Defense Nuclear Nonproliferation

Executive Budget Summary

Mission

The global proliferation of Weapons of Mass Destruction (WMD) and their missile delivery systems is one of the most serious dangers confronting the United States. At least 20 countries -- some of them hostile to the United States -- already have or may be developing WMD through the acquisition of dual-use technology, indigenous development and production, and/or support from rogue supplier states. This problem is continuing and evolving, with far-reaching consequences for international security and stability.

Nonproliferation is one of the President's highest national security priorities. He continues to support an expanded, multi-program threat reduction initiative for the Russian WMD complex.

Based on the highly specialized scientific, technical, analytical, and operational capabilities of the Department of Energy (DOE) and its National Laboratories, the DOE, through its Office of Defense Nuclear Nonproliferation, is uniquely suited to provide leadership in national and international efforts to reduce the danger to U.S. national security posed by the proliferation of WMD. The Office of Defense Nuclear Nonproliferation accomplishes this mission by: (1) **preventing** the spread of WMD materials, technology, and expertise; (2) **detecting** the proliferation of WMD worldwide; (3) **reversing** the proliferation of nuclear weapons capabilities; (4) **disposing** of surplus materials in accordance with terms set forth in agreements between the U.S. and Russia; and (5) **storing** surplus fissile materials in a safe manner pending disposition.

Objectives

In order to reduce the international proliferation threat, the Office of Defense Nuclear Nonproliferation is focusing its resources and expertise on the following near-term priorities: (1) securing nuclear materials, technology, and expertise in Russia and the Newly Independent States; (2) limiting weapons-usable fissile materials worldwide; (3) developing new technologies against emerging chemical and biological threats; (4) enabling transparent and irreversible nuclear reductions; (5) enhancing U.S. capability to monitor nuclear explosions; (6) controlling nuclear exports; (7) strengthening the nuclear nonproliferation regime; (8) reducing the threat posed by the operation of unsafe nuclear facilities worldwide; (9) eliminating stockpiles of U.S. surplus weapons plutonium and highly enriched uranium (HEU); (10) engaging Russia to disposition stockpiles of Russian weapons usable plutonium; and (11) reducing the number of sites where surplus plutonium is stored.

Strategy

Some of our most important international activities include: conducting the government-to-government and laboratory-to-laboratory programs of cooperation between U.S. nuclear experts and their counterparts at nuclear facilities and institutes in the former Soviet Union to improve materials protection, control and

accountability; preventing "brain drain" and creating non-weapons related employment; working with the private sector to engage WMD weapons scientists, engineers, and technicians in the former Soviet Nuclear Cities in activities which reduce the proliferation threat and promote their transition to non-defense sector employment; assisting Russia and the Newly Independent States in establishing and enhancing nuclear material export control systems; developing technologies and systems to detect the proliferation of WMD and to monitor and verify existing treaties; working with the Democratic Peoples Republic of Korea (DPRK) to maintain the integrity of long-term storage of the spent fuel canisters at Nyongbyon nuclear site prior to their removal from North Korea; providing technical support for long-term monitoring of Iraqi facilities and other nuclear safeguards and emergency programs of the International Atomic Energy Agency (IAEA); providing unique and in-depth policy and technical expertise as part of the U.S. Government's integrated efforts to ratify and implement a Comprehensive Test Ban Treaty (CTBT); demonstrating the capability to disassemble weapons components pits and converting plutonium into forms suitable for disposition; down blending surplus HEU for peaceful use as commercial reactor fuel; and supporting U.S. Government efforts to negotiate a bilateral plutonium disposition agreement with Russia, including international financing and support to Russian development and implementation of disposition technologies.

Major Change

The Department intends to implement Title 32 of the National Defense Authorization Act for FY 2000, Public Law 106-65, which establishes the National Nuclear Security Administration (NNSA) effective March 1, 2000. The NNSA is being established at a time when DOE is in the midst of major management and security reforms. The implementation plan for the NNSA builds upon these initiatives, and aims to provide clear and direct lines of accountability and responsibility for management and operation the Nations's nuclear nonproliferation activities. The implementation plan provides that the NNSA will have three program offices that report to the Secretary of Energy and the Under Secretary for Nuclear Security. The NNSA will include the following organizations: Deputy Administrator for Defense Programs; Deputy Administrator for Defense Nuclear Nonproliferation; and Deputy Administrator for Naval Reactors.

As a result of the establishment of the NNSA, the Office of the Assistant Secretary for Nonproliferation and National Security will be re-designated as the Deputy Administrator for Defense Nuclear Nonproliferation. In addition, the Office of Fissile Materials Disposition will be incorporated within this Office. The Assistant Deputy Administrator for Fissile Materials also will serve as the Special Secretarial Negotiator for Plutonium Disposition.

The implementation plan provides that, in general, employees currently funded under the Nonproliferation and National Security or the Fissile Materials Disposition program direction accounts will be designated as employees of the NNSA. Their roles and responsibilities will remain essentially unchanged, focusing on the continuing missions of the programs. The Deputy Administrator for Defense Nuclear Nonproliferation will carry out the duties specified in the section 3215(b) of the NNSA Act. Pending confirmation of a Deputy Administrator, the current Assistant Secretary for Nonproliferation and National Security will serve as the Deputy Administrator.

FY 2001 Plans

In FY 2001, the Department will achieve its nonproliferation and national security priorities by: (1) providing materials protection, control and accountability for fissile materials in Russia and the Newly Independent States; (2) working to complete installation of MPC&A upgrades on all Russian Naval fresh fuels by December 2000; (3) cooperating with authorities in the former Soviet Union to redirect scientific intellectual capital through the science and technology centers and the Initiatives for Proliferation Prevention Program; (4) promoting the transition of nuclear weapons workers to non-defense work through the Russian Nuclear Cities Initiative; (5) beginning work on the long-term disposition program of the plutonium bearing spent fuel at the BN-350 Reactor in Kazakhstan; (6) enhancing efforts to prepare for and to respond to potential terrorist use of chemical and biological weapons; (7) concentrating efforts toward limiting the production and use of weapons-usable fissile materials in the civil sector by reducing and eventually eliminating the use of highly enriched uranium and promoting alternatives to the civil use of plutonium and continuing the Reduced Enrichment for Research and Test Reactors (RERTR) Program; (8) providing necessary technology development, analysis, and training as part of the U.S. Government's efforts to complete and implement a CTBT; (9) enabling transparency and irreversibility in the nuclear weapon dismantlement process; (10) strengthening the international nonproliferation regime through measures which include our efforts in North Korea; (11) negotiating an international fissile material cutoff convention; (12) cooperating with and supporting the IAEA safeguards programs, including the facilitation of IAEA inspections in the United States.

During FY 2001, DOE will support the President's initiative on Keeping America Secure for the 21st Century by continuing to fund the development and demonstration of key technologies to improve the U.S. capability to prepare for and respond to domestic terrorism involving chemical and biological agents. In addition, we will initiate construction of the Nonproliferation and International Security Center at Los Alamos National Laboratory, Los Alamos, New Mexico.

In FY 2001, NN will continue to budget for the International Nuclear Safety Program. The Program supports international nuclear safety cooperation, and addresses safety issues associated with nuclear materials facilities in Russia. In addition, the Highly Enriched Uranium Transparency Implementation program will continue to be responsible for ensuring that the nonproliferation aspects of an agreement between the United States and the Russian Federation are met.

In support of all of the Department's nonproliferation capabilities, we will continue to develop technologies and systems for detecting, characterizing, and monitoring proliferant activities worldwide. In particular, we will strive to identify technical breakthroughs to revolutionize proliferation detection capabilities.

