the European Union TACIS program, foreign governments, and non-governmental organizations to ensure that issues are identified and resolved using a coordinated approach among donor countries and organizations. Support a graduate level education program in nuclear materials safety at two Russian universities through a consortium of three American universities led by Texas A&M University.

*The FY04 increase of $500,000 allows support for the G8 Nuclear Safety and Security Working Group and the G8 Global Partnership Initiative.*

| | | | |
|---|---|---|---|
| **Subtotal, Corrective Measures and Technical Cooperation . . . . . .** | **2,100** | **5,236** | **10,983** |

| | | | |
|---|---|---|---|
| **International Emergency Management and Cooperation . . . . . .** | **1,100** | **2,300** | **2,350** |

Conduct information sharing and coordination with other foreign governments regarding emergency management cooperation. Current ongoing cooperation is predominately with Japan, France, S. Korea, Finland, Armenia, 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.

Support IAEA with radiation detectors and technical assistance for their emergency program and address lost sources. 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 and exercises involving nuclear facility workers and local and national government counterparts. Develop and conduct three training courses for nuclear facility emergency staff in Ukraine and Russia.

*Slight increase of $50,000 reflects an inflation adjustment.*

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Technical Support Activities** | **2,376** | **2,240** | **750** |

Provide resources for general laboratory project management, technical support, quality assurance, technical information development, and communications products and services. Support strategic planning requirements and the DOE/NNSA internship program to familiarize U.S. graduate students with the field of nuclear nonproliferation.

*Reduction reflects reduced technical and contracting support in FY04 largely associated with the DOE-funded Soviet Designed Safety Program.*

| | | | |
|---|---|---|---|
| **Total, International Nuclear Safety and Cooperation** | **53,961** | **14,576** | **14,083** |

## Explanation of Funding Changes from FY 2003 to FY 2004

| | FY 04 vs. FY 03 ($000) |
|---|---|
| **Soviet-Designed Reactor Safety-DOE** | |
| # The FY04 decrease of $4,000,000 reflects completion in FY 03 of funding for the major DOE-funded safety upgrade projects for Soviet-designed Nuclear Power Plants. . . . . | -4,000 |
| **Nuclear Safety Analyses** | |
| # The FY04 decrease of $800,000 reflects completion of analysis projects. . . . . | -800 |
| **Corrective Measures and Technical Cooperation** | |
| # Increase includes +$1,465,000 for Research Reactor Safety and Shutdown to engage two additional research reactors, +$1,132,000 for the Kazakhstan BN-350 Reactor Shutdown to allows design of the sodium process facility, +$1,900,000 for Nuclear Power Plant Protection from Sabotage/Terrorist Attacks to implement of prevention measures at two plants, +$750,000 for Safety Cooperation with China to support program start-up activities and initial workshops, and +$500,000 for Cooperation with International Nuclear Safety Organizations to support for the G8 Nuclear Safety and Security Working Group and the G8 Global Partnership Initiative. . . . . | +5,747 |
| **International Emergency Management and Cooperation** | |
| # Reflects an inflation adjustment. . . . . | +50 |
| **Technical Support Activities** | |
| # 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. . . . . | -1,490 |
| **Total Funding Changes, International Nuclear Safety and Cooperation . . . . . .** | **-493** |

# Elimination of Weapons Grade Plutonium Production

## Program Mission

The mission of the Elimination of Weapons Grade Plutonium Production (EWGPP) in Russia program is to facilitate the shut down of the Russian Federation's three remaining weapons-grade plutonium production reactors. This program directly supports National Nuclear Security goal (NS-2) – detect, prevent, and reverse the proliferation of weapons of mass destruction while promoting nuclear safety worldwide. The program will enable the Russian Federation to shutdown its remaining weapons-grade plutonium- production capability, preventing the production of weapons usable materials. This fulfills goal NS-2 by meeting strategy NS2-3 to protect or eliminate weapons and weapons-usable nuclear material or infrastructure and redirect excess foreign weapons expertise to civilian enterprises.

The EWGPP program is comprised of three projects. The first two: the Seversk Plutonium Production Elimination Project (SPPEP), and the Zheleznogorsk Plutonium Production Elimination Project (ZPPEP) will replace the power from three Russian Federation (RF) weapons-grade plutonium production reactors with power from fossil fuel plants to facilitate the shut down of the reactors. Two reactors are located at Seversk and one is located at Zheleznogorsk. The SPPEP will refurbish an existing plant using a partially completed design from the Russian Federation. The ZPPEP design is not as mature, and management of the project is closer to a new construction. The associated Nuclear Safety Project (NSUP) will expeditiously pursue high priority short-term safety upgrades to the ADE-2, ADE-4, and ADE-5 reactors, reducing the risk of a major accident during the limited period while replacement power is being provided and prior to shut down of the reactors.

The program will be completed when the agreed-to-replacement energy is provided, which will allow the three reactors to be shut down. Based on pre-conceptual design studies, the Seversk Project will be completed in 2008, the Zheleznogorsk project will be completed in 2011, and the Nuclear Safety Project will be completed in 2005, assuming joint US/RF signature in the Spring of 2003 to the Amendment to the Plutonium Production Reactor Agreement, and conclusion to associated implementation and site access arrangements by the Spring of 2003.

The overall 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. The program also provides technical expertise and leadership for NNSA and DOE in interagency, bilateral, and multilateral fora involving elimination of weapons-usable material.

## Program Strategic Performance Goals

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

**Performance Indicator**
Percentage of progress towards constructing a fossil plant in Seversk facilitating the shut down of two weapons-grade plutonium production reactors.

Percentage of progress towards constructing a fossil plant in Zheleznogorsk facilitating the shut down of one weapons-grade plutonium production reactors.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| (N.A. Program was being transferred from DOD.) | Complete 1% toward the construction of a fossil plant in Seversk (increasing the total to 1% complete towards shutting down two plutonium production reactors by 2008)*.<br><br>Complete 0.5% toward the construction of a fossil plant in Zheleznogorsk (increasing the total to 0.5% complete towards shutting down one plutonium production reactor by 2011)*. | Complete an additional 24% toward the construction of a fossil plant in Seversk (increasing the total to 25% complete towards shutting down two plutonium production reactors by 2008)*.<br><br>Complete an additional 2.5% toward the construction of a fossil plant in Zheleznogorsk (increasing the total to 3% complete towards shutting down one plutonium production reactor by 2011)*. |

* Based on pre-conceptual design feasibility study Budgeted Cost of Work Scheduled and the transfer in late January 2003 of prior year unobligated balances from DOD to DOE.

## Significant Program Shifts

The FY 2003 Congressional Budget request was based on the expected transfer of the Elimination of Weapons-Grade Plutonium Production program from the Department of Defense to the DOE consistent with the Administration's review of Nonproliferation and Threat Reduction Assistance to the Russian Federation which concluded in December 2001. The transfer was authorized with the enactment of the National Defense Authorization Act of FY 2003. This has resulted in a delay in the program implementation of over one year, necessitating a realignment of the FY 2004 Congressional Budget justification with respect to the FY 2003 Congressional Budget Request.

# Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request |
|---|---|---|---|
| Elimination of Weapons-Grade Plutonium Production | 14,200 [a] | 49,339 [b] | 50,000 |
| Total, Elimination of Weapons-Grade Plutonium Production | 14,200 | 49,339 | 50,000 |

**Public Law Authorizations and Other Agreements:**

Public Law 107-117, Department of Defense and Emergency Supplemental Appropriations for Recovery from and Response to Terrorist Attacks on the United States Act, 2002

Public Law 107-206, 2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States

Public Law 107-314, Bob Stump National Defense Authorization Act for FY 2003

Plutonium Production Reactor Agreement (PPRA), September, 1997

Amendment to the PPRA (expected Spring, 2003)

EWGPP Implementing Agreement (expected Spring, 2003)

Seversk and Zheleznogorsk Site Access Agreements (expected Spring, 2003)

[a] Reflects a comparability adjustment of $4,200,000 from the International Nuclear Safety program to reflect the incorporation of short-term safety upgrades to the plutonium production reactors into the broader Elimination of Weapons-Grade Plutonium Production program, Public Law 107-117. Also reflects $10,000,000 from a FY 2002 emergency supplemental contained in Public Law 107-206.

[b] Excludes an additional $73,800,000 in prior year balances to be transferred from Department of Defense in late January 2003 as authorized under the Bob Stump National Defense Authorization Act for FY 2003, Public Law 107-314.

# Funding by Site

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| NNSA Service Center | | | | | |
| NNSA Service Center | 0 | 49,339 | 50,000 | 661 | 1.3% |
| National Energy Technology Laboratory | 8,500 | 0 | 0 | 0 | 0.0% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 4,200 | 0 | 0 | 0 | 0.0% |
| Savannah River Operations Office | | | | | |
| Savannah River Site Office | 1,000 | 0 | 0 | 0 | 0.0% |
| Washington Headquarters | 500 | 0 | 0 | 0 | 0.0% |
| Total, Elimination of Weapons Grade Plutonium Production | 14,200 | 49,339 | 50,000 | 661 | 1.3% |

# Site Description

## NNSA Service Center

The NNSA Service Center is located in Albuquerque, New Mexico. The NNSA Service Center will assist the program in selecting U.S. integrating contractors for the Seversk and Zheleznogorsk Plutonium Production Elimination Projects.

## Savannah River Site Office

The Savannah River Operations Office located in Aiken, South Carolina is one of DOE's operations offices. This effort is to support the development of project/program specific project management deliverables as outlined under DOE 413.3, DOE guidance, and NNSA program criteria.

## Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory (PNNL) located in Richland, WA, is one of DOE's multi-program national laboratories. PNNL will serve as the lead laboratory and integrating contractor providing technical, contracting, and administrative program support to address interim safety upgrades to the three reactors under the Nuclear Safety Program (NSUP).

## National Energy Technology Laboratory

The National Energy Technology Laboratory (NETL), located in Pittsburgh, Pennsylvania, is one of DOE's multi-program national laboratories. NETL, DOE's lead fossil energy laboratory, is tasked to provide the necessary technical and engineering expertise, legal, administrative (e.g., project management, procurement, safety, etc.), and logistical support to implement this program. NETL is recognized as a world leader in fossil energy based electric power generation and district heating.

# Elimination of Weapons-Grade Plutonium Production

## Mission Supporting Goals and Objectives

The Elimination of Weapons-Grade Plutonium Production (EWGPP) Program is a cooperative effort with the Russian Federation (RF) 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 encountered technical difficulties and other alternatives were evaluated.

The program will provide alternate fossil-fueled energy plants to supply heat and electricity to the surrounding communities facilitating shut down of the reactors. The three plutonium production reactors will continue to operate until the replacement plants are completed. The Seversk Plutonium Production Elimination Project facilitates the shut down of two weapons-grade plutonium production reactors by refurbishing an existing 1950s fossil-fueled facility. The Russian Federation began upgrades in 1978 but cash flow problems caused difficulties from that point forward. The U.S. plan is to build on design work that has been completed at this facility. The Zheleznogorsk Plutonium Production Elimination Project facilitates the shut down of one weapons-grade plutonium production reactors by constructing a new fossil-fueled facility. 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 short-term safety upgrades to these reactors will be incorporated to reduce the risk of accidents for the duration of their interim operation and to enable shut down.

## Subprogram Performance Indicators:

Percentage of progress towards constructing a fossil plant in Seversk facilitating the shut down of two weapons-grade plutonium production reactors.

Percentage of progress towards constructing a fossil plant in Zheleznogorsk facilitating the shut down of one weapons-grade plutonium production reactors.

Percentage progress toward completing Nuclear Safety Upgrades Project.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| (N.A. Program was being transferred from DOD.) | Complete 1% toward the construction of a fossil plant in Seversk (increasing the total to 1% complete towards shutting down two plutonium production reactors by 2008)*. | Complete an additional 24% toward the construction of a fossil plant in Seversk (increasing the total to 25% complete towards shutting down two plutonium production reactors by 2008)*. |
| (N.A. Program was being transferred from DOD.) | Complete 0.5% toward the construction of a fossil plant in Zheleznogorsk (increasing the total to 0.5% complete towards shutting down one plutonium production reactor by 2011)*. | Complete an additional 2.5% toward the construction of a fossil plant in Zheleznogorsk (increasing the total to 3% complete towards shutting down one plutonium production reactor by 2011)*. |
| Began planning efforts with Supplemental appropriation funds. | Complete 5% toward completion of needed safety upgrades (increasing the total to 5% complete towards reducing the risk of accidents for the duration of the reactors operation project will be complete by 2005)* | Complete an additional 62% toward completion of needed safety upgrades (increasing the total to 67% complete towards reducing the risk of accidents for the duration of the reactors operation project will be complete by 2005)* |

* Based on pre-conceptual design feasibility study Budgeted Cost of Work Scheduled and the transfer in late January 2003 of prior year unobligated balances from DOD to DOE.

# Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Seversk Plutonium Production Elimination | 0 | 32,339 | 33,000 | 661 | 2.0% |
| Zheleznogorsk Plutonium Production Elimination | 0 | 15,000 | 15,000 | 0 | 0.0% |
| Plutonium Production Reactor Safety | 4,200 [a] | 0 | 0 | 0 | 0.0% |
| Technical Support Activities | 10,000 [b] | 2,000 | 2,000 | 0 | 0.0% |
| Total, Elimination of Weapons-Grade Plutonium Production | 14,200 | 49,339 [c] | 50,000 | 661 | 1.3% |

[a] Reflects a comparability adjustment of $4,200,000 from the International Nuclear Safety program to reflect the incorporation of short-term upgrades to the plutonium production reactors into the broader Elimination of Weapons-Grade Plutonium Production program, Public Law 107-117.

[b] Relfects $10,000,000 from a FY 2002 emergency supplemental contained in Public Law 107-206.

[c] Excludes an additional $73,800,000 in prior year balances to be transferred from Department of Defense in late January 2003 as authorized under the Bob Stump National Defense Authorization Act for FY 2003, Public Law 107-314.

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Seversk Plutonium Production Elimination** . . . . . | **0** | **32,339** [a] | **33,000** |

The Seversk Plutonium Production Elimination Project facilitates the shut down of two weapons-grade plutonium production reactors by refurbishing an existing 1950s fossil-fueled facility. The Russian Federation began upgrades in 1978 but cash flow problems caused difficulties from that point forward. The U.S. plan is to build on the work that has been done at this facility.

FY 2002 developed into a transition year since initial funding for these efforts only became available late in FY 2002 with the second Defense supplemental appropriation, and due to the delay until FY2003 of the transfer of prior-year unobligated funds from DoD to DOE.

In FY 2003, transfer of the prior-year balances from DOD to DOE was authorized with passage of the Bob Stump National Defense Authorization Act for FY 2003. This legislation also transferred programmatic responsibilities associated with those funds. Prior to signing any contracts with Russian Federation subcontractors, the Department will conclude intergovernmental signing of the EWGPP Implementation Agreement and site access arrangements. After the site access arrangements have been agreed upon, the project will begin work to sign initial contracts. The project will establish management, contracting, implementation and oversite mechanisms for both U.S. and R.F. contractors. It will establish contracts with U.S. Integrating Contractor for on-site support, field oversite and responsibility for the execution of work by RF firms . Refurbishment of the Seversk Thermal Heat and Electricity Plant (TET) will begin with tasks at the new boiler unit, one turbine generator, the new fuel conveying system, and two boiler units. Specific tasks include: begin the working design of the new Boiler unit; begin acquisition of equipment for the new Boiler unit; begin the working design of the turbine generator, begin acquisition of equipment for the turbine generator; begin installation of the new fuel conveying system; and begin refurbishment of two boiler units.

[a] Excludes an additional $56,800,000 of the $73,800,000 in prior year balances to be transferred from Department of Defense in late January 2003 as authorized under the Bob Stump National Defense Authorization Act for FY 2003, Public Law 107-314.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

In FY 2004, the project will continue work at the new boiler unit, the first turbine generator, the new fuel conveying system, and two boiler units, and will initiate work at the second turbine generator, two more boiler units, on the auxiliary equipment, and the auxiliary structures. For the new boiler unit specific tasks will include: complete the working design; complete acquisition of equipment and materials; and begin construction and installation. For the first turbine generator specific tasks will include: complete working design; complete acquisition of equipment and materials; begin construction and installation; and begin and complete dismantling of existing equipment. For the second turbine generator specific tasks will include: begin working design; begin acquisition of equipment and materials; and begin dismantling of existing equipment. Continue installation of the fuel conveying system. Continue refurbishment of the first two boiler units. Begin refurbishment of the second two boiler units. For the Auxiliary Equipment (such as turbine cooling water pumps) specific tasks will include: begin and complete working design; begin acquisition of equipment and materials; and begin construction. Begin auxiliary structures task by beginning the construction of the Fuel and Lubrication Storage Depot.

*The $661,000 increase does not reflect the application of $56.8 million in prior year balances expected to be transferred to DOE NNSA from DOD in January 2003 as authorized under the Bob Stump National Defense Authorization Act for Fiscal Year 2003, Public Law 107-314.*

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Zheleznogorsk Plutonium Production Elimination** . . . . . **0** **15,000** **15,000**

FY 2002 developed into a transition year since initial funding for these efforts only became available late in FY 2002 with the second Defense supplemental appropriation, and due to the delay until FY2003 of the transfer of prior-year unobligated funds from DoD to DOE.

In FY 2003, transfer of the prior-year balances from DOD to DOE was authorized with the passage of the Bob Stump National Defense Authorization Act for FY 2003. This legislation also transferred programmatic responsibilities associated with those funds. Prior to signing any contracts with Russian Federation subcontractors, the Department will conclude intergovernmental signing of the EWGPP Implementation Agreement and site access arrangements. The project will establish management, contracting, implementation and oversite mechanisms for both U.S. and R.F. contractors. It will establish contracts with U.S. Integrating Contractor for on-site support, field oversite and responsibility for the execution of work by RF firms. The initial design of the Zheleznogorsk Thermal Heat and Electricity Plant (ZTETs) will be started and preliminary site activities to assist in completion of the detailed design and site preparation.

In FY 2004, the project will complete the initial design and preliminary site details, obtain Russian regulatory approval, and initiate detailed design activities for the ZTETs. The site will be evaluated to determine usefulness of existing buildings and structures.

*Level funding in FY04 results in cumulative funding of $30,000,000 for this project through FY 04 allowing this program to remain on schedule for completion 8-years from the signing of the initial Zheleznogorsk contract.*

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**Plutonium Production Reactor Safety** . . . . . **4,200** **0** [a] **0**

This element consists of short-term safety upgrades to the three plutonium production reactors and was an integral part of the original Plutonium Production Reactor Shutdown Agreement and the associated Implementing Agreement. Both the U.S. and the Russian Federation (RF) agree that these reactors have serious safety deficiencies. U.S. safety assistance is in the best interest of the U.S. as it supports U.S. energy security with relation to our country's nearly 20% dependence on nuclear power and because U.S. funding and U.S. technical expertise support will allow these urgent safety upgrades to be implemented much more quickly than if the Russian Federation were to undertake them, as the RF with its constrained financial resources may not have been able to undertake them.

The three plutonium production reactors were designed in the 1950s, built in the 1960s, and began operation in 1964 or 1965. The shutdown of these reactors is a national security and nonproliferation goal. The current approach to shutdown these reactors down and cease plutonium production is to supply alternative heat and electricity for the surrounding communities from fossil-fuel power plants. However, the reactors will continue to operate to provide heat and electricity for the 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, they are considered to be the three highest safety risk reactors in the world. Efforts to jointly address appropriate and urgent safety upgrades to these reactors, without extending the operating life of these reactors, are being conducted.

FY 2002 efforts included walkdown evaluations at all three plants. In February, 2002, meetings between US and RF parties occurred and the RF presented proposed safety upgrades activities. These activities were reviewed by DOE for appropriateness and prioritized. Initial contracts with the RF are awaiting signature of the EWGPP Implementing Agreement and Access Arrangements.

[a] Excludes an additional $17,000,000 of the $73,800,000 in prior year balances to be transferred from Department of Defense in late January 2003 as authorized under the Bob Stump National Defense Authorization Act for FY 2003, Public Law 107-314.

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

$17.0 million in funding transferred from DOD in FY 2003 fully funds the program, and will be utilized to support subprojects that include: Emergency Cooling Modernization, Reactivity Control and Monitoring, Control and Protection System, Emergency Electrical Power Supply, Improved Fire Protection for Emergency Electrical Power Supply, Emergency Communications, Elimination of Iron Shot, Graphite Stack Stabilization, Strain Gauge Monitoring, Emergency Cooling Analysis, Safety Analysis Report, Probabilistic Safety Assessment, and Accident Mitigation Manual, Experimental Fuel Rupture Testing, Computer Codes, and Passive Safety Protection Development. The Plutonium Production Reactor Safety Project will be completed two years after signing the initial contracts with the Russian Federation. In FY 2004, the Department will continue all the subprojects started in FY 2003. Completion of the associated projects will occur within 3-years from signing of initial contracts due to the long lead-time of some of the equipment. Upgrades can be completed with these funds in 2005.

| | | | |
|---|---|---|---|
| **Technical Support Activities** | **10,000** | **2,000** | **2,000** |

Provide resources for crosscutting efforts, such as project reviews and reporting, contract administration, intergovernmental contract negotiation support, general laboratory technical support, quality assurance, foreign logistical support, and other communications products and services. Also provides for the necessary supporting technical and engineering expertise and independent analyses, and cross-cutting project management system support.

Initial start up efforts also include support for an independent review of alternative acquisition strategies, for development of an acquisition strategy, selection of the US Integrating Contractor (IC), and establishment and support of Project Management certification and training for the Russian Federation integrating contractor, Rosatomstroy.

| | | | |
|---|---|---|---|
| **Total, Elimination of Weapons-Grade Plutonium Production** | **14,200** | **49,339** | **50,000** |

## Explanation of Funding Changes from FY 2003 to FY 2004

| | FY 04 vs. FY 03 ($000) |
|---|---|
| **Seversk Plutonium Production Elimination** | |
| C The $661,000 increase does not reflect the application of $56.8 million in prior year balances expected to be transferred to DOE NNSA from DOD in January 2003 as authorized under the Bob Stump National Defense Authorization Act for Fiscal Year 2003, Public Law 107-314. The cumulative $122,139,000 (including DOD PY funds) for this project through FY 04 allows this program to remain on schedule for completion within five years from the signing of the initial Seversk contract . . . . . | 661 |
| **Zheleznogorsk Plutonium Production Elimination** | |
| C Level funding in FY04 supports a cumulative $33,000,000 for this project through FY 04 allowing this program to remain on schedule for completion eight years from the signing of the initial Zheleznogorsk contract.. . . . . | 0 |
| **Plutonium Production Elimination Reactor Safety** | |
| C No funding in FY04 for Plutonium Production Reactor Safety reflects application in FY03 of $17.0 million of the $73.8 million in prior-year balances expected to be transferred to DOE NNSA from DOD in January 2003 as authorized under the Bob Stump National Defense Authorization Act for Fiscal Year 2003, Public Law 107-314. Upgrades can be completed with these funds in 2005. . . . . | 0 |
| **Total Funding Changes, Elimination of Weapons-Grade Plutonium Production Program** | **661** |

# Accelerated Material Disposition

## Program Mission

The National Nuclear Security Administration mission includes the elimination of nuclear weapons useable material, especially in Russia. These national security goals reduce the threat of terrorist use of weapons of mass destruction and help ensure the irreversibility of nuclear arms reductions.

Within the Office of Defense Nuclear Nonproliferation, the Highly Enriched Uranium (HEU) Transparency Implementation Program conducts operations with Russian Federation (R.F.) nuclear weapons production installations to reduce weapons useable HEU under the 1993 HEU/LEU Purchase Agreement. Similarly the Material Consolidation and Conversion (MCC) program downblends HEU to low enriched uranium (LEU) and the Reduced Enrichment for Research and Test Reactors (RERTR) Program assists Russian efforts to accelerate development of reactor fuel designs to convert research and test reactors from HEU to LEU.

As a result of the May 2002 Summit meeting in Moscow between Presidents Bush and Putin, a new opportunity exists to accelerate the permanent reduction/disposition of additional HEU material, as well as opportunities to dispose of additional plutonium over and above existing agreements. This is a unique opportunity to directly purchase additional HEU and HEU converted to LEU material for storage and use by the U.S. Government under this new Accelerated Material Disposition (AMD) Program. The mission of the AMD Program is to negotiate and implement proposals on near- and long-term, bilateral and multilateral means to further reduce inventories of highly enriched uranium (HEU) and plutonium.

Congressional authorization support for Accelerated Disposition of Highly Enriched Uranium efforts was voiced in the FY 03 National Defense Authorization Act, Public Law 107-314, section 3157, and more explicitly in the supporting conference report guidance.