The U.S. surplus fissile materials disposition program will continue design of two plutonium disposition facilities: the Pit Disassembly and Conversion Facility and the Mixed Oxide (MOX) Fuel Fabrication Facility, and begin design of the Immobilization and Associated Processing Facility. Efforts also include production-mode testing of the pit disassembly and conversion prototype for disassembling plutonium weapons components and converting the plutonium to stable forms suitable for international inspection and

disposition; tests and demonstrations of non-pit plutonium conversion and first-stage immobilization; and the MOX fuel lead test assembly program. DOE will continue to ship surplus HEU to the United States Enrichment Corporation (USEC) for blend down; implement a detailed interagency agreement with the Tennessee Valley Authority (TVA) which will include construction of capital improvements at the Savannah River Site (SRS) for disposition of 33 metric tons (MT) of off-specification HEU by blend down and irradiation in TVA reactors; and begin preparation for the blend down and sale of 10 MT of HEU currently under IAEA safeguards.

Negotiation of a bilateral agreement with Russia to begin disposition of plutonium in the Russian Federation is expected to be completed in the spring of 2000. DOE will begin facility upgrades for a demonstration-scale plutonium conversion system in Russia; complete final design of lead test assembly manufacturing equipment for the VVER-1000 reactor; initiate detailed research and development for the nuclear fuel and power conversion system for the GT-MHR in Russia; and proceed with facilities in Russia in the initial phase of U.S.-Russia cooperation as defined in the bilateral agreement on plutonium disposition.

Long-Term Nonproliferation Program for Russia

The Nonproliferation Program for Russia is a major new initiative of the Department's nonproliferation and national security mission. This new long-term component is intended to supplement ongoing, quick response programs and initiate more permanent solutions to some of the most serious concerns with the old Soviet nuclear arsenal. It addresses the risks to U.S. national security posed by nuclear materials and the decaying nuclear complex in Russia, by: preventing the spread of nuclear materials, technology, and expertise; reversing the proliferation of nuclear weapons capabilities; reducing stockpiles of weapons usable materials; accelerating the transition of Russian nuclear weapons scientists to peaceful employment on non-weapons work; accelerating closure and reduction of Russian nuclear infrastructure; reducing the proliferation threat posed by current and future reactor designs; and developing an effective emergency response system.

Program objectives for the new initiative are (1) to secure nuclear materials and expertise in Russia; (2) to limit stockpiles of weapons-usable fissile materials; (3) to promote transparent and irreversible nuclear reductions; (4) to strengthen the nuclear nonproliferation regime; and, (5) to promote proliferation resistant civil nuclear technologies.

Rose Gottemoeller
Assistant Secretary
Office of Nonproliferation
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Date

FY 2001 Congressional Budget Request Non-Comparable Table

(dollars in thousands)

	FY 1999 Current Appropriation Other Defense Activities	FY 2000 Current Appropriation Other Defense Activities	FY 2001 Request Other Nuclear Security Activities
Nonproliferation and Verification R&D	204,799	225,044	232,990
Arms Control	256,243	260,948	272,870
Long-Term Russian Program	0	0	100,000
International Nuclear Safety	79,989	15,000	20,000
HEU Transparency Implementation	0	15,690	15,190
Intelligence	35,460	0	0
Emergency Management	21,000	20,925	0
Nuclear Safeguards and Security	55,200	68,854	0
Security Investigations	30,000	32,664	0
Program Direction	93,854	89,000	41,550
Subtotal, Nonproliferation and National Security	776,545	728,125	682,600
Use of Prior Year Balances	-7,970	0	0
Offset to User Organizations	-20,000	-20,000	0
Total, Nonproliferation and National Security	748,575	708,125	682,600
U.S. Fissile Materials Disposition	136,127	132,507	173,517
Russian Plutonium Disposition	227,995	29,945	40,000
Program Direction	4,588	7,343	9,918
Subtotal, Fissile Materials Disposition	368,710	169,795	223,435
Use of Prior Year Balances	-1,469	-49,000[a]	0
Offset of Proposed Supplemental	0	-40,000	0
Add back of Proposed Supplemental	0	40,000	0
Total, Fissile Materials Disposition	367,241	120,795	223,435
Total, Defense Nuclear Nonproliferation	1,115,816	828,920	906,035

FY 2001 Congressional Budget Request Comparable Table

(dollars in thousands)

	FY 1999 Current Appropriation Other Defense Activities	FY 2000 Current Appropriation Other Defense Activities	FY 2001 Request Other Nuclear Security Activities
Nonproliferation and Verification R&D	204,799	225,044	232,990
Arms Control	258,743	263,448	272,870
Long-Term Russian Program	0	0	100,000
International Nuclear Safety	79,989	15,000	20,000
HEU Transparency Implementation	13,580	15,690	15,190
Program Direction	28,060	28,055	41,550
Subtotal, Nonproliferation and National Security	585,171	547,237	682,600
Use of Prior Year Balances	-5,527	0	0
Total, Nonproliferation and National Security	579,644	547,237	682,600
U.S. Fissile Materials Disposition	196,122	194,330	213,517
Russian Plutonium Disposition	200,000	0	0
Program Direction	4,588	7,343	9,918
Subtotal, Fissile Materials Disposition	400,710	201,673	223,435
Use of Prior Year Balances	-1,469	-49,000 [a]	0
Offset of Proposed Supplemental	0	-40,000	0
Add back of Proposed Supplemental	0	40,000	0
Total, Fissile Materials Disposition	399,241	152,673	223,435
Total, Defense Nuclear Nonproliferation	978,885	699,910	906,035

[a]Congress provided $200M in a FY 1999 emergency supplemental appropriation for Russian plutonium disposition. $49M is being used as a FY 2000 offset for use of prior year balances. The FY 2001 budget requests an advance appropriation of $49M to become available in FY 2004. The FY 2000 supplemental request also defers the use of $40M of the Russian plutonium disposition funds until FY 2003. This would restore funding for Russian plutonium disposition to $200M.

Nonproliferation and Verification Research and Development

Program Mission

The Department of Energy's (DOE) Nonproliferation and Verification Research and Development (R&D) program conducts applied research, development, testing, and evaluation of science and technology for strengthening the U.S. response to National Security threats and threats to world peace posed by the proliferation of nuclear, chemical, and biological weapons and diversion of special nuclear material. Activities are focused on the development, design, prototype construction and production of operational sensor systems needed for proliferation detection, proliferation deterrence, nuclear explosion monitoring, and chemical and biological nonproliferation.

The DOE will continue to leverage its considerable nuclear nonproliferation R&D base to address important objectives including: ground-based and satellite-based nuclear explosion monitoring instrumentation, nuclear warhead dismantlement initiatives; countering nuclear smuggling and terrorism; applying DOE's resident chemical and biological science expertise to support U.S. preparation for and response to the use of chemical and biological agents; and supporting law enforcement agencies. All activities also support the timely transfer of tested prototype systems to other U.S. Government agency users. The program continues to support commercialization of technologies and contributes to the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs.

In FY 2000, the DOE will initiate a process of free and open competition for twenty five percent of the Nonproliferation and Verification R&D program. The first step in FY 2000 will be to participate in a joint, collaborative open solicitation with the Defense Threat Reduction Agency for nuclear explosion monitoring R&D. In addition, an independent review of the R&D program by outside experts is underway. This group, the Nonproliferation and National Security Advisory Committee, established in accordance with Section 9 of the Federal Advisory Act, P.L., No. 92-463, and Executive Order 12838, has been tasked to provide recommendations regarding competition. DOE is committed to continue to work toward reaching the twenty-five percent competition goal, and will use the advisory committee's recommendations to help identify specific focus areas for competition in FY 2001 and beyond.

Program Goal

The program goal is to enhance U.S. National Security through needs-driven R&D. The emphasis is on developing the requisite technologies to detect and deter nuclear proliferation, to meet U.S. nuclear explosion monitoring goals, and to develop and demonstrate chemical and biological detection and related technologies to enable us to better prepare for and respond to chemical and biological attacks.

Program Objectives

- Develop and demonstrate technologies needed to remotely detect the early stages of a proliferant nation's nuclear weapons program.

- Develop, demonstrate, and deliver technologies to locate, identify, and characterize nuclear explosions underground, underwater, in the atmosphere, and in space. Delivery of these R&D products will enhance the U.S. nuclear explosion monitoring capability.
- Produce operational satellite-based nuclear explosion monitoring sensor systems.
- Develop and demonstrate technologies for nuclear materials protection, control, and accounting; nuclear warhead dismantlement monitoring; counter nuclear smuggling; and enhancing law enforcement forensics.
- Develop, demonstrate, and deliver in partnership with the Department of Defense and other agencies, technologies and systems that dramatically improve our ability to detect the proliferation or use of chemical and biological agents, and to minimize the consequences of potential use of chemical or biological agents.
- Transition developed technologies to other agencies.

Performance Measures

Proliferation Detection

- Demonstrate and evaluate the proliferation detection capabilities of the multispectral thermal imager small satellite. Continue collaborative efforts with other Government organizations to demonstrate enhanced multispectral imaging technology for National Security and civil applications.
- Complete feasibility assessments and detailed research and development program plans for development of a 10 to 100 fold increase in some detection capabilities.
- Complete the construction and perform the first flight demonstration of a prototype airborne lidar system on board an unmanned aerial vehicle.

Nuclear Explosion Monitoring

- Produce and deliver three Global Positioning System (GPS) satellite nuclear explosion detection sensor systems per year to provide uninterrupted capability for continuous worldwide monitoring for nuclear explosions occurring in the atmosphere or in space.
- Deliver to the U.S. National Data Center Release 5 of an operational knowledge base that can be accessed by automated processing systems and human analysts to improve ground-based nuclear explosion monitoring and verification confidence.

Deterring Proliferation

- Demonstrate new techniques for detection of chemical and nuclear signatures associated with proliferation activities.
- Develop improved analytical laboratory and field methods to aid law enforcement forensic investigations. Continue cooperative efforts with the Federal Bureau of Investigation (FBI), Bureau of Alcohol, Tobacco, and Firearms (ATF), National Institute of Justice (NIJ), and others.

Develop technology to confirm and monitor the non-reversible dismantlement of nuclear weapons and removal of special nuclear materials from nuclear weapons cycle while protecting sensitive weapon design information.

Chemical and Biological Nonproliferation

In the mid-to long term, performance will be measured by the extent to which DOE-developed technologies and systems are integrated into operational use to prepare for and respond to chemical and biological attacks. Specific goals in FY 2001 include the demonstration of systems to protect key infrastructure and special events from chemical and biological attacks, and the demonstration of new chemical and biological detectors.

Significant Accomplishments and Program Shifts

Proliferation Detection

Effluent sensing activities will evolve to focus on a joint program to develop a hybrid sensor system for demonstration onboard an aircraft. This system will demonstrate capabilities for both nonproliferation and counterproliferation missions. This joint program will leverage significant investments at both partners to provide maximum benefit to the nation.

Data analyzed from the orbiting DOE multispectral thermal imager small research satellite (launched in FY 2000) will be used to demonstrate and evaluate space-based multispectral and thermal imaging technology for nonproliferation, treaty monitoring, and other National Security and civilian applications.

Develop Synthetic Aperture Radar (SAR) algorithms for proliferation detection and treaty monitoring purposes, and provide other USG organizations with algorithms for their use.

Nuclear Explosion Monitoring

For the program providing nuclear explosion monitoring sensors for the Air Force Global Positioning System (GPS) satellite constellation, the focus will continue to shift from the cold war mission to the emerging nuclear test threats from threshold states. Working closely with the U.S. Air Force, a replenishment plan will be implemented to ensure future GPS payloads address the changing focus.

Research and engineering work to detect and analyze underground, underwater, atmospheric, and space nuclear detonations will result in the delivery of integrated analysis software products to the U.S. National Data Center as well as providing support for commercialization of previously provided radionuclide and infrasound prototype detection systems. The program focus is shifting toward integration of information useful for calibration of monitoring stations and associated monitoring equipment and data analysis tools. Integration of developed products into the monitoring system of the national monitoring organization will be sharpened as operational experience with monitoring system stations and communications systems is gained.

Deterring Proliferation

Develop analytical methods to enhance in-laboratory capabilities to deter nuclear proliferation and to support forensic investigations by domestic and international law enforcement agencies.

Conduct a comprehensive research and development program for detection and analytical technologies which integrate arms control, counter proliferation, and counter terrorism objectives in order to prevent nuclear smuggling and terrorism.

Chemical and Biological Nonproliferation

Within the Chemical and Biological Nonproliferation Program (CBNP), advances continue to occur in a number of areas. In the detection initiative, key miniaturized components have now been integrated into a "chip" format. This has enabled the delivery of the hand-held chemical and biological toxin detector prototype due in mid FY 2000. In the biological area, advances continue to improve our ability to detect engineered pathogens and to identify the geographical origin of a biological agent. These and related results have demonstrated key underlying principles that will allow us to aggressively push forward in FY 2001 to develop 2nd generation systems that are fully tested and field-ready.

The slight increase in funding will allow the development and demonstration of much-needed technologies to respond to the domestic threat posed by chemical and biological weapons.

Nonproliferation and International Security Center

Construction will start on the Nonproliferation and International Security Center (NISC). It will house approximately 465 people in a 164,000 square foot area at the Los Alamos National Laboratory. The facility will contain laboratories for physics, electronics, and instrumentation development along with technical work spaces and administrative functions. The NISC will also include areas for program management, safeguard assessments, and intelligence activities.

Funding Profile

(dollars in thousands)

	FY 1999 [a] Current Appropriation	FY 2000 [a] Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 [b] Request
Nonproliferation and Verification R&D					
Proliferation Detection	67,416	67,500	-1,606	65,984	67,500
Nuclear Explosion Monitoring	77,363	73,500	-250	73,250	73,500
Deterring Proliferation	41,523	42,683	-2,735	39,848	42,852
Chemical and Biological Nonproliferation	18,497	31,417	8,635 [c]	40,052	42,138
Subtotal, Nonproliferation and Verification R&D	204,799	215,000	+4,044	219,044	225,990
Construction	0	6,000	0	6,000	7,000
Subtotal, Nonproliferation and Verification R&D	204,799	221,000	+4,044	225,044	232,990
Use of Prior-Year Balances	-1,873	0	0	0	0
General Reductions	0	-5,146 [d]	+5,146	0	0
Total, Nonproliferation and Verification R&D	202,926	215,854	+9,190 [e]	225,044	232,990

Public Law Authorization:

Public Law 95-91, “Department of Energy Organization Act”

Public Law 106-65, “National Defense Authorization Act FY 2000"

[a] Amounts appropriated in these columns were appropriated under “Other Defense Activities”

[b] Amounts reflected in this column are required under “Other Nuclear Security Activities”

[c] In FY 2000, $10 million was transferred from Arms Control to Nonproliferation and Verification R&D to correctly align appropriations conference language and base table

[d] Share of EWD Reduction for Contractor Travel ($687k) and Directed Savings ($4,459k)

[e] Government-wide rescission of .38% ($810k)

Funding by Site

(dollars in thousands)