The AMD 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 National policy objectives on nuclear nonproliferation and does not adversely affect existing agreements or the commercial nuclear fuel market.

## Program Strategic Performance Goals

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

## Program Goal

Permanently eliminate approximately 15 Metric Tons (MT) over ten years of excess HEU in Russia, in addition to the 500 MT of HEU identified in the 1993 HEU Purchase Agreement and other agreements prior to May 2002. This quantitatively reduces nonproliferation and terrorist threats and the associated safeguards and security requirements. 15 MT of HEU is enough HEU to make approximately 600 nuclear devices assuming the IAEA definition of a significant quantity. In addition, increase to up to 5 MT, the annual quantity of HEU converted to LEU under the MCC program.

### Performance Indicators

Demonstrate annual improvement towards eliminating up to an additional 1.5 MT per year over a ten year of HEU above the current HEU Purchase Agreement.

### Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Resulting from the May 2002 Presidential Summit in Moscow, completed Technical Experts report on Accelerated Nuclear Materials Reduction. | Sign separate government-to-government agreements for the HEU/LEU purchase and stockpile effort and for the HEU Reseach Reactor Fuel Purchase project.<br><br>Explore and develop authorized opportunities to accelerate implementation of these new efforts in FY03, as well as efforts for the Reduced Enrichment of Research and Test Reactors (RERTR) initiative in U.S. and R.F./CIS. | Complete first shipment of Russian HEU to the U.S. for the HEU Research Reactor Fuel Purchase project. Also Complete the first shipment of LEU from Russia for the uranium stockpile.<br><br>Accelerate RERTR initiatives in U.S. and R.F. by completing conversion feasibility studies on two USG reactors and increased investment in U.S. and R.F. fuel R&D efforts. |

## Significant Program Shifts

This is a new initiative resulting from the May 2002 U.S. / R.F. Presidential Summit meeting. It provides a unique opportunity for the U.S. government (DOE/NNSA) to directly purchase weapons usable Highly Enriched Uranium (HEU) from Russia. This material will directly support U.S. national security and energy supply security objectives.

## Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request |
|---|---|---|---|
| HEU/LEU Purchase and Stockpile | 0 | 0 | 25,000 |
| HEU Research Reactor Fuel Purchase | 0 | 0 | 1,000 |
| Accelerated Reduced Enrichment for Research and Test Reactors (RERTR) | 0 | 0 | 3,000 |
| Accelerated Material Consolidation and Conversion (MCC) | 0 | 0 | 1,000 |
| Total, Accelerated Material Disposition | 0 | 0 | 30,000 |

**Public Law Authorizations:**

Public law 107-314, Bob Stump National Defense Authorization Act of FY 2003.

# Accelerated Material Disposition

## Mission Supporting Goals and Objectives

The May 2002 Presidential Summit meeting resulted in a joint U.S. and Russian Federation re-commitment to nuclear nonproliferation goals and the reduction (elimination) of additional weapons usable Highly Enriched Uranium (HEU). The Secretary of Energy and Minister of Atomic Energy, as chairmen of the joint Nuclear Materials Expert Group, then accepted a series of recommendations to reduce additional quantities of HEU and forwarded their report to their Presidents for final approval. Concurrently, joint U.S./R.F. expert teams initiated technical discussions and negotiation of government-to-government agreements to implement the recommendations. The negotiations are expected to result in signing two agreements in the Spring of 2003 which would also define the additional quantity of material available in the projects. The U.S. interagency review process has cleared these initiatives, which are also consistent with Congressional authorization to accelerate the disposition of HEU (Section 3157 of FY03 National Defense Authorization Act, P.L. 107-314). The new HEU Accelerated Material Disposition (AMD) program includes:

- DOE purchases initially up to 1.5 metric tons (MT) per year of HEU converted to LEU at 4.95% U-235 for delivery to and storage by DOE. The Low Enriched Uranium (LEU) would constitute a reserve stockpile to assure security of supply of LEU for commercial nuclear power plants. The LEU would be sold only in special conditions, sold after 2014, or maintained as a longer-term reserve. Sale revenues would eventually be returned to Treasury and offset costs.

- DOE purchases on average 150kg per year of HEU at 93% U-235 to be used as fuel for U.S. research and test reactors for a limited time up to 10 years. Costs include purchase price, transportation, transparency, inventory management, and project management. The purchase will be coordinated with the U.S. and Russian Reduced Enrichment for Research and Test Reactors (RERTR) activities.

- Accelerate U.S. and Russian RERTR efforts to develop reactor fuel designs to convert research and test reactors from HEU to LEU. This would apply to five reactors in the U.S. and up to 19 reactors in Russia and the CIS states.

- Increase to up to 5 MT the annual quantity of HEU converted to LEU at 19.5% U-235 enrichment under the Material Consolidation and Conversion (MCC) program.

**Subprogram Goals:**

Eliminate approximately 15 MT over ten years of R.F. declared surplus HEU through the U.S. purchasing and strategic stockpiling of 4.95% enrichment LEU derived from weapons-origin HEU and converted at a annual rate of 1-1.5 MT of HEU/year.

Eliminate Russian Fuel declared surplus HEU through the U.S. purchase an average of 150kg per year of 93% HEU annually for use as fuel in U.S. test and research reactors in coordination with efforts to convert these reactors to LEU fuel.

Accelerate the Reduced Enrichment for Research and Test Reactors (RERTR) program efforts by completing conversion feasibility studies for two USG reactors and beginning conversion feasibility studies for two Russian designed reactors beyond current FY03 baseline.

Accelerate the Material Consolidation and Conversion (MCC) program conversion rate of HEU to LEU to up to 5 MT/yr.

**Performance Indicators**

Demonstrate annual improvement towards eliminating up to an additional 1.5 MT per year of HEU above the current HEU Purchase Agreement.

Purchase on average 150kg per year of HEU at 93% U-235 to be used as fuel for U.S. research and test reactors for limited time of up to 10 years in coordination with efforts to convert the reactors to LEU fuel.

Accelerate the RERTR program beyond its FY2003 baseline for converting 4 U.S. reactors and up to 19 reactors in the R.F./CIS from HEU fuel use to LEU.

Accelerate the MCC program's conversion rate of HEU to LEU to up to 5 MT/yr.

**Annual Performance Results and Targets**

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| HEU/LEU Purchase and Stockpile: May 2002 Presidential Summit in Moscow. Completed Technical Experts report on Accelerated Nuclear Materials Reduction. | HEU/LEU Purchase and Stockpile: Sign government-to-government agreements for the HEU/LEU purchase and stockpile effort. Explore and develop authorized opportunities to implement these efforts in FY03. | HEU/LEU Purchase and Stockpile: Complete the first shipment of LEU from Russia for the uranium stockpile. |
| HEU Research Reactor Fuel Purchase: May 2002 Presidential Summit in Moscow. Completed Technical Experts report on Accelerated Nuclear Materials Reduction. | HEU Research Reactor Fuel Purchase: Sign government-to-government agreements for HEU Research Reactor Fuel Purchase effort. Explore and develop authorized opportunities to implement these efforts in FY03. | HEU Research Reactor Fuel Purchase: Complete the first 250kg shipment of 93% HEU from Russia for the use in U.S. research and test reactors. |
| Accelerated Reduced Enrichment for Research and Test Reactors (RERTR): May 2002 Presidential Summit in Moscow. Completed Technical Experts report on Accelerated Nuclear Materials Reduction. | Accelerated Reduced Enrichment for Research and Test Reactors (RERTR): Explore and develop authorized opportunities to implement these efforts in FY03, such as negotiating and signing appropriate government-to-government agreements. | Accelerated Reduced Enrichment for Research and Test Reactors (RERTR): Complete conversion feasibility studies for two USG reactors. Significantly increase investment and accelerate schedule on cooperative U.S./R.F. advanced LEU fuel development. Begin conversion feasibility studies for two Russian designed reactors beyond current FY03 baseline. |
| Accelerated Material Consolidation and Conversion (MCC): May 2002 Presidential Summit in Moscow. Completed Technical Experts report on Accelerated Nuclear Materials Reduction. | Accelerated Material Consolidation and Conversion (MCC): No Activities except planning efforts under the Accelerated MCC. | Accelerated Material Consolidation and Conversion (MCC): Expand the production capabilities of the two current facilities and if necessary, equip a third Russian facility to implement MMC efforts to increase up to 5 MT the annual quantity of HEU converted to LEU. |

# Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| HEU/LEU Purchase and Stockpile | 0 | 0 | 25,000 | 25,000 | 100.0% |
| HEU Research Reactor Fuel Purchase | 0 | 0 | 1,000 | 1,000 | 100.0% |
| Accelerated Reduced Enrichment for Research and Test Reactors (RERTR) | 0 | 0 | 3,000 | 3,000 | 100.0% |
| Accelerated Material Consolidation and Conversion (MCC) | 0 | 0 | 1,000 | 1,000 | 100.0% |
| Total, Accelerated Material Disposition | 0 | 0 | 30,000 | 30,000 | 100.0% |

# Funding by Site

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Oak Ridge Operations Office | | | | | |
| Oak Ridge- (ORNL / Y-12 / K-25) | 0 | 0 | 26,000 | 26,000 | 100.0% |
| Chicago Operations Office | | | | | |
| Brookhaven National Laboratory | 0 | 0 | 1,000 | 1,000 | 100.0% |
| Argonne National Laboratory | 0 | 0 | 3,000 | 3,000 | 100.0% |
| Total, Chicago Operations Office | 0 | 0 | 4,000 | 4,000 | 100.0% |
| Total, Accelerated Material Disposition | 0 | 0 | 30,000 | 30,000 | 100.0% |

## Oak Ridge - Oak Ridge National Laboratory and Y-12 Plant

Oak Ridge is a DOE weapons and R&D site located in Oak Ridge, TN. Technical expert personnel from each of these organizations support the HEU/LEU Purchase and Inventory Program by serving as U.S. agent and in that program implementation.

## Brookhaven National Laboratory

BNL provides experience in contracting with various Russian vendors, including government-run institutes, and contracts all of the downblending activities for material consolidation and conversion.

## Argonne National Laboratory

ANL executes the technical implementation of the RERTR program and contracts with various Russian vendors, including government-run institutes to develop LEU fuel for use in Soviet-designed reactors. Futhermore, ANL also provides technical assistance to reactor operators to perform all technical projects required to convert research reactors worldwide.

## Detailed Program Justification

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

**HEU/LEU Purchase and Stockpile** . . . . . **0** **0** **25,000**

A new agreement is being negotiated between the United States and Russia whereby DOE would purchase the Separative Work Units (SWU) and natural uranium component associated with this 4.95% LEU material at a price to be determined. This agreement should be ready for signature by the Spring of 2003. DOE would purchase and store the LEU product material as a stockpile reserve. The material would be kept off the commercial market until the current HEU-LEU Agreement is completed in 2013, until shortages in the market or unusual circumstances arise that require use of the reserve material, or maintained as a longer-term reserve.

According to estimates, the total amount of HEU-LEU above the 500 MT available through the HEU-LEU Agreement will be 10-15 metric tons within the next ten years if programs to use the material are implemented. This material would be available for down blending at a rate of 1-1.5 MT per year. Preponderance of future funds provided to R.F. as purchase price of delivered LEU. DOE contractors in Oak Ridge, TN and Portsmouth, OH would cover funds transfers and LEU inventory management. Eventual sales revenue would be returned to Treasury and offset costs.

Congressional authorization for this aspect of the Accelerated Nuclear Material Disposition of HEU effort was expressed in the bill language of the FY 03 National Defense Authorization Act, Public Law 107-314, section 3157, but more explicitly in the supporting conference report guidance, which states the amendment "would authorize the Secretary of Energy to pursue a program with the Russian Federation on options for blending highly enriched uranium to reduce the concentration of U-235 below 20 percent."

*The $26,000,000 net increase in FY 04 over the current FY03 zero amount would allow for the first shipment of LEU to the U.S. to be completed in CY04.*

**HEU Research Reactor Fuel Purchase Program** . . . . . **0** **0** **1,000**

DOE proposes to purchase on average 150 kg per year of Russian HEU per year to be used to manufacture fuel for four U.S. HEU-fueled research reactors (one DOE, one NIST, and two university reactors). DOE currently provides approximately 150 kg of approximately 93% HEU per year for these five reactors. The Russian HEU would be shipped to the NNSA Y-12 plant for interim storage pending shipment to the U.S. fuel manufacturer. The majority of the program funds will be provided to the R.F. for HEU purchase. Project management will be supported through Oak Ridge - Y-12 plant and BWXT contractor.