	FY 1999 [a]	FY 2000 [a]	FY 2001 [b]	$ Change	% Change
Albuquerque Operations Office					
Albuquerque Operations Office	3,363	1,000	1,000	0	0%
Los Alamos National Laboratory	57,418	63,805	67,238	3,433	5.4%
Sandia National Laboratory	69,375	72,313	74,570	2,257	3.1%
Total, Albuquerque Operations Office	130,156	137,118	142,808	5,690	4.2%
Chicago Operations Office					
Chicago Operations Office	0	509	509	0	0%
Ames Laboratory	570	545	545	0	0%
Argonne National Laboratory	1,975	3,015	3,015	0	0%
Brookhaven National Laboratory	980	990	990	0	0%
Environmental Measurements Laboratory	385	150	150	0	0%
Total, Chicago Operations Office	3,910	5,209	5,209	0	0%
Idaho Operations Office					
Idaho National Eng. & Env. Laboratory	2,185	1,423	1,423	0	0%
Nevada Operations Office					
Nevada Operations Office	465	0	0	0	0%
Bechtel Nevada	2,515	1,490	1,490	0	0%
Remote Sensing Laboratory	0	400	400	0	0%
Special Technologies Laboratory	0	290	290	0	0%
Total, Nevada Operations Office	2,980	2,180	2,180	0	0%
Oakland Operations Office					
Oakland Operations Office	0	880	880	0	0%
Lawrence Berkeley National Laboratory	1,110	1,872	1,872	0	0%
Lawrence Livermore National Laboratory	38,548	42,681	44,937	2,256	5.3%
Total, Oakland Operations Office	39,658	45,433	47,689	2,256	5.3%
Oak Ridge Operations Office					
Oak Ridge Y-12 Plant	6,479	6,986	6,986	0	0%
ORISE(Oak Ridge Institute for Science & Education	0	115	115	0	0%
Total, Oak Ridge Operations Office	6,479	7,101	7,101	0	0%
Richland Operations Office					
Pacific Northwest Laboratory	16,651	18,083	18,083	0	0%
Savannah River Operations Office					
Savannah River Technology Center	2,445	2,157	2,157	0	0%

[a] Amounts appropriated in these columns were appropriated under “Other Defense Activities:

[b] Amounts reflected in this column are requested under “Other Nuclear Security Activities”

(dollars in thousands)

Washington Headquarters	335	6,340	6,340	0	0%
	FY 1999 [a]	FY 2000 [a]	FY 2001 [b]	$ Change	% Change
Subtotal, Nonproliferation and Verification R&D	204,799	225,044	232,990	7,946	3.5%
Use of prior-year balances	-1,873	0	0	0	0%
Total, Nonproliferation and Verification R&D	202,926	225,044	232,990	7,946	3.5%

[a] Amounts appropriated in these columns were appropriated under “Other Defense Activities”

[b] Amounts reflected in this column are requested under “Other Nuclear Security Activities”

Site Description

Ames Laboratory

Ames Laboratory will develop standard methods for state-of-the-art commercial systems to enable U.S. forensics laboratories to attribute future terrorism associated with WMD. These research results will be transferred to local U.S. Law Enforcement agencies to improve investigations and for mitigation of the consequences of nuclear material release during foreign testing, terrorism or accidents.

Argonne National Laboratory

Argonne National Laboratory will conduct research on deployable arms control technology which can be used to analyze signatures from the production or reprocessing of nuclear weapon material, participate as a member of the Radiation Detection Panel, provide technical advisor services on nuclear systems for treaty monitoring, and develop nuclear material measurement techniques which can be used during investigations and for mitigation of the consequences of nuclear material release during foreign testing, terrorism or accidents. Argonne also plays a key role in the development and implementation of modeling and simulation capabilities to predict the dispersal of chemical and biological agents in subway systems.

Brookhaven National Laboratory

Brookhaven National Laboratory will develop stand-off detection and analysis technologies for arms control, nonproliferation and counter terrorism applications.

Environmental Measurements Laboratory

The Environmental Measurements Laboratory (EML) will provide advisory and quality assurance services to the radionuclide subsystem being installed internationally by the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty (CTBT). EML has been designated to replace the McClellan AFB radionuclide laboratory specified in the treaty since McClellan AFB has been closed.

Idaho National Engineering and Environmental Laboratory

The Idaho National Engineering and Environmental Laboratory (INEEL) will participate as a member of the Radiation Detection Panel and will develop detection technologies for arms control applications using accelerator systems. INEEL is a member of an interlaboratory group to develop technologies to counter terrorism and search/locate Highly Enriched Uranium. Additionally, INEEL will develop modeling capabilities for the design and test of specific advanced materials.

Lawrence Berkeley National Laboratory

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

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) will develop specific geographical regional models to improve U.S. technical capability and confidence to locate and identify seismic events to support nuclear explosion monitoring assessments, gamma ray imaging technology for arms control applications, advanced technologies to search and locate special nuclear material used in a threatening manner, analytical methods to use the investment of "smart highway systems" to detect WMD during crisis situations and consequence management, and forensics methods for law enforcement which will improve the U.S. capability to investigate the threat of WMD. LLNL will conduct research in the areas of STET and passive hyperspectral remote detection, including hardware and software (algorithm) development and field testing systems onboard aircraft. LLNL personnel will provide planning for experiments conducted at the effluent release facility at the Nevada Test Site which is used to test all detection sensors. LLNL will have a key role in the development of CBW transport modeling capabilities for prediction in urban areas and supports our development of DNA diagnostics for forensic analysis. LLNL will conduct research in the areas of miniaturized chemical detectors by using advanced micromachining techniques, novel biochemical transducer mechanisms, and by developing more efficient multi-sensor data processing algorithms.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) will provide the U.S. National Data Center with improved analytic tools and sensors for discriminating small earthquakes and industrial activities from banned nuclear explosions. LANL will continue to develop the next generation electromagnetic pulse sensor and radiation sensor systems for satellite-based systems. The laboratory will investigate remote unattended methods to monitor SNM in long-term storage for arms control and domestic safeguards, including unmanned systems which can strengthen internal safeguards by monitoring fissile materials in support of future arms control negotiations (e.g. START III) and other international safeguards initiatives. LANL will provide analysis of neural network applications to supply low cost and simple detection technology for treaty monitoring, regional and bilateral conflict resolution and advanced concepts for counter terrorism response. 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. LANL has an important role in the development of a biological detection and early warning system. The world radiometric calibration facility and expertise developed at LANL , as part of the multispectral thermal imaging small satellite, will be used in ongoing data analysis from the satellite which is now in orbit as well as in other spectral programs.

Nevada Operations Office

The Nevada Operations Office will support experimental field tests at the HAZMAT Spill Center, a facility managed by the Nevada Operations Office and located at the Nevada Test Site. The HAZMAT Spill Center will be used because it is a unique, one-of-a-kind facility, built to conduct testing using hazardous materials under controlled conditions.

Oak Ridge Y-12 Plant

The Oak Ridge Y-12 Plant will support the development of sampling technology and measurement protocols to improve the application of non-nuclear monitoring technology to detect and track nuclear materials production. To support this nonproliferation mission, Y-12 collaborates with Oak Ridge National Laboratory (ORNL) to develop concepts and prototype advanced monitoring tools for analytical systems to be used by DoD special operations and U.S. domestic Law Enforcement. ORNL will conduct research to support cooperative monitoring requirements for bilateral nonproliferation and arms control initiatives with Russia. ORNL will provide leading-edge research into candidate materials which could replace exiting nuclear detectors used for gamma spectroscopy and neutron detection. ORNL will continue investigation of small portable mass spectroscopy units and the application of micro-fluidics systems for "lab-on-a-chip" concepts. ORNL will continue development of an advanced mass spectrometer for real-time detection and identification of biological pathogens. ORNL will investigate new sensor concepts using microcalorimetry and bio-chemo-optomechanical techniques.