While it is U.S. policy to minimize civil HEU use, HEU fuel is required for approximately the next 10 years, until LEU fuel is developed for these research reactors under the DOE Reduced Enrichment for Research and Test Reactors (RERTR) program. HEU purchases for research reactor fuel will be coordinated with the RERTR program and discontinued once reactors are converted.

*The $1,000,000 net increase in FY 04 over the current FY03 zero amount reflects follow-on second year costs to secure acquisition and delivery of an average of 150kg per year of 93% HEU to the U.S. NNSA Y-12 plant.*

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **Accelerated Reduced Enrichment for Research and Test Reactors (RERTR)** . . . . . | **0** | **0** | **3,000** |

In accordance with U.S. policy to minimize civil HEU use, the RERTR program is developing LEU fuel for the five U.S. HEU-fueled research reactors: two at DOE, one at NIST, and two at universities. The U.S. also encourages other countries to minimize civil HEU use and has implemented legislation to limit HEU exports, consistent with U.S. policy.

Under this effort, RERTR is accelerating its program to develop LEU fuel for 5 large domestic HEU fueled research reactors. Each reactor will be converted as soon as appropriate LEU fuel becomes available.

In addition, there are 19 large Soviet-designed research reactors that use up to 400 kilograms of HEU per year. RERTR funding is being provided for the development of appropriate LEU fuels to assist conversion of foreign HEU-fueled research reactors to LEU fuel. Since 1996, Minatom has been cooperating with the DOE RERTR program developing LEU fuel to replace the HEU fuel currently used by these research reactors. The RERTR program increase will support acceleration of the existing Russian RERTR program to develop, test and qualify LEU fuel to convert the Soviet-designed HEU-fueled research reactors. The goal is to convert these reactors to LEU fuel as soon as possible. The United States has already committed to fund the replacement LEU reactor core for the Tashkent reactor in Uzbekistan.

This additional dedicated funding will expedite the domestic and international program above its current FY03 baseline, which currently does not fund further efforts on fuel development or reactor conversion at the Russian institutes and does not propose early conversion of four of the five large U.S. research reactors that require extremely high density LEU fuel in order to convert. Recent R&D advances indicate that ultra high density LEU fuel can be developed that will allow the conversion of all currently operating research reactors worldwide. Augmented funding is required to complete the development and qualify the advanced fuel by FY09 so that the fuel can be available for immediate commercial use. Moreover, funds are also required to support the conversion of Soviet-designed reactors, once fuel is qualified, through purchase of replacement fuel cores.

*The $3,000,000 net increase in FY 04 over the current FY03 zero amount reflects funding required for accelerating ongoing LEU fuel development and research reactor conversion efforts both in the United States and Russia. These funds will be specifically used to accelerate conversion of five large U.S. reactors and up to 19 large Soviet-designed reactors, several of which are in regions of proliferation concern.*

| | (dollars in thousands) | | |
|---|---|---|---|
| | FY 2002 | FY 2003 | FY 2004 |
| **Accelerated Material Consolidation and Conversion (MCC)** | **0** | **0** | **1,000** |

Minatom has established a special commission to survey both Minatom and non-Minatom sites to determine the amount of HEU that could be made available for conversion to LEU oxide enriched to approximately 19% U-235 under the MCC Project. The commission is expected to complete its study by the end of the Spring of 2003. The U.S. has proposed to increase the annual rate of down blending up to a maximum 5 MT. The most proliferation attractive HEU from sites deemed at highest risk would receive priority for conversion to LEU.

Two Russian facilities, NII NPO Luch at Podolsk and the Research Institute of Atomic Reactors (GNTs RF NIIAR) in Dimitrovgrad, currently participate in the MCC Project. It is possible that their existing capacity can be increased to handle the additional material. However, if necessary, a third facility could be added to the program.

*The $1,000,000 net increase in FY 04 over the current FY03 zero amount reflects funding required for the initiation of additional downblending activities.*

| | | | |
|---|---|---|---|
| **Total, Accelerated Material Disposition . . . . . .** | **0** | **0** | **30,000** |

## Explanation of Funding Changes from FY 2003 to FY 2004

| | FY 04 vs. FY 03 ($000) |
|---|---|
| **HEU/LEU Purchase and Stockpile**<br>The $25,000,000 net increase in FY 04 over the current FY03 zero amount would allow for the first shipment of LEU to the U.S. to be completed in CY04. | +25,000 |
| **HEU Research Reactor Fuel Purchase**<br>The $1,000,000 net increase in FY 04 over the current FY03 zero amount reflects follow-on second year costs to secure acquisition and delivery of 250kg of 93% HEU to the U.S. NNSA Y-12 plant. | +1,000 |
| **Accelerated Reduced Enrichment for Research and Test Reactors (RERTR)**<br>The $3,000,000 net increase in FY 04 over the current FY03 zero amount reflects funding for accelerating ongoing LEU fuel development and research reactor conversion efforts both in the United States and Russia. These funds will be specifically used to accelerate conversion of five large U.S. reactors and up to 19 large Soviet-designed reactors, several of which are in regions of proliferation concern. | +3,000 |
| **Accelerated Material Consolidation and Conversion (MCC)**<br>The $1,000,000 net increase in FY 04 over the current FY03 zero amount reflects funding required for the initiation of additional downblending of HEU to LEU. | +1,000 |
| **Total Funding Changes, Accelerated Material Disposition . . . . . .** | +30,000 |

# Fissile Materials Disposition

## Program Mission

The Office of Fissile Materials Disposition (OFMD) is responsible for disposing of inventories of U.S. surplus weapon-grade 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 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.

Beyond FY2004, the Administration is committed to providing the resources necessary to fully support this program.

The program objectives include:

- Eliminate U.S. surplus plutonium in parallel with Russia by irradiating it as mixed oxide (MOX) fuel.
- Eliminate U.S. surplus HEU by down-blending the material to low-enriched uranium (LEU) for peaceful use as fuel for commercial reactors.
- Support U.S. Government efforts to dispose of surplus Russian plutonium.

## Program Strategic Performance Goal

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

## Program Goal

Eliminate surplus Russian plutonium and surplus U.S. plutonium and HEU.

## Performance Indicators

Percentage of design and construction of Pit Disassembly and Conversion Facility completed

Percentage of detailed procedures for nuclear weapon pit disassembly developed

Percentage of the design and construction of the U.S. MOX Fuel Fabrication Facility completed

Amount of HEU shipped to the United States Enrichment Corporation (USEC) for down-blending

Amount of off-specification HEU down-blended

Percentage of the design and construction of the Russian MOX Fuel Facility completed

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Draft Title I design submitted in September 2002 for the U.S. Pit Disassembly and Conversion Facility. Title II (detailed) design started in September 2002. | Complete 60% of the detailed design of the U.S. Pit Disassembly and Conversion Facility. | Complete 100% of the detailed design of the U.S. Pit Disassembly and Conversion Facility. |
| Completed 100% of the limited upgrades of the ARIES demonstration system and 100% of the draft operating procedures of the ARIES technology successfully demonstrating disassembly of each pit class destined for the PDCF | Complete 50% of pit disassembly hot demonstration activities at LANL. | Complete 66% of pit disassembly hot demonstration activities at LANL, complete 100% of the draft PDCF procedures for each pit in the U.S. surplus inventory, and complete 100% detailed design report for government furnished design of PDCF process equipment. |
| Completed 100% of conceptual design for an enhanced aqueous polishing capability for incorporation into the U.S. Mixed Oxide Fuel Fabrication facility | Complete 75% of the detailed design of the U.S. Mixed Oxide Fuel Fabrication Facility. | Complete the last 25% of the detailed design for the U.S. Mixed Oxide Fuel Fabrication Facility (total of 100% complete) and begin construction. |

| | | |
|---|---|---|
| Shipped 9 metric tons (MT) of surplus highly enriched uranium (HEU) from Y-12 to U.S. Enrichment Corporation (USEC) for down-blending to low enriched uranium (LEU). A grand total of 23MT has been shipped to USEC. | Ship an additional 11 MT of surplus HEU to the USEC and the Tennessee Valley Authority (TVA) for down-blending to LEU. A grand total of 34 MT has been shipped to USEC. | Ship an additional 11 MT of surplus HEU to the USEC and the TVA for down-blending to LEU. A grand total of 45 MT has been shipped to USEC. |
| Completed 84% of capital improvements at SRS for off-specification HEU down-blending. | Complete 100% of capital improvements at SRS for off-specification HEU down-blending HEU and deliver resulting LEU to TVA (equivalent to 3.7 MT of HEU). | Down-blend off-specification HEU at SRS and deliver resulting LEU and surplus HEU to TVA (equivalent of 9.0 MT of HEU, for a total of 12.7MT). |
| Initiated discussions on details of the program for disposing of surplus Russian weapon-grade plutonium. | Finalize decisions on the technical path forward for disposition of surplus Russian weapon-grade plutonium.<br><br>Begin Russianization of U.S. MOX Fuel Fabrication Facility design so it can be used for the Russian MOX Fuel Fabrication Facility design. | Complete the detailed design for the Russian MOX Fuel Fabrication Facility (total 100% complete) and begin Construction. |

**Significant Program Shifts**

OFMD was previously pursuing a dual-track strategy for U.S. plutonium disposition that called for fabricating 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. However, a 2001 Administration review of nonproliferation programs with Russia raised concerns about the cost and the ability to implement the U.S. and Russian programs. The review resulted in a revised U.S. approach for plutonium disposition which relies exclusively on the irradiation of MOX fuel to dispose of surplus plutonium. 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, reduces peak-year funding associated with simultaneously building two disposition facilities, and facilitates the closure of DOE's former Nuclear Weapons Complex sites.

Approximately 6 metric tons of plutonium previously destined for immobilization will now be processed in a MOX Fuel Fabrication Facility (FFF) with an expanded capability to accommodate this material. As a result, work on immobilization will be phased out. DOE chose to pursue a MOX-only strategy instead of

immobilization-only because the MOX strategy is the key to working with Russia to dispose of its surplus plutonium. Using primarily immobilization to dispose of plutonium is unacceptable to Russia because it does not degrade the weapons-usefulness of the plutonium. In addition, the MOX strategy relies on proven technology, while immobilization has not been proven on a production scale.

While the U.S. program has progressed according to schedule, the Russian program has slipped. In order to accelerate the Russian effort and bring the two programs back on a parallel track, the U.S. offered Russia the design of the U.S. aqueous polishing capability and MOX Fuel Fabrication Facility being developed by Duke, Cogema, Stone & Webster. In December, 2002, following several meetings to discuss the technical details surrounding the offer, MINATOM officials notified the U.S. that the Russian Federation would accept the U.S. offer. This will greatly accelerate the Russian disposition effort, help to ensure parallelism between the two programs, save money and time by avoiding the need to design Russian facilities for conversion and MOX fuel fabrication, and provide for greater material security. Consequently, concerted efforts are presently underway to "Russianize" the detailed design of the U.S. facility, reach agreement on licensing arrangements to permit Russia to use Cogema MOX technology for plutonium disposition, and establish a viable management structure to implement plutonium disposition in Russia. Due to the Congressional mandate that the U.S. and Russian programs must proceed in parallel, the U.S. program may have to be delayed slightly in order to allow the Russian program to catch up to the U.S. program schedule. The exact timing cannot be determined until detailed technical discussions take place with the Russians. As soon as changes to the U.S. schedule for plutonium disposition are identified, the Department will notify Congress, as appropriate.

# Funding Profile

(dollars in thousands)

| | FY 2002 Comparable Appropriation | FY 2003 Request | FY 2004 Request | $ Change | % Change |
|---|---|---|---|---|---|
| Fissile Materials Disposition | | | | | |
| U.S. Surplus Fissile Materials Disposition . . | | | | | |
| Operations and Maintenance . . . . . | 134,938 [a] | 194,000 | 193,805 | -195 | -0.1% |
| Construction . . . . . | 106,333 | 156,000 | 415,600 | 259,600 | 166.4% |
| Total, U.S. Surplus Fissile Materials Disposition . . . . . | 241,271 | 350,000 | 609,405 | 259,405 | 74.1% |
| Russian Surplus Fissile Materials | | | | | |
| Russian Fissile Materials Disposition | | | | | |
| Operations and Maintenance . . . . . | 55,936 [b] | 97,000 [c] | 46,100 | -50,900 | -52.5% |
| Advanced Reactor Technology | | | | | |
| Operations and Maintenance . . . . . | 5,000 | 1,000 | 1,000 | 0 | 0.0% |
| Total, Russian Surplus Fissile Materials . . . . | 60,936 | 98,000 | 47,100 | -50,900 | -51.9% |
| Subtotal, Fissile Materials Disposition . . . . . | 302,207 | 448,000 | 656,505 | 208,505 | 46.5% |
| Use of prior year balances . . . . . | -50,333 [d] | -64,000 [c] | 0 | 64,000 | |
| Total, Fissile Materials Disposition . . . . . | 251,874 | 384,000 | 656,505 | 272,505 | 71.0% |

**Pub Law Authorization and Other Agreements:**

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

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

[a] Includes a $151,451 rescission in FY02.