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 and National Security applications. The laboratory will support efforts to detect and characterize signatures from nuclear explosion monitoring systems. The laboratory will be a strong participant in the development of advanced forensics methods that are necessary to address WMD contaminated evidence analysis by Law Enforcement. 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 heterodyne technique to increase the detection sensitivity of laser chemical-detection systems and algorithms for processing hyperspectral, ultraspectral and laser data for chemical detection, identification, and quantification.

Remote Sensing 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. RSL is also developing new, highly sensitive chemical sensor using coated optical waveguides for field analysis of chemical, nuclear, and biological weapon signatures.

Sandia National Laboratories

The Sandia National Laboratories (SNL) will develop, demonstrate, and validate improvements to existing and planned information system technologies to provide capabilities for highly automated, high confidence data processing and analysis in support of nuclear explosion monitoring. SNL will support the U.S. program to detect nuclear detonations from satellites by providing systems engineering, the optical sensors and the on-orbit processing and power conditioning technologies. In partnership with U.S. Law Enforcement, the laboratory will develop nuclear detection systems to interdict smuggled nuclear materials in transit across U.S. borders. SNL will participate in a multilaboratory effort to develop CZT as a room temperature spectrometer and in a consortium of national labs and academic institutions to develop micro-technologies for detection and analysis of chemicals. SNL will continue development of advanced Synthetic Aperture Radars and analysis methods for mapping, and the detection of proliferation events. SNL will continue development of an ultraviolet system for remote detection of effluents. SNL will continue operation of the multispectral thermal imager satellite. SNL will continue developing a "chemistry laboratory on a chip," a technology that will bring the power of an analytical laboratory down to a hand-held format. In addition, SNL will continue development of environmentally friendly CBW decontamination foams.

Savannah River Technology Center

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

Washington Headquarters

DOE Headquarters staff coordinate Office of Nonproliferation Research and Engineering projects with other government agencies and transfers funding as required to the SBIR and STTR programs. In addition, DOE Headquarters manages funding transfers to other government agencies such as the Departments of the Navy, Air Force, and the Health and Human Services to provide their expertise to the Office of Nonproliferation Research & Engineering.

Proliferation Detection

Mission Supporting Goals and Objectives

The Proliferation Detection mission is to develop and demonstrate innovative proliferation detection technologies, and advanced data analysis.

The multilaboratory and joint interagency projects within this activity area are comprised of comprehensive, end-to-end research and development efforts that:

- Examine the nature of proliferation targets to determine remotely observable signatures.
- Conduct phenomena modeling to understand the environment's effects on observables and how these effects can be taken into account.
- Develop sensor systems to remotely detect and measure the signature.
- Develop techniques to interpret the data and produce meaningful information.
- Develop interagency technology partnerships to transfer successful technology to users.

These activities are closely coordinated with other Government agencies and, continuing in FY 2001, the methodology and experience that have resulted in significant advances in the nuclear proliferation detection mission area, are applied to the chemical and biological weapons proliferation arena. Many of the sensor systems and base technology designed to detect chemical signatures from nuclear weapons activities can be used to detect chemical signatures from chemical and potentially biological weapons activities.

The largest proliferation detection technology thrust continues to be a coordinated effort aimed at detecting and understanding effluents. This program follows the end-to-end methodology outlined above that includes efforts to understand and quantify the source term, the effects of the environment on the possible observables, development of sensor concepts to detect and measure these observables, field tests, demonstrations, and development of exploitation tools to interpret the data.

FY 2001 will see the continued consolidation of active detection techniques and passive imaging detection techniques into a hybridized system that combines the best attributes of both technologies. This consolidation is not simply the systemization of methods and techniques developed previously, as it requires continued technical innovation. However, past development and field-tests have provided sufficient demonstrations of the utility and promise of these techniques to justify a programmatic shift towards prototype development.

Even while prototype hardware development is taking place, exploring advanced detection concepts will continue to ensure future capability. Additionally, establishment of library spectra of chemical signatures and development of algorithms and software tools to exploit the voluminous data from the test and prototype systems will continue as this will be necessary for other government agencies to effectively utilize the sensor system.

In parallel with (and building upon) the efforts to develop next generation hybridized systems, this program will continue to develop algorithms and software tools to exploit passive spectral data. This effort supports near-term goals yet complements long-term mission needs.

Other significant technology thrusts for proliferation detection include multispectral thermal imaging, synthetic aperture radar (SAR) imaging, and other non-chemical techniques. Work will continue in these areas but with a greater emphasis on new techniques and proliferation observables.

FY 2001 will see a decrease in funds applied to multispectral thermal imaging because the large costs associated with the development and launch of a small technology demonstration satellite have been successfully completed. Remaining funding for this area will be used to operate and perform scientific experimentation utilizing the satellite's instruments. The satellite is expected to remain a viable tool for technology demonstration through FY 2002. Prior to the satellite's launch, an interagency users group was formed to ensure other agencies of the Government could make use of this satellite for appropriate civil, environment, and defense research. A significant number of these collaborations are underway and will continue in FY 2001 and FY 2002.

In FY 2001 there will be an increase in funds applied to synthetic aperture radar (SAR) imaging and other non-chemical techniques for detecting proliferation. Additionally, it is recognized that many of these new techniques require closer collaboration between the technologists who develop new technologies and end users who must draw conclusions from these technologies. Thus, beginning in FY 2001, additional effort will be placed on improving the access of technology end-users to the technology developers for the purpose of better utilization of advanced detection techniques. A great wealth of specialized knowledge applicable to end-user problems has accumulated in the DOE laboratories as a result of past sensor development programs. A "virtual center" will be established to facilitate collaboration and more direct application of this specialized knowledge to the needs of appropriate end-users.

Performance Measures

Remote Effluent Detection

- # Jointly with the DoD partner, complete the evaluation of candidate technologies and decide on the conceptual design of a future joint airborne demonstration of hybrid effluent detection sensor system.
- # Continue the development of analyst tools to fully exploit hyperspectral imaging for effluent detection.
- # Complete the construction and perform the first flight demonstration of a prototype airborne lidar system on board an unmanned aerial vehicle.

Remote Physical Detection and Enabling Technologies

- # Demonstrate and evaluate the proliferation detection capabilities of the multispectral thermal imaging small satellite. Continue collaborative efforts with other Government organizations to demonstrate enhanced multispectral imaging technology for National Security and civil applications.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Remote Effluent Detection	38,137	40,700	41,700	1,000	2.5%
Remote Physical Detection and Enabling Technologies	29,279	25,194	25,800	606	2.4%
Total, Proliferation Detection	67,416	65,894	67,500	1,606	2.4%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Remote Effluent Detection			
# Complete and conduct first flight of a prototype unmanned aerial vehicle based lidar system. Complete a detailed systematic trade study with a DoD partner that will culminate in a conceptual design of a hybrid sensor prototype for eventual completion and demonstration in FY 2005.	25,782	22,720	23,720
# Continued emphasis will be placed on hyperspectral imaging technology. This area will work extensively with data taken by a demonstration airborne system and will develop new analysis techniques that will fully utilize the information available in a spectral image. Key enabling technologies will be identified and further developed, and the spectral signatures library necessary to support data analysis will be further developed.	12,355	17,980	17,980
Remote Physical Detection and Enabling Technologies			
# The multispectral thermal imager small satellite will be used to demonstrate nonproliferation remote sensing technology. Satellite sensor data will be analyzed by numerous organizations throughout the Government and academia	17,324	13,100	7,250
# Develop innovative algorithms to enable real-time processing of voluminous quantities of remote sensing (radar, passive/active optical and radio-frequency) data into the information required by decision makers and explore novel detector concepts at the laboratory bench level.	11,955	12,094	18,550
Total, Proliferation Detection	67,416	65,894	67,500

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2000 vs. FY 2001 ($000)
# The increase in remote effluent detection is due to a shift towards detailed design after completion of the new sensor trade study	+1,000
# Multispectral thermal imager program funding decreases as the program shifts from final assembly and launch of the technology demonstration satellite to on-orbit operations, field validation measurements, and data analysis after the system's launch in FY 2000.	-5,850
# Increase emphasis on understanding signatures and detector physics associated with new proliferation measurement concepts, and closer collaboration with technology end users..	+6,456
Total Funding Change, Proliferation Detection	1,606

Nuclear Explosion Monitoring

Mission Supporting Goals and Objectives

Develop and demonstrate technologies for monitoring explosive testing of nuclear devices. Develop and field sensors and algorithms to detect, locate, identify, and characterize nuclear explosions which occur in the atmosphere, in space, underground, and underwater. Address national requirements and provide operational support for U.S. national monitoring capabilities.