[b] Includes a $63,549 rescission. FY 2002 funding does not reflect an appropriation transfer to Program Direction for an office move and additional staffing and travel in the amount of $2,480,000 approved by Congress in early FY 2003. Also includes $42,000,000 appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program ($200,000,000). These balances plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

[c] Includes $64,000,000 appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program ($200,000,000). These balances plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

[d] Includes prior year balances used from project 87-D-140 Consolidated Special Nuclear Materials Storage Facility (*$5,340,000) and Project 01-D-142 Immobilization and Associated processing Facility ($2,993,000). Also includes $42,000,000 appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program ($200,000,000). These balances plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

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

U.S. - Russian Scientific and Technical Cooperation Agreement - 7/98

Public Law 105-261, Licensing of Certain Mixed Oxide Fuel Fabrication and Irradiation Facilities10/99

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

Public Law 107-314, Bob Stump National Defense Authorization Act for FY2003

# Funding by Site

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Chicago Operations Office | | | | | |
| Argonne National Laboratory (West) | 37 | | | —— | —— |
| MOX Fuel Fabrication Facility Design and Construction (DCS) | 65,993 | 93,000 | 402,000 | 309,000 | 332.3% |
| MOX Fuel Fabrication & Irradiation (DCS) | 34,700 | 43,500 | 28,400 | -15,100 | -34.7% |
| Pit Disassembly & Conversion Facility (WGI) | 11,000 | 33,000 | 13,600 | -19,400 | -58.8% |
| Total, Chicago Operations Office | 111,730 | 169,500 | 444,000 | 274,500 | 161.9% |
| Idaho Operations Office | | | | | |
| Idaho National Engineering & Environmental Laboratory | —— | —— | | —— | —— |
| Livermore Site Office | | | | | |
| Lawrence Livermore National Laboratory (LLNL) | 1,900 | 2,500 | 1,168 | -1,332 | -53.3% |
| Los Alamos Site Office | | | | | |
| Los Alamos National Laboratory (LANL) | 43,270 | 43,000 | 40,907 | -2,093 | -4.9% |
| National Energy Technology Laboratory (NETL) (formerly FETC) | —— | —— | | —— | —— |
| Nevada Operations Office | | | | | |
| Nevada Operations Office | —— | —— | | —— | —— |
| NNSA Service Center | | | | | |
| Atomic Energy of Canada, Ltd | 697 | 1,000 | 1,072 | 72 | 7.2% |
| General Atomics (GA) | 4,500 | 1,000 | 1,125 | 125 | 12.5% |
| NNSA Service Center (All Other Sites) | 3,940 | 4,500 | 4,875 | 375 | 8.3% |
| NNSA Service Center (AL) | 1,960 | 1,000 | 1,000 | 0 | 0.0% |
| Total, NNSA Service Center | 11,097 | 7,500 | 8,072 | 572 | 7.6% |
| Oak Ridge Operations Office | | | | | |
| Oak Ridge National Laboratory | 11,150 | 17,800 | 18,237 | 437 | 2.5% |
| Y-12 Plant | 13,236 | 48,000 | 44,900 | -3,100 | -6.5% |
| Oak Ridge Operations Office | —— | —— | —— | | |
| Total, Oak Ridge Operations Office | 24,386 | 65,800 | 63,137 | -2,663 | -4.0% |
| Pantex Site Office | | | | | |

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Pantex Plant (PX) | 7,805 | 8,640 | 8,275 | -365 | -4.2% |
| Richland Operations Office | | | | | |
| Pacific Northwest National Laboratory | 2,534 | 4,000 | 166 | -3,834 | -95.9% |
| Sandia Site Office | | | | | |
| Sandia National Laboratory | 0 | 160 | 680 | 520 | 325.0% |
| Savannah River Operations Office | | | | | |
| Savannah River Site | 51,300 | 65,300 | 63,100 | -2,200 | -3.4% |
| Savannah River Operations Office | 5,300 | 11,660 | 25,600 | 13,940 | 119.6% |
| Total, Savannah River Operations Office | 56,600 | 76,960 | 88,700 | 11,740 | 15.3% |
| Washington Headquarters | | | | | |
| Headquarters | 885 | 5,940 | 1,400 | -4,540 | -76.4% |
| Russian Federation | 42,000 | 64,000 | 0 | -64,000 | -100.0% |
| Subtotal, Fissile Materials Disposition | 302,207 | 448,000 | 656,505 | 208,505 | 46.5% |
| Use of prior-year balances | -50,333 | -64,000 | 0 | 64,000 | -100.0% |
| Total, Fissile Materials Disposition | 251,874 | 384,000 | 656,505 | 272,505 | 71.0% |

# Site Description

## Chicago Operations Office

The Chicago Operations Office (CHO) provides project and contract management support for the MOX fuel program and MOX Fuel Fabrication Facility (FFF) project and contract management support for the Pit Disassembly and Conversion Facility (PDCF) design contract. During construction, CHO will continue to provide contract management services such as funding direction and authority to contractors, overseeing contract performance, and providing legal and accounting services in support of headquarters.

## 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 for the production-scale facility. The lab also provides technical services, independent design review, independent assessment of the safety basis for the MOX FFF, as well as support for technical aspects associated with monitoring and inspection activities. LANL also provides support to efforts associated with the 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 is responsible for the post irradiation examination of 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 prior to fabrication into MOX fuel.

## 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) is the site selected for disposition of U.S. plutonium and, as such, 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. During the construction phases of MOX FFF and PDCF, SRS will be responsible for site integration and construction of site infrastructure including electric power, water & sewer, roads, communications, waste management, fire protection, security and related services.

## 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 monitoring and inspection activities, closeout for immobilization activities, and work on licensing and regulation development with Gosatomnadzor of Russia. Lawrence Livermore National Laboratory (LLNL) is responsible for investigating issues associated with packaging, transport, and storage infrastructures for plutonium disposition in 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.

## Subprogram Goals

Eliminate surplus U.S. weapon-grade plutonium

Eliminate surplus U.S. highly enriched uranium

Establish the basis for disposition operations

## Performance Indicators

**Percentage of design and construction of Pit Disassembly and Conversion Facility completed**

**Percentage of detailed procedures for nuclear weapon pit disassembly developed**

**Percentage of the design and construction of the U.S. MOX Fuel Fabrication Facility completed**

**Amount of HEU shipped to the United States Enrichment Corporation (USEC) for down-blending**

**Amount of off-specification HEU down-blended**

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Draft Title I design submitted in September 2002 for the U.S. Pit Disassembly and Conversion Facility. Title II (detailed) design started in September 2002. | Complete 60% of the detailed design of the U.S. Pit Disassembly and Conversion Facility. | Complete 100% of the detailed design of the U.S. Pit Disassembly and Conversion Facility. |

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Completed 100% of the limited upgrades of the ARIES demonstration system and 100% of the draft operating procedures of the ARIES technology successfully demonstrating disassembly of each pit class destined for the PDCF. | Complete 50% of pit disassembly hot demonstration activities at LANL. | Complete 66% of pit disassembly hot demonstration activities at LANL, complete 100% of the draft PDCF procedures for each pit in the U.S. surplus inventory, and complete 100% detailed design report for government furnished design of PDCF process equipment. |
| Completed 100% of the conceptual design for an enhanced aqueous polishing capability for incorporation into the U.S. Mixed Oxide Fuel Fabrication Facility. | Complete 75% of the detailed design of the U.S. Mixed Oxide Fuel Fabrication Facility | Complete the last 25% of the detailed design for the U.S. Mixed Oxide Fuel Fabrication Facility (total 100% complete) and begin construction. |
| Shipped 9 MT of surplus HEU from Y-12 to USEC for down-blending to LEU. A grand total of 23MT has been shipped to USEC. | Ship an additional 11 MT of surplus HEU to USEC and TVA for down-blending to LEU. A grand total of 34 MT has been shipped to USEC. | Ship an additional 11 MT of surplus HEU to USEC and TVA for down-blending to LEU. A grand total of 45 MT has been shipped to USEC. |
| Completed 84% of capital improvements at SRS for off-specification HEU down- blending | Complete 100 % of capital improvements at SRS for off-specification HEU down-blending. Begin down-blending of HEU and deliver resulting LEU and surplus HEU to TVA (equivalent to 3.7 metric tons of HEU). | Down-blend off-specification HEU at SRS and deliver resulting LEU and surplus HEU to TVA contractor (equivalent to 9.0 metric tons of HEU for a total of 12.7MT). |

**U.S. Plutonium Disposition**

OFMD is responsible for disposing of 34 metric tons of U.S. surplus weapons-usable plutonium, in accordance with the September 2000 U.S.-Russia Plutonium Management and Disposition Agreement and Congressional direction to conduct both disposition programs in parallel.

A 2001 Administration review of U.S. nonproliferation programs with Russia detailed a revised strategy for the U.S. plutonium disposition program. Under the revised strategy, DOE will phase out immobilization activities and focus on the irradiation of plutonium contained in mixed oxide (MOX) fuel in domestic, commercial reactors to dispose of this material. Two key facilities will be built at the Savannah River Site: the MOX Fuel Fabrication Facility and the Pit Disassembly and Conversion Facility.

### Reactor-Based Technologies/MOX Fuel Fabrication Facility

In FY 2004, the U.S. will begin construction of the MOX Fuel Fabrication Facility (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, 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 Nuclear Regulatory Commission (NRC) will license 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, 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 Assemblies (LAs) are required to verify the performance of the MOX fuel. The data from these LAs will be used to predict the performance of production quantities of fuel in the domestic nuclear reactors and to support NRC licensing activities. DOE is evaluating the possibility of fabricating these LAs in Europe (Eurofab), with a backup plan to produce the assemblies as the first fuel fabricated in the full-scale MOX FFF. Fabrication of LAs in the full-scale U.S. facility, however, will cause delays of at least two years in achieving full-scale MOX production, relative to the Eurofab approach.

### 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 suitable for feed material to the MOX FFF, and 4) package the resulting plutonium oxide for interim storage, pending disposition in the MOX FFF.

The PDCF will be operational for seven years and then be decontaminated and decommissioned over a three- to four-year period. A demonstration system (ARIES) is currently operating at LANL and has demonstrated the technology and the capability to disassemble each of the various pit types in the surplus U.S. inventory. The facility will use the ARIES process — a dry pyrochemical process — to convert plutonium metal to an oxide form suitable as feedstock for the MOX FFF. In FY 2004, LANL will also begin preparing detailed pit disassembly procedures for each pit type in the surplus U.S. inventory.

## U.S. Uranium Disposition

### Highly Enriched Uranium

The United States declared over 174 metric tons (MT) of HEU surplus to defense needs. DOE is working towards making this surplus HEU non-weapons-usable, primarily by blending it down to low enriched uranium (LEU) and recovering its economic value by using the resultant LEU as fuel for power reactors.

In December 1994, the Department signed a memorandum of agreement with United States Enrichment Corporation (USEC) for the transfer and down-blending of 50 metric tons of surplus HEU to USEC for use as commercial reactor fuel. To date, approximately 23 MT have been transferred to USEC for down-blending; the remainder will be transferred in phased deliveries through FY 2005.

The 174 MT declared surplus includes some "off-specification" HEU, which when down-blended does not meet standard commercial fuel specs, but is 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. Lifecycle costs of the off-specification HEU blend-down project require approximately $350,000,000, and a portion of this may be repaid by the end of the project from DOE/TVA-shared fuel savings (depending on future market prices for uranium). Most importantly, this arrangement 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 from the Office of Defense Programs (DP) for storing surplus plutonium in Zone 4 at the Pantex Plant and at the Plutonium Facility at LANL (approximately 1.5 MT). [a] Operating costs associated with storing surplus plutonium residing at the Pantex Plant include surveillance and maintenance activities 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 disassembled and 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 the Office of Defense Programs to the OFMD program. Storage requirements will continue until the material is moved to the down-blending site for disposition(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 providing surveillance for surplus HEU materials and facilities.

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[a]Prior to FY 2001, the Office of Defense Programs (DP) was responsible for funding this activity.

[b]In FY 2003 and 2004 the Office of Defense Programs (DP) will continue to repackage into sealed-insert storage containers the national security and surplus pits at the Pantex Plant to provide a more controlled storage environment.

**National Environmental Policy Act (NEPA)**

NEPA activities include preparing and reviewing Environmental Assessments, Environmental Impact Statements, and supplemental NEPA analyses for fissile material storage and disposition activities. In addition, NEPA efforts include preparing supplements and amended Record of Decisions, both for initial decisions as well as for major programmatic changes.

**Common Technologies**

As specified in the U.S.-Russia Plutonium Management and Disposition Agreement, monitoring and inspection will be required to confirm that the obligations set forth in the Agreement are being met and the resulting spent fuel meets agreed criteria. Funding for this activity supports technical analyses as well as negotiations with Russia on an effective monitoring and inspection regime. The Agreement requires that these negotiations be concluded prior to the construction of the Russian facilities. Funding for common technologies also provides support for efforts that are common to both the MOX FFF and the PDCF, such as providing plutonium oxide to the MOX FFF prior to the operation of the PDCF.

## Funding Schedule

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| Operations and Maintenance | | | | | |
| U.S. Plutonium Disposition | 81,000 | 95,800 | 70,100 | -25,700 | -26.8% |
| U.S. Uranium Disposition | 26,000 | 75,000 | 93,000 | 18,000 | 24.0% |
| Supporting Activities | 27,938 | 23,200 | 30,705 | 7,505 | 32.3% |
| Subtotal, Operations and Maintenance | 134,938 | 194,000 | 193,805 | -195 | -0.1% |
| Construction | 106,333 | 156,000 | 415,600 | 259,600 | 166.4% |
| Use of Prior-Year Balances | -8,333 | | | | |
| Total, U.S. Surplus Fissile Materials Disposition | 232,938 | 350,000 | 609,405 | 259,405 | 74.1% |

## Detailed Program Justification

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| **U.S. Plutonium Disposition** | | | |
| # **Reactor-Based Technologies** | 52,000 | 57,400 | 36,750 |

As part of fuel qualification activities, continue the implementation of the Lead Assembly (LA) work, including initiation of fuel fabrication. 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 operating license for the MOX FFF, continue modifications to the commercial nuclear reactors, complete irradiation of last test specimens, and perform the bulk of post-irradiation examination of all the test specimens. In accordance with the Administration's revised plutonium disposition strategy, plutonium disposition support systems activities will be incorporated into the MOX FFF project. *Although the LA fabrication activities will predominantly occur in FY 2004, the budget decrease is due to obtaining the budget authority in order to place the contract for LA fabrication in FY 2003.*

| | | | |
|---|---|---|---|
| # **Pit Disassembly and Conversion** | 26,000 | 37,000 | 33,350 |

Complete hot demonstration of the Automated Recovery and Integrated Extraction System (ARIES) system and limited demonstration of the ARIES technology. Continue development of HEU decontamination, material characterization, and Special Recovery Line activities. *The decrease is primarily due to completion of the draft PDCF procedures for each pit class in FY 2004.*

| | | | |
|---|---|---|---|
| # Immobilization and Associated Processing | 3,000 | 1,400 | 0 |

Completed closeout activities associated with the Plutonium Immobilization Plant in FY 2003.

| | | | |
|---|---|---|---|
| Total, U.S. Plutonium Disposition | 81,000 | 95,800 | 70,100 |
| **U.S. Uranium Disposition** | | | |
| # Highly Enriched Uranium | 26,000 | 75,000 | 93,000 |

- Off-Specification HEU Blend Down Project: Continue final processing, down-blending, and LEU loading operations at SRS for shipments to Nuclear Fuel Services (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.
- Shipping Containers: Receive certification for ES-2100 HEU oxide contents and procure additional

(dollars in thousands)

| FY 2002 | FY 2003 | FY 2004 |
|---|---|---|

containers and/or container components suitable for HEU oxide contents.

- **<** USEC 50 MT Transfer Project: Continue shipping surplus HEU (11 MT) from the Y-12 Plant to USEC for down-blending 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). Begin preparations for other unallocated material projects.
- < *The construction project will be completed in FY 2004. The increase is primarily due to workscope related to the off-specification HEU Blend Down Program, including TVA off-specification integration activities, additional Y-12 HEU shipments, increased SRS down-blending and LEU and HEU shipment operations, laboratory analyses of product material, payments to TVA for Uranium/Aluminum 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.*

| | | | |
|---|---|---|---|
| **Total, U.S. Uranium Disposition** | 26,000 | 75,000 | 93,000 |

**Supporting Activities**

| | | | | |
|---|---|---|---|---|
| # | Surplus Plutonium Storage | 12,000 | 9,800 | 13,305 |

Continue storing surplus plutonium at the Pantex Plant and LANL. Continue to package surplus 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). Begin fabricating, testing, and certifying the new surplus pit shipping containers. *The increase includes costs for starting to fabricate, test, and certify the new surplus pit shipping container.*

| | | | | |
|---|---|---|---|---|
| # | **Surplus HEU Storage** | 6,000 | 6,000 | 6,000 |

Continue to store 85 MT of surplus HEU at the Y-12 Plant. This estimate is based on assumptions that the material will continue to be stored in one vault and DOE will continue its cost-sharing relationship with the Office of Defense Programs.

| | | | | |
|---|---|---|---|---|
| # | **NEPA** | 1,500 | 2,500 | 1,500 |

Complete in FY 2003 an environmental review of Lead Assembly activities; prepare follow-up EAs, supplemental analyses, and/or supplemental EISs 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 decrease is due to recent successful litigation with regard to DOE's NEPA strategy.*

(dollars in thousands)

| | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|
| # **Common Technologies and Integration** | 8,438 | 4,900 | 9,900 |
| < Support U.S. participation 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. Support development of guidance to U.S. design engineers on monitoring and inspection specifications which need to be included in the design of the two plutonium facilities. The Agreement requires that these negotiations be concluded prior to the construction of the Russian facilities. Support efforts common to both the MOX FFF and PDCF, such as providing plutonium oxide to the MOX FFF prior to the operation of the PDCF. ***The increase is primarily due to expanded support for monitoring and inspection activities in FY 2004 and for increased support in FY 2004 to provide plutonium oxide in FY 2008 to the MOX FFF prior to the operation of the PDCF.*** | | | |
| Total, Supporting Activities | 27,938 | 23,200 | 30,705 |
| Subtotal, U.S. Surplus Fissile Materials Disposition | 134,938 | 194,000 | 193,805 |
| **Construction** | 106,333 | 156,000 | 415,600 |
| # See "Capital Operating Expenses and Construction Summary" for details. *The increase is due to beginning construction for the MOX FFF partially offset by completion of HEU construction for the Disposition facilities and completion of PDCF detailed design.* | | | |
| Total, U.S. Surplus Fissile Materials Disposition | 241,271 | 350,000 | 609,405 |

## 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 the 1998 Scientific and Technical Cooperation in Plutonium Management Agreement. This Scientific and Technical Cooperation Agreement provides for conducting tests and demonstrations of proposed plutonium disposition technologies.

In addition to the Scientific and Technical Cooperation Agreement, the U.S. and Russia signed the Plutonium Management and Disposition Agreement in September 2000, which commits the countries to dispose of 68 metric tons of surplus weapon-grade plutonium – 34 metric tons in each country. Disposition will take place 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 (immobilization will not be pursued by either country).
- 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.

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 for Russian plutonium disposition and has committed to seek an additional $200,000,000 in future appropriations. The United Kingdom, France, and Japan have collectively pledged approximately $300,000,000. Since 1996, G-8 countries have provided political support, as well as some research and development funding. The U.S. is actively seeking to obtain the balance of the funds for the Russian disposition program from countries other than the U.S. and possibly from non-governmental or commercial sources as well.

[a] FY 1999 Emergency Supplemental appropriated $200,000,000, of which $151,000,000 remains.

**Subprogram Goals**

Eliminate surplus Russian weapon-grade plutonium

## Performance Indicators

Percentage of construction of the Russian MOX Fuel Facility completed

## Annual Performance Results and Targets

| FY 2002 Results | FY 2003 Targets | FY 2004 Targets |
|---|---|---|
| Initiated discussions on the details of the program for disposing of surplus Russian weapon-grade plutonium. | Finalize decisions on technical path forward for disposition of surplus Russian weapon-grade plutonium. | |
| | Begin Russianization of U.S. MOX Fuel Fabrication facility design so it can be used for the Russian MOX Fuel Fabrication facility design. | Complete the detailed design for the Russian MOX Fuel Fabrication facility (total 100% complete) and begin construction. |

**Russian Plutonium Disposition**

To support the disposition of the excess Russian plutonium, the U.S. and Russia are working together on technology development of plutonium conversion and nondestructive assay, and irradiation of MOX fuel in reactors. Key elements of this work include:

- Assisting Russia with the design of plutonium conversion system for converting weapons-origin plutonium metal to an oxide form for use in MOX fuel and suitable for international inspection.
- 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 breeder 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. Although this is a long term technology option that would not be used for the 34 MT identified in the Agreement, this technology might be suitable for disposition of additional Russian plutonium beyond the 34 MT.

Recent Russian program decisions include: use of pellet fuel technology for MOX fuel fabrication (eliminates vibropak technology from further consideration), reliance on existing VVER-1000 light water reactors and

possibly the BN-600 fast reactor for plutonium disposition, and the possible export of some Russian MOX fuel for irradiation elsewhere.

While the U.S. program has progressed according to schedule, the Russian program has slipped. In order to accelerate the Russian effort and bring the two programs back on a parallel track, the U.S. offered Russia the design of the U.S. aqueous polishing capability and MOX Fuel Fabrication Facility being developed by Duke, Cogema, Stone & Webster. In December 2002, following several meetings to discuss the technical details surrounding the offer, MINATOM officials notified the U.S. that the Russian Federation would accept the U.S. offer. This will greatly accelerate the Russian disposition effort, help to ensure parallelism between the two programs, save money and time by avoiding the need to design Russian facilities for conversion and MOX fuel fabrication, and provide for greater material security. Consequently, concerted efforts are presently underway to "Russianize" the detailed design of the U.S. facility, reach agreement on licensing arrangements to permit Russia to use Cogema MOX technology for plutonium disposition, and establish a viable management structure to implement plutonium disposition in Russia. Due to the Congressional mandate that the U.S. and Russian programs must proceed in parallel, the U.S. program may have to be delayed slightly in order to allow the Russian program to catch up to the U.S. program schedule. The exact timing cannot be determined until detailed technical discussions take place with the Russians. As soon as changes to the U.S. schedule for plutonium disposition are identified, the Department will notify Congress, as appropriate.

**Support and Oversight in the U.S.**

In FY 2003, the U.S. and Russia are working together on research and development to support the technical path forward for the Russian program. The U.S. is also supporting work on the plutonium conversion capability and MOX lead assembly facilities. In FY 2004, the U.S. will continue to provide required review and technical oversight of technology development of plutonium disposition activities in Russia.

**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, if additional plutonium above the initial 34 MT is identified for disposition. 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.