The Nuclear Explosion Monitoring Research and Engineering (NR&E) program is one of the DOE's longest standing nonproliferation initiatives. The concept of a U.S. national capability using satellite-borne nuclear explosion surveillance came about during interagency discussions from 1959 to 1962, leading to deployment of the original satellite-based nuclear explosion detection sensors. During the 40 years of this program, more than 100 DOE satellite payloads have been launched, using U.S. Air Force and National Aeronautics and Space Administration boosters. The national need for worldwide cognizance of nuclear explosions is as important as ever in this time of high nuclear proliferation concern.

Building on the delivery of radionuclide and infrasound prototypes to the U.S. National Data Center for commercialization, the DOE program is focusing on integration of information such as calibration data for seismic, radionuclide, hydroacoustic and infrasound stations, as well as other R&E products which enable nuclear explosion monitoring agencies to perform their operational mission. This research and development program addresses U.S. national monitoring requirements and is driven by U. S. national monitoring goals.

Performance Measures

Satellite-Based Systems

- Produce, deliver, and operationally support three Global Positioning System (GPS) satellite nuclear explosion detection flight systems per year, to maintain continuous, worldwide, monitoring capability as on-orbit GPS satellites age and are replaced.
- Develop and demonstrate the next generation of satellite-based optical, electromagnetic pulse, and radiation sensor systems to detect nuclear explosions in Earth's atmosphere and in space.

Ground-Based Systems

- Characterize explosion-like signals from natural and industrial sources, to increase the reliability of analyses to distinguish natural events and industrial activity from nuclear explosions.
- Transfer enhanced regional data evaluation and explosion identification capabilities including calibration data to the U.S. National Data Center (NDC).
- Provide the U.S. NDC, and as appropriate other national organizations, with operational support for seismic, radionuclide, hydroacoustic, and infrasound sensor systems to enable them to perform the nuclear explosion monitoring mission and to make verification assessments.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Satellite-Based Systems	49,940	49,940	49,940	0	0%
Ground-Based Systems	27,423	23,310	23,560	250	1.1%
Total, Nuclear Explosion Monitoring,	77,363	73,250	73,500	250	1.1%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Satellite-Based Systems			
# This program provides satellite sensors for detecting, identifying, locating, and technically characterizing nuclear explosions in the Earth's atmosphere and in near-Earth space. Treaty monitoring, proliferation detection, and military goals are supported. Specific activities include flight instrumentation design, fabrication, and testing. The equipment is used on U.S. Air Force Global Positioning System (GPS) and Defense Support Program (DSP) satellites under the auspices of the Air Force Space and Missile Systems Center and the Air Force Space Command. 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.	49,940	49,940	49,940
Ground-Based Systems			
# Transfer, in systematic automated data processing software releases, enhanced regional data evaluation and explosion identification capabilities, including calibration data to the U.S. National Data Center (NDC) at the Air Force Technical Application Center. Provide the NDC with operational support for its seismic, radionuclide, hydroacoustic, and infrasound sensor systems to enable the NDC to perform its nuclear explosion monitoring mission.	27,423	23,310	23,560
Total, Nuclear Explosion Monitoring	77,363	73,250	73,500

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2000 vs. FY 2001 ($000)
# Restores funds cut as a result of FY 2000 general reductions. Previously planned regional calibration activities will be conducted to continue to enhance the knowledge for the National Data Center.	250
Total Funding Change, Nuclear Explosion Monitoring	250

Deterring Proliferation

Mission Supporting Goals and Objectives

The technology development activities supported under this area are broadly aimed at the development of enabling technologies to inhibit nuclear materials diversion in nonproliferation, arms reduction, and counter terrorism applications.

Specific projects focus on the development of improved radiation detection technologies, on advanced field and laboratory nuclear materials analysis methods, and micro technologies for detection and analysis. In FY 2001, the nuclear R&D activities will focus on the development of technologies to counter nuclear smuggling and terrorism threats. Developed systems will enhance the U.S. capability to: conduct wide area searches, remotely monitor the storage of nuclear material placed under safeguards or under bilateral agreements with Russia, develop analysis tools to detect proliferation activities associated with WMD production, and develop a new generation of cost-effective detection systems based on micro technologies. The partnership with U.S. law enforcement agencies will enable DOE to share developed field detection and laboratory analysis systems.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Radiation Detection	15,805	14,975	14,975	0	0%
Nuclear Material Analysis	12,763	8,780	11,600	2,820	0%
Micro Technologies	12,955	11,500	11,500	0	0%
SBIR/STTR	0	4,593	4,777	184	0%
Total, Deterring Proliferation	41,523	39,848	42,852	3,004	0%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Deterring Proliferation			
# Radiation Detection: Develop innovative concepts to increase sensitivity, resolution, range, fieldability, and simplify system operations and interpretation of data. Develop, integrate, and demonstrate high resolution radiation detection systems which operate at room temperature or with compact coolers, systems with the capability to detect special nuclear material at long ranges, and detectors with novel hardware and software information barriers to protect sensitive weapons information for systems used with international organizations or for treaties and international agreements. Develop and maintain the technology base for key radiation detection and characterization technologies and systems which underpin U.S. national security capabilities in the areas of safeguarding nuclear material, combating terrorism, nonproliferation, and arms control.	15,805	14,975	14,975
# Nuclear Materials Analysis: Develop advanced field and laboratory capabilities for the detection and analysis of proliferation-related activities primarily in support of the arms control, law enforcement and other communities. Develop automated gaseous and particulate collection systems and integrate with automated in-field analysis capability for possible remote, unattended operation. Develop novel approaches to enhance the capability of new sensor systems to discriminate between proliferation chemicals of interest and "normal" background. Develop innovative ways to increase sample throughput, reduce analysis time and decrease the per sample cost for laboratory analysis.	12,763	8,780	11,600
# Micro Technologies: Develop micro technologies which will enable the miniaturization of detection and analysis systems that can be readily deployed with a human operator or can be operated remotely and/or unattended in support of law enforcement and arms control missions. Develop and demonstrate prototype miniature chemical sensors, arrays of micro-sensors, and "smart" networks which will reduce false alarms and enhance the probability of detecting activities of concern.	12,955	11,500	11,500

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
# SBIR/STTR: Funding for the SBIR and STTR program is 2.65% of the total extramural R&E conducted by the Office of Nonproliferation Research & Engineering, but is contained in the Deterring Proliferation subprogram.	0	4,593	4,777
Total, Deterring Proliferation	41,523	39,848	42,852

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
# Restores funding cut as a result of FY2000 general reduction. Previously planned sensor system and laboratory analysis instruments will be developed and transitioned to arms control and law enforcement.	2,820
# SBIR/STTR increase reflects the increase in overall Nonproliferation and Verification R&D Program.	184
Total, Deterring Proliferation	3,004

Chemical and Biological Nonproliferation

Mission Supporting Goals and Objectives

The mission of the Department of Energy's Chemical and Biological Nonproliferation Program (CBNP) is to develop, demonstrate and deliver technologies and systems that will lead to major improvements in the U.S. capability to prepare for and respond to chemical or biological attacks

Program Objectives

The specific objectives of the CBNP are:

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

DOE Role and Interagency Context.