## Funding Schedule

| | (dollars in thousands) | | | | |
|---|---|---|---|---|---|
| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
| **Russian Fissile Materials Disposition** | | | | | |
| Russian Plutonium Disposition | 44,000 | 87,760 | 41,100 | -46,660 | -53.2% |
| Support and Oversight in the U.S. | 11,936 | 9,240 | 5,000 | -4,240 | -45.9% |
| Total, Russian Fissile Materials Disposition | 55,936 | 97,000 | 46,100 | -50,900 | -52.5% |
| Advanced Reactor Technology | 5,000 | 1,000 | 1,000 | —— | —— |
| Total, Russian Surplus Fissile Materials Disposition | **60,936** | **98,000** | **47,100** | **-50,900** | **-51.9%** |
| Use of Prior-Year Balances [a] | -42,000 | -64,000 | —— | 64,000 | 100.0% |
| **Total, Russian Surplus Fissile Materials Disposition** | **18,936** | **34,000** | **47,100** | **13,100** | **38.5%** |

[a]These funds were appropriated in the FY 1999 Supplemental Appropriation for the Russian Plutonium Disposition program ($200M). These balances plus remaining balances (totaling $151,000,000) will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

## Detailed Program Justification

| | (dollars in thousands) | | |
|---|---|---|---|
| | FY 2002 | FY 2003 | FY 2004 |
| **Russian Fissile Materials Disposition** | | | |
| **Russian Plutonium Disposition (funds spent in Russia)** | 42,000 | 64,000 | —— |

As specified in the U.S.-Russia Plutonium Management and Disposition Agreement, funding from new budget authority continues the work initiated in FY 2002 and 2003. As soon as the U.S. and Russia finalize the technical path forward for the Russian program and inform Congress, the available prior year balances ($151M) mandated for work in Russia as specified will be obligated**.**

- **<** Plutonium Conversion . . . . . 2,000 14,545 10,872

  Complete the fabrication of the non-destructive assay capability for plutonium conversion. Complete working drawings for fabrication of equipment for the conversion system. *The decrease is due to the completion of the majority of long-lead system component purchases in FY 2003.*

- **<** Immobilization . . . . . —— —— ——

- **<** MOX Fuel Fabrication . . . . . 4,450 19,956

  Support construction of the MOX Fuel Fabrication Facility. Complete preliminary design of the MOX fuel fabrication facility (which includes an associated waste processing capability), working drawings, and the majority of the construction of the equipment to fabricate MOX LAs. Complete most of the required confirmatory fuel research and development work to allow completion of the VVER-MOX fuel performance computer code that will be used to support licensing and insertion of lead assemblies. Complete the BN-600 MOX fuel design documentation to support hybrid core operation. *The increase is due to the transition from research and development to facility construction in Russia. Total funding for the construction will predominantly be provided by international contributors and unobligated balances from the FY 1999 Supplemental Appropriation for the Russian plutonium disposition program.*

- **<** VVER-1000 Reactors . . . . . 1,700 3,664

  Complete the design for demonstration modifications at Balakovo-4. Complete the framework for the Balakovo safety basis evaluation and continue to update the safety basis documents. Complete several design packages for modifications needed to support the LA and 1/3 MOX core programs. 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 the start of modifications to the VVER-1000 reactors to accommodate MOX fuel.*

- **<** BN-600 Reactor . . . . . 1,185 2,554

| (dollars in thousands) | | |
|---|---|---|
| FY 2002 | FY 2003 | FY 2004 |

**Russian Fissile Materials Disposition**

Complete set up and check-out of component fabrication lines for BN-600 radial breeding blanket replacement. Initiate fabrication of core components for BN-600 radial breeding blanket replacement. Complete BN-600 hybrid core safety analyses and submit licensing package to GAN for hybrid core conversion. Complete BN-600 uranium core with reflector/shield safety analyses and submit licensing package to GAN for blanket replacement. *The increase is due to the start of modifications to the BN-600 reactor to accommodate MOX fuel.*

< Licensing and Regulation/Other Program Support . . . . . 850 1,832

Complete the final drafts and publish the 12 high priority regulations for public comment in Russia. Provide expert review for certification of plutonium conversion system. *The increase is due to more work in the development of regulations and licensing review for the plutonium conversion system and MOX LA facilities.*

< Packaging, Transportation, and Storage . . . . . 1,030 2,222

Complete Technical Economic Feasibility (TEF) study of plutonium packaging, storage and transportation. Select plutonium container and transportation set designs. Start plutonium oxide container and transportation set certification tests. Start Justification of Investment (JOI) design for the Krasnoyarsk plutonium oxide repackaging facility. Complete Tomsk plutonium oxide repackaging facility engineering study. Complete TEF engineering assessment of MOX spent fuel packaging, storage and transportation by VNIPIET. Complete JOI for MOX dry spent fuel storage facility. *The increase is due to increased studies of plutonium packaging, storage, and transportation, and to the start of plutonium oxide container and transportation set certifications.*

| | | | |
|---|---|---|---|
| **Subtotal, Russian Plutonium Disposition . . . . . .** | 44,000 | 87,760 | 41,100 |
| **# Support and Oversight in the U.S. (funds spent in U.S.) . . . . . .** | 11,936 | 9,240 | 5,000 |

Continue to provide support and oversight, as directed, of research and development and design activities for plutonium disposition in Russia. *The decrease is due to the transition of the program from research and development to construction of the facilities in Russia.*

| | | | |
|---|---|---|---|
| **# Advanced Reactor Technology . . . . . .** | 5,000 | 1,000 | 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. Commence irradiation sample GT-MHR fuel (first fuel samples are uranium). Continue reactor plant component testing.

| | | | |
|---|---|---|---|
| **Subtotal, Russian Surplus Fissile Materials Disposition . . . . . .** | **60,936** | **98,000** | **47,100** |
| Less Use of Prior-Year Balances [a] . . . . . | -42,000 | -64,000 | 0 |
| **Total, Russian Surplus Fissile Materials Disposition . . . . . .** | **18,936** | **34,000** | **47,100** |

[a]These balances will be spent in the Russian Federation in accordance with a new detailed program execution plan to be provided to Congress.

## Explanation of Funding Changes from FY 2003 to FY 2004

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| **U.S. Surplus Fissile Materials Disposition** | |
| **U.S. Plutonium Disposition** | |
| # **Reactor-Based Technologies** | |
| The decrease is due to placement of the contract for LA fabrication in FY 2003, although the LA fabrication activities will predominantly occur in FY 2004. | -20,650 |
| # **Pit Disassembly and Conversion** | |
| The decrease is primarily due to completion of the hot demonstration at LANL | -3,650 |
| # **Immobilization and Associated Processing** | |
| The decrease is due to closeout of immobilization activities. | -1,400 |
| Total, U.S. Plutonium Disposition | -25,700 |
| **U.S. Uranium Disposition** | |
| # **Highly Enriched Uranium (HEU)** | |
| The increase is due to increased workscope related to the off-specification HEU Blend Down Project, including TVA off-specification project integration activities, additional Y-12 HEU shipments, increased SRS down-blending and LEU and HEU shipment operations, laboratory analyses of product material, payments to TVA for Uranium/Aluminum 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. | 18,000 |
| **Total, U.S. Uranium Disposition** | 18,000 |
| **Supporting Activities** | |
| # Surplus Plutonium Storage | |
| The increase is due to starting the fabrication, testing, and certifying of the new surplus pit shipping containers.. | 3,505 |
| # NEPA | |
| The decrease is due to recent successful litigation with regard to DOE's NEPA strategy. | -1,000 |

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| # **Common Technologies and Integration** | |
| The increase is primarily due to expanded support for monitoring and inspection activities in FY 2004 and increased support in FY 2004 for efforts to provide plutonium oxide in FY 2008 to the MOX FFF prior to the operation of the PDCF. | 5,000 |
| **Total, Supporting Activities** | 7,505 |
| **Subtotal, U.S. Surplus Fissile Materials Disposition** | -195 |
| **Construction** | |
| The increase is due to beginning construction of the Mixed Oxide Fuel Fabrication Facility | 259,600 |
| **Total, U.S. Surplus Fissile Materials Disposition** | 259,405 |
| **Russian Surplus Fissile Materials Disposition** | |
| **Russian Fissile Materials Disposition** | |
| # **Russian Plutonium Disposition (funds spent in Russia)** | |
| < Plutonium Conversion | |
| The decrease is due to the completion of long-lead system component purchases in FY 2003 | -3,673 |
| < MOX Fuel Fabrication | |
| The increase is due to the transition from research and development to facility construction in Russia. Total funding for the construction will predominantly provided be by international contributors and unobligated balances from the FY 1999 Supplemental Appropriation for the Russian plutonium disposition program | 15,506 |
| < VVER-1000 Reactors | |
| The increase is due to the start of modifications to the VVER-1000 reactors to accommodate MOX fuel. | 1,964 |
| < BN-600 Reactor | |
| The increase is due to the start of modifications to the BN-600 reactor to accommodate MOX fuel. | 1,369 |
| < 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. | 982 |

| | FY 2004 vs. FY 2003 ($000) |
|---|---|
| < Packaging, Transportation, and Storage | |
| The increase is due to increased studies of plutonium packaging, storage, and transportation, and to the start of plutonium oxide container and transportation set certifications. | 1,192 |
| Total, Russian Plutonium Disposition | 17,340 |
| **# Support and Oversight in the U.S. (funds spent in the U.S. in support of Russia)** | |
| The decrease is due to the transition of the program from research and development to construction of the facilities in Russia. | -4,240 |
| Subtotal, Russian Fissile Materials Disposition | 13,100 |
| # Advanced Reactor Technology | |
| The program will continue efforts in FY 2004 using prior-year balances. | 0 |
| Total, Russian Surplus Fissile Materials Disposition | 13,100 |
| **Total Funding Change, Fissile Materials Disposition** | **272,505** |

# Capital Operating Expenses and Construction Summary

## Construction Projects

(dollars in thousands)

| | Total Estimated Cost (TEC) | Prior Year Appropriations | FY 2002 | FY 2003 | FY 2004 | Unappropriated Balance |
|---|---|---|---|---|---|---|
| 99-D-141 Pit Disassembly & Conversion Facility[a] | TBD | 58,707 | 11,000 | 33,000 | 13,600 | TBD |
| 99-D-143 Mixed Oxide (MOX) Fuel Fabrication Facility[b] | TBD | 66,318 | 65,993 | 93,000 | 402,000 | TBD |
| 01-D-407 Highly Enriched Uranium (HEU) Blend Down Project | 80,226 | —— | 29,340 | 30,000 | 0 | —— |
| Total, Construction | | 125,025 | 106,333 | 156,000 | 415,600 | TBD |

## Capital Operating Expenses

| | FY 2002 | FY 2003 | FY 2004 | $ Change | % Change |
|---|---|---|---|---|---|
| General Plant Projects | | | | | |
| Support Activities-Surplus Pu Storage | 242 | 249 | 256 | 7 | 2.8% |
| Capital Equipment | 5,203 | 5,359 | 5,520 | 161 | 3.0% |
| Total, Capital Operating Expenses | **5,445** | **5,608** | **5,776** | **168** | **3.0%** |

[a]Total Estimated Cost (TEC) estimate will be determined when the PDCF facility construction cost and schedule baselines are established at the completion of Title I (preliminary) design.

[b]Total Project Cost is estimated at $1,842,000,000 and is reflected in the 2-15-02 Report to Congress

# 99-D-141, Pit Disassembly and Conversion Facility C Title I & II Design, Savannah River Site, Aiken, South Carolina

(Changes from FY 2003 Congressional Budget Request are denoted with a vertical line [ | ] in the left margin.)

## Significant Changes

- # Project Performance Baseline will be established in the 3rd quarter of FY 2003 instead of the last quarter of FY 2002. A cost estimate has been included as part of the 90% preliminary design submission in September 2002. This estimate will be validated in FY 2003.
- # A Waste Solidification Building (WSB) that will handle both PDCF and MOX radioactive waste will be incorporated into the PDCF project. Costs and schedule for this building are being developed in FY 2003. (See page 4 for further clarification)

## 1. Construction Schedule History

| | Fiscal Quarter | | | | | |
|---|---|---|---|---|---|---|
| | A-E Work Initiated | A-E Work Completed | Physical Construction Start | Physical Construction Complete | Total Estimated Cost ($000) | Total Project Cost ($000) |
| FY 2000 Budget Request *(A-E and technical design only)* | 2Q 1999 | 4Q 2001 | 2Q 2001 | 4Q 2004 | TBD [a] | TBD [a] |
| FY 2001 Budget Request *(Preliminary Estimate)* | 3Q 1999 | 1Q 2002 | 1Q 2002 | 3Q 2005 | TBD [a] | TBD [a] |
| FY 2002 Budget Request *(Preliminary Estimate)* | 3Q 1999 | TBD | TBD | TBD | TBD [a] | TBD [a] |
| FY 2003 Budget Request *(Preliminary Estimate)* | 3Q 1999 | 1Q 2004 | TBD | TBD | TBD [a] | TBD [a] |
| FY 2004 Budget Request *(Performance Baseline)* | 3Q 1999 | 2Q 2004 | TBD [b] | TBD [b] | TBD [b] | TBD [b] |

Note: Project will be held at design completion to permit phasing with MOX FFF and to avoid higher per year funding.

[a] Total Estimated Cost (TEC) and Total Project Cost (TPC) estimates will be determined when the Project Performance Baseline is established in 3rd quarter of FY 2003.