The DOE has taken on the challenge of responding to the threat of chemical and biological attacks because of: (1) the urgency of addressing this threat, and (2) the vast capabilities resident at the DOE national laboratories.

The Department and its National Laboratories have a long history in nonproliferation and national security. In addition, the Laboratories have extensive expertise in the chemical and biological sciences as a result of major investments in programs such as the Human Genome Project and the new Microbial Genome Project, as well as programs supporting the Department's nuclear mission. This expertise, and related capabilities in microfabrication, computer modeling, decontamination technologies, and system integration form the basis for DOE's role in addressing chemical and biological weapon threats. In addition to technological expertise, the Department has long been responsible for protecting its sites from terrorist attacks of all kinds.

Other important Federal activities in the Departments of Defense, Justice, and Health and Human Services, and other agencies are focused on improving our preparation and response to the potential use of chemical or biological agents. The DOE CBNP is designed to complement these and other programs while

relying on the unique capabilities of the DOE laboratories. To avoid duplication of effort, the CBNP interacts with related efforts by a number of formal and informal coordination mechanisms.

The CBNP is differentiated from the related efforts in the following ways:

- The CBNP seeks to provide major capability advances in the 3 – 5 year time frame.
- The CBNP focuses on the development of robust capabilities in a systems context specifically targeted at the domestic threat.

CBNP Content and Structure, and Processes

Critical shortfalls exist in our ability to prepare for, detect, and respond to a chemical or biological attack. The DOE CBNP is primarily focused on the development of systems for detection, identification, and warning due to the central role of these functions in an overall response system. The program has adopted both short-term and long-term approaches in carrying out its mission. The short-term effort is built around **Domestic Demonstration and Applications Programs,** featuring technology currently or soon to be available. Longer-term R&D leading to enhanced capability is undertaken within the **Technology Development Initiatives**.

Within each of the Technology Development Initiatives described below, the actual projects and the performing organizations are selected with a **peer review process**. In late FY 1999, the program was completely reviewed by a group of experts from outside of DOE. Based on this review, modifications were made to maintain the highest possible technical quality of this mission-focused program.

The demonstration programs will be periodically reviewed to evaluate conceptual designs and operational requirements and to assess progress toward fielding the prototype systems.

Domestic Demonstration and Applications Programs (DDAPs). These programs address specific applications and involve close interaction with Federal and local planners and responders. The goal of these programs is to demonstrate a complete system, integrating technologies developed by DOE as well others, and in turn provide guidance to the R&D efforts. Development of system architectures is central to the DDAPs concept; architectures consider the role of infrastructure, operations and technology in responding to the threat, and guide the integration of multiple technologies into an overall system. Two DDAPs, both emphasizing detection, identification, and early warning, are currently underway. An additional DDAP will enter the planning phase in FY 2001.

- **PROTECT- Program for Response Options and Technology Enhancements for Chem/Bio Terrorism.** The objective of this civilian infrastructure protection DDAPs is the fielding of technologies and analysis tools to support protection of “at risk” facilities. A pilot study focuses on the subway system of a major metropolitan area. Current assessments reveal that the nation’s subway systems are not prepared to detect or respond to chemical and biological threats. Analysis and modeling are being used to support sensor development and integration, data management, and development of associated operational response concepts. Based on current planning, an integrated sensor network will be installed in FY 2001 - 2002 at five stations in the pilot subway system. The sensor network will be linked with interior modeling and prediction codes to support crisis and consequence management response options. Lessons learned from this project will be utilized to adapt and install operational integrated sensor networks in other subway systems, as well as key facilities such as airports, arenas and high-rise buildings.

- **BASIS-Biological Aerosol Sentry and Information System** The objective of this biological sentry and crisis management DDAPs is to produce a portable system for protecting special events or for deployment to a major city during high alert conditions. Currently, state and local authorities have no means for detecting biological agents and predicting the evolving hazard zone. This effort includes systems architecture development, sensor development and integration, modeling support, and demonstration and testing activities. In FY 2001, a deployable bio-sensor network will be demonstrated, along with supporting urban hazard assessment models that receive and process sensor inputs, and the integrated planning tools, databases, and communications resources necessary to support crisis and consequence management operations. Pending a successful demonstration in FY 2001, this system will be deployed in support of a major special event in FY 2002.

Technology Development Initiatives. These research and development activities develop high-payoff enabling technologies suitable for initial use in 3-5 years. Currently, development is underway in four areas, detection, modeling and prediction, decontamination, and biological foundations. The main emphasis is on biological detection and the underpinning research performed in the biological foundations area.

Chemical and Biological Detection.

Goal. The goal of this initiative is to develop a suite of detection systems that will significantly improve chemical and biological detection capabilities in urban environments for Federal, state and local responders. Implicit in this goal is the recognition that there is no "silver bullet" to solve this problem and that detection systems must be capable of detecting the many chemicals and biological species that might be used in a terrorist attack.

R&D Initiative. This work builds upon DOE advances in laser technology, capabilities in micro-fabrication, and work in the development of DNA-based diagnostics. Key efforts include the development of an autonomous biological agent detector, a hand-held chemical agent and biotoxin detector, and an improved mass spectrometer. The techniques differ in their level of technical maturity, application area, development risks, and benefits and, hence, comprise a well-balanced detection portfolio. Recent highlights include:

- Fabrication of key miniaturized components, including lasers and separations columns to enable the development of a hand-held chemical and biological toxin detector.
- Development of an automated sample processing module for the autonomous biological detector.
- Initial testing of biological detector against realistic environments in an environmental wind tunnel.

Modeling and Prediction.

Goal. The objective of this initiative is the accurate prediction of chemical and biological agent dispersal during the multitude of release scenarios that might occur in an urban environment. This is essential for the protection of human life and for the effective operation of emergency response teams.

R&D Initiative. This effort builds upon substantial investments by DOE and the National Laboratories in high-performance computing. The modeling effort supported by the CBNP is aimed at developing a robust, validated, operational modeling capability suitable for use in urban areas. Initiative elements include models for air flow and transport within building interiors and subways, models for flow around buildings, and the linking of these models to form an integrated, multi-scale computational capability.

Crosscutting issues, including understanding the surface deposition of chemical and biological agents and their fate under typical environmental conditions, are also being investigated. Together, advancements in these areas will enable accurate predictions of the extent and impact of a chemical or biological terrorism incident. Recent highlights include:

- Acceleration of computer codes for modeling of flows over complex urban terrain by over 20 times.
- Integration of particle deposition loss factors into interior modeling codes.
- Modeling of a large number of scenarios to determine the most important areas for further investment.
- Development of interim response guidance for chemical releases in subways and urban areas.

Decontamination.

Goal. The objective of this initiative is to develop rapid, effective, and safe (non-toxic and non-corrosive) decontamination technologies for a range of chemically and biologically contaminated surfaces. Additionally, standards are sought for sampling and analysis methods to ensure compliance with acceptable civilian cleanup criteria.

R&D Initiative. This work builds upon DOE expertise in understanding fundamental biology and chemistry and advanced diagnostic instrumentation. Current efforts focus on methods that are minimally corrosive and yet effective for decontamination and include: the development of improved reagents and delivery systems (e.g., gels and foams); advanced decontamination techniques, such as low temperature plasmas; and a study to address the environmental issues associated with urban decontamination. Recent highlights include:

- Development of a decontamination foam effective against all classes of chemical agents as well as high-priority biological agents.
- Demonstration of a unique dry technique--a plasma jet--to neutralize chemical and biological agents.