[b] (See also footnote a). *The Report to Congress: Disposition of Surplus Defense Plutonium at Savannah River Site* dated February 15, 2002 cites a Construction Start date of FY 2006, and Completion date of FY 2009. This *Report also* cites a to go TPC in current (budget) year dollars for FY2002--FY2008 of $993.8 million. Adding the prior year costs and the costs for FY2009, the TPC would be $1231.6 million. The corresponding amount for TEC is $699.1 million, which does not include the cost for the detailed design & construction of WSB (See attached description).

## 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 | 35,000[a] | 35,000[a] | 40,140[a] |
| 2004 | 13,600[b] | 13,600[b] | 13,600[b] |

## 3. Project Description, Justification and Scope

This project supports the NNSA strategic goal to protect or eliminate weapon-usable nuclear material or infrastructure. The Pit Disassembly and Conversion Facility Project provides the capability to convert surplus plutonium metal and the plutonium in surplus pits (nuclear weapons) to a form that can be fabricated into MOX fuel for irradiation in U.S. commercial nuclear reactors. The irradiated MOX fuel is not readily usable in nuclear weapons.

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. 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 is planned to be operational for seven 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

[a] This assumes that $2 million of OPC funding will be appropriated into TEC funds for FY 2003.

[b] Funding and cost are not included for the Waste Solidification Building (WSB). Funding is being developed in FY 2003.

constructed consistent with Nuclear Regulatory Commission (NRC) licensing standards but will not be licensed by the NRC.

## 4. Details of Cost Estimate

(dollars in thousands)

| | Current Estimate | Previous Estimate |
|---|---|---|
| Design Phase | | |
| Preliminary and Final Design costs (Design, Drawings, and Specifications) | 85,000 | 75,940 |
| Design Management costs @ 16% of Above Costs | 13,800 | 12,360 |
| Total, Design Phase | 98,800 | 88,300 |
| Contingencies at approximately 20% of above costs | | |
| Design Phase | 18,000 | 18,000 |
| Total, Design Costs | 116,800[a] | 106,300 |
| Construction Management | 1,500 | TBD |
| Site Preparation (incl. M&O Support) and construction cost | TBD | TBD |
| Total Agency Requirement | TBD | 106,300 |

## 5. Method of Performance

A cost plus fixed-fee contract for preliminary design and a cost plus award fee contract for detailed design have been awarded for the PDCF. The procurement strategy includes an option for construction inspection services (Title III) for which a decision will be made during the Title II 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.

a This number does not include the funding for the detailed design and construction of the Waste Solidification Building (WSB). This is being developed in FY 2003. See page 4 for clarification regarding the Waste Solidification Building.

## 6. Schedule of Project Funding

(dollars in thousands)

| | Prior Years | FY 2002 | FY 2003 | FY 2004 | Outyears | Total |
|---|---|---|---|---|---|---|
| Design | | | | | | |
| Design | 58,707 | 11,000 | 35,000 | 12,093 | 0 | 116,800 |
| Total Design (Federal and Non-Federal) | 58,707 | 11,000 | 35,000 | 12,093 | 0 | 116,800 |
| Construction Management | | | | 1,500 | TBD | TBD |
| Site Preparation and construction | | | | **CC** | TBD | TBD |
| Total Agency Requirement (Design, Site Preparation, and construction) | 58,707 | 11,000 | 35,000 | 13,593 | TBD | TBD |

## 7. Related Annual Funding Requirements

(dollars in thousands)

| | Current Estimate | Previous Estimate |
|---|---|---|
| Annual facility operating costs | TBD[a] | N/A |

**Clarification B Waste Solidification Building**

The life cycle cost in the *Report to Congress: Disposition of Surplus Defense Plutonium at Savannah River Site* for the disposal of certain categories of radioactive liquid wastes from the MOX Fuel Fabrication Facility was based on sending the radioactive liquid wastes to the Waste Tank farm in the F-Area via underground pipes. The radioactive liquid wastes would be diluted in the tanks, treated and then processed in the Defense Waste Processing Facility in S-Area via underground pipes. The radioactive liquid wastes from the Pit Disassembly and Conversion Facility were to be sent for treatment along with the MOX Fuel Fabrication Facility Radioactive liquid wastes. Subsequent to the preparation of the *Report to Congress*, the Department proposed an expedited shutdown of the F-Canyon processing capability, introducing uncertainty whether the F-Area waste treatment capability would be available in the years needed for executing the plutonium disposition mission. To reduce the programmatic risk to the mission, a new capability (the Waste Solidification Building) is proposed as part of the Pit Disassembly and Conversion Facility Project to dispose of these radioactive liquid wastes.

The cost for deploying the Waste Solidification Building is to be shared between the MOX Fuel Fabrication Facility Project and the Pit Disassembly and Conversion Facility Project. The MOX Fuel Fabrication Facility

[a] The report to Congress: Disposition of Surplus Defense Plutonium at Savannah River Site cites an operating cost of $718.2 Million, without contingency and in FY 2001 dollars. For an operating period of 7.5 years and a contingency of 5%, the annual facility operating cost would be $100.5 Million in FY 2001 dollars.

Project will contribute 50% of the funding for the Waste Solidification Building design, construction, start-up, and operation through reprogramming funds from the MOX Fuel Fabrication Facility Project to the Pit Disassembly and Conversion Project. The anticipated reduction in operating cost for the MOX Fuel Fabrication Facility in using the Waste Solidification Building instead of the use of the F-Area waste tank treatment and the Defense Waste Processing Facility included in the *Report to Congress* is used to offset the shared cost of the Waste Solidification Building. The approach to use a Waste Solidification Building for the disposal of these radioactive liquid wastes is expected to leave the total life cycle cost of the plutonium disposition mission unchanged.

# 99-D-143, Mixed Oxide Fuel Fabrication Facility, Savannah River Site, Aiken, South Carolina

## Significant Changes for FY 04 Budget

(Changes from FY 2003 Congressional Budget Request are denoted with a vertical line [ | ] in the left margin).

- # Site preparation and physical construction will commence as scheduled in FY 04.
- # Initial long lead equipment will be purchased for the Aqueous Polishing and MOX process equipment.
- # Complete MOX FFF design (slip from FY 03 due to Administration review of Plutonium disposition program) to accommodate impure plutonium previously destined for immobilization.

## 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 | | |
| FY 2001 Budget Request *(Preliminary Estimate)* | 2Q 1999 | 3Q 2002 | 4Q 2002 | 1Q 2006 | | |
| FY 2002 Budget Request *(Preliminary Estimate)* | 2Q 1999 | 4Q 2002 | 2Q 2003 | 1Q 2007 | | |
| FY 2003 Budget Request *(Preliminary Estimate)* | 2Q 1999 | 4Q 2003 | 2Q 2004 | 4Q 2007 | | |
| FY 2004 Budget Request (Current Estimate) | 2Q 1999 | 1Q 2004 | 2Q 2004 | 4Q 2007 | $1,622 M | $1,842 M |

## 2. Financial Schedule

(dollars in thousands)

| Fiscal Year | Appropriations | Obligations | Costs |
|---|---|---|---|
| Design, Procurement Engineering, Site Preparation, Long Lead Procurement (FY 04), Physical Construction (FY04) | | | |
| 1999 | 28,000 | 9,600 | 2,546 |
| 2000 | 12,375 | 30,775 | 33,512 |
| 2001 | 25,943 | 25,943 | 30,000 |
| 2002 | 65,993 | 65,993 | 55,993 |
| 2003 | 93,000 | 93,000 | 103,260 |
| 2004 | 402,000 | 402,000 | TBD[a] |

a DOE expects to obligate funding for equipment procurements and for construction subcontracts.

## 3. Project Description, Justification and Scope

The 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 Savannah River 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 powder from the Pit Disassembly and Conversion Facility (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 powder. 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 (AAmericanization@ 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 International Atomic Energy Agency (IAEA). The facility also requires 120,000 square feet of structures adjacent to the MOX process areas for secure shipping and receiving, material receipt, utilities, and technical support.

The overall estimated cost for the MOX FFF is $1,622 M Total Estimated Cost (TEC). This amount includes the MOX FFF design budget ($171 M). The construction costs are estimated to be $1,451 M (including contingency). The detailed design and engineering costs for the glove boxes and software control systems are considered to be construction costs, except for the FY 02 activities which were considered design costs and were included within the $171M design budget. The overall base design is 70% complete as of December 1, 2002. Title I (preliminary) design began in mid FY 99 and was completed in December 2000. Title II (detailed design) began in January 2001 and will be completed by December 2003. Cost estimates were developed based on Title I design information. A revised cost estimate for the MOX FFF to incorporate the scope changes identified in FY 03 budget request was completed in December 2002. This cost estimate will serve as the basis to establish a project performance baseline in the fourth quarter of FY 03.

The FY 03 activities include continuing work on the MOX FFF base design. The structural design will be completed to develop construction bid packages to support FY 04 construction. Manufacturing design activities continued for the glove box and process units to support long-lead procurement activities that will begin in FY 04. Manufacturing engineering activities will commence for canning, pelletizing, 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, 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 04, activities include completion of the MOX FFF design. This is a slip from the FY 03 budget due to changes in the Plutonium disposition program announced by the Administration in January 2002. The completion of the license application and safety documentation to Nuclear Regulatory Commission, continue detailed manufacturing design of the glove box equipment, commence procurement of long lead equipment, and physical construction of the MOX FFF building. To support commencement of physical construction activities, site preparation activities will be initiated in late FY 03 and will continue in FY 04. These activities include 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 later in FY 04. Installation and commissioning of the concrete batch plant will also begin in FY 04.

The FY 04 physical construction activities include the final excavation, backfill, and the initiation of structural installation of the MOX FFF Building, and installation of the standby diesel generator building and utilities. The physical construction cost includes non-manual cost, contingency, escalation, sales tax, and profit. To conduct this work, the initial suite of construction work packages will be issued in FY 04. The first equipment build-to-print glove box procurement will be awarded in FY 04. These procurements include specific Aqueous Polishing equipment (tanks) and large HVAC filters.

## 4. Details of Cost Estimate

(dollars in thousands)

| | Current Estimate | Previous Estimate |
|---|---|---|
| Design Phase | | |
| Preliminary and Final Design costs (Design, Drawings and Specifications) | 153,300 | 140000 |
| Contingencies | 18,000 | 31318 |
| Total, Design Phase | 171,318 | 171,318 |
| FY 03 Procurement Engineering and Site Preparation | 53,993 | 54,311 |
| FY 04 Procurement Engineering and Site Preparation | 74,000 | |
| FY 04 Physical Construction and Long Lead Procurement | 328,000 | -- |
| Total Budget | 627,311 | 225,629 |

## 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). In FY 02, DOE modified its contracting strategy to segment Phase I into three options of work. Option 1A is the effort associated with long lead procurement, long lead engineering, basic ordering agreements, and the related project management support functions that are not already included in the base contract. Option 1B is the effort associated with the construction of the MOX FFF, where construction would be defined here to mean all procurement, construction and construction management services for the MOX FFF, support structures and related infrastructure, installation checks and testing conducted as part of the turnover of the construction efforts to an operating or startup team; and project management functions associated with these efforts. Option 1C is the effort associated with start-up of he MOX FFF and non-MOX FFF work.

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. Under an umbrella prime contract that is incentivized the MOX FFF 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 | FY 2004 | Total |
| Design Cost | | | | | | |
| Design | 40,375 | 25,943 | 65,993 | 39,007a | | 171,318 |
| Total Design (Federal and Non-Federal) | 40,375 | 25,943 | 65,993 | 39,007 | | 171,318 |
| Procurement Engineering and Site Preparation | ____ | ____ | ____ | 53,993 | 74,000 | 127,993 |
| Construction and Long Lead Procurement | | | | | 328,000 | 328,000 |
| Total Agency Requirement (Design, Procurement Engineering, long lead Procurement, Physical Construction) | 40,375 | 25,943 | 65,993 | 93,000 | 402,000 | 627,311 |

## 7. Related Annual Funding Requirements

| | (dollars in thousands) | |
|---|---|---|
| | Current Estimate | Previous Estimate |
| Annual facility operating costs | b | N/A |

a Includes funding to complete the design in FY 2004.

b *The report to Congress: Disposition of Surplus Defense Plutonium at Savannah River Site* cites an operating cost of $718.2 million, without contingency and in FY 2001 dollars. For an operating period of 7.5 years and a contingency of 5%, the annual facility operating cost would be $100.5 million in FY 2001 dollars.