Biological Foundations.

Goal. The objective of this initiative is to develop molecular biology based capabilities to support efforts in advanced detection, attribution, and medical countermeasures. Detailed study of both biological agents and ambient background microbiological populations, at the DNA and structural level, will enable rapid, conclusive identification of agents; recognition of bio-engineered features, such as antibiotic resistance; geographic source determination; event reconstruction and attribution; and aid other agencies develop vaccines and treatments for both pathogens and toxins.

R&D Initiative. This work builds upon DOE capabilities in DNA sequencing and advanced light sources used in biological structure determination. Ongoing work under this initiative can be divided into three broadly-based efforts: nucleic acid-based signatures, toxin structural signatures, and molecular epidemiology and tracking. These efforts are aimed at providing the biological data necessary to underpin advanced detection and forensics capabilities. Recent highlights include:

- Completion of DNA sequencing of the plasmids of plague and anthrax.
- Development of Amplified Fragment Length Polymorphism techniques to identify and geo-locate the strains of anthrax. Extension of this technique to other pathogens has begun.

- Completion of high resolution three-dimensional structures of botulinum toxins and tetanus toxins.
- Development of techniques to compare strains of plague and other high priority pathogens.

CBNP Roadmap

The “roadmap” shown below was developed to guide CBNP planning, and portrays the major milestones for the program, by technology and system integration element, over a five-year period. The goals for each area are the result of iterative process that examined the resources and the time required for a major advance in capability. A key goal underlying the expanded program is the delivery of meaningful products and/or capabilities in the shortest possible time frame. The planning was constrained by the existing state of science and practical funding levels.

CBNP Five-Year Plan: Major Milestones and Deliverables

		FY00	FY01	FY02	FY03	FY04
System Integration / DDAPs	**PROTECT**	Subway vulnerability assessment / response strategies	Integrated chemical detection system demonstration (one station)	Chemical detection system demonstration at five subway stations	Emergency mgmt and training / bio detection demonstration	Preparedness system fielded for four subway systems
	BASIS	Architecture development for city protection	Integrated biological early warning system demonstration for a metropolitan area	Expanded / ruggedized bio detection system for a metropolitan area	Architecture development for 2nd generation systems	Enhanced system with deployment to other cities
	Forensics		Bioagent "geolocation" capability for two pathogens	Limited capability to recognize genetically engineered agents	Technological protocols for event reconstruction	"Geolocation" and engineered agent ID for additional agents
	Decontamination			System design studies	Mobile spray and gaseous systems demonstration	Initial system fielded with sampling & analysis tools
Technology Development	**Biological Foundations**	DNA fingerprinting of top ten BW pathogens	Laboratory standards for genetic analysis using DNA fingerprints	Identification of virulence pathways for five BW agents	Ten-fold improvements in time and cost for DNA based detection	Structure/function relationships determined for top ten biotoxins
	Modeling and Prediction	Guidance for response to releases in office buildings and subways	Validated model for flow prediction in interiors / subways. Web access to CB models for planning	Integrated indoor / outdoor model for vulnerability analysis	Begin transition to full operational capability	Operational indoor / outdoor predictive capability fielded for national use
	Detection	Handheld prototype tested on top chem & biotoxin agents	Prototype autonomous biological detector tested for four pathogens	Field test prototype hand-held chemical and biotoxin detector	Field test autonomous sensor for ten BW pathogens	Field test virus module in handheld chem & biotoxin sensor
	Decontamination	Live agent testing with environmentally benign gels & foams	Gel and foam systems fielded		Dry plasma-based system tested on broad range of materials	

Icons show how technology development initiatives feed into system integration efforts

The cost figures on which this roadmap is based are comparable to technology development and system integration efforts occurring elsewhere within the Federal government and within the private sector. For example in the Detection area, historical data indicate that engineering an existing laboratory capability for field use costs about $10-20M over 2-3 years. Fielding an instrument based on a new concept, or

adapting an existing one for a new application, requires $30-50M over 4-6 years. These objectives are comparable to the detection goals of the CBNP.

Domestic Demonstration and Application Programs costs are based on data from several DoD demonstration programs, and depend strongly on the time duration and number and complexity of demonstration products left behind with users. For example, the DoD-sponsored 911-Bio program was a $4.5M one-year demonstration exercise with no technology development or residual capability. The DoD Portal Shield program, similar in scope and complexity to the PROTECT and BASIS DDAPs, is estimated at $40-60M over 4-5 years.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Technology Development Initiatives	16,997	31,200	31,200	0	0%
Domestic Demonstration and Application Programs	1,500	8,852	10,938	2,086	23.6%
Total, Chemical and Biological Nonproliferation	18,497	40,052	42,138	2,086	5.2%

Detailed Program Justification

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Chemical and Biological Nonproliferation

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
# Technology Development Initiatives. The goal of these initiatives is the development of advanced technologies to respond to chemical and biological threats. Four initiatives are currently supported with the emphasis on biological detection: (1) rapid and low false-alarm chemical and biological detection technologies, (2) predictive chemical and biological plume transport models suitable for planning and response to attacks in urban areas, (3) decontamination and restoration technologies for urban areas, and (4) development of the underpinning biological sciences necessary for biological detection, including detection of engineered organisms and for attribution purposes, and to aid other agencies (e.g. USAMRIID) in the development of medical countermeasures. Selected deliverables are shown in the program roadmap	16,997	31,200	31,200
# Domestic Demonstration and Application Programs (DDAPs). The goal of these programs is to rapidly demonstrate the utility of systems for specific applications. Development of system architectures is central to these initiatives; architectures consider the role of infrastructure, operations and technology in responding to the threat, and guide the integration of multiple technologies into an overall system. Two DDAPs, both emphasizing detection and early warning, are currently underway. Selected deliverables are shown in the program roadmap.	1,500	8,852	10,938
Total, Chemical and Biological Nonproliferation [a]	18,497	40,052	42,138

Explanation of Funding Changes from FY 2000 to FY 2001

[a] Total CBNP funding was not separated into two areas in FY 1999 and FY 2000 budget documents.

	FY 2001 vs. FY 2000 ($000)
Increased funds are required for the Domestic Demonstration and Application Programs as we move into the implementation stage. In FY 2001, two demonstrations will be performed, one in a major subway system and the other in a U.S. city in anticipation of a special event.	2,086
Total Funding Change, Chemical and Biological Nonproliferation	2,086

Capital Operating Expenses and Construction Summary

Capital Operating Expenses

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Capital Equipment	4,411	4,300	4,300	0	0
Total, Capital Operating Expense	4,411	4,300	4,300	0	0

Construction Projects

(dollars in thousands)

	Total Estimated Cost (TEC)	Prior Year Appropriations	FY 1999	FY 2000	FY 2001	Unappropriated Balance
00-D-192, Nonproliferation & International Security Center, LANL	58,769	0	0	6,000	7,000	45,769
Total, Construction	58,769	0	0	6,000	7,000	45,769

00-D-192, Nonproliferation and International Security Center (NISC), Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 1999 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The Strategic Computing Complex (SCC) will be built about 70 feet north of the planned NISC in a parking lot that was previously planned as a NISC parking lot. An interface agreement has been executed with SCC. This will result in the elimination from NISC of the demolition and salvage of existing structures, and a decrease in site utility removal located on the SCC portion of the site. Construction of SCC will also reduce the parking area to be developed by NISC, resulting in a reduction in capacity from about 950 cars to about 250 cars. LANL institution will provide for the deficit in parking spaces. Seismic design requirements have been increased by direction from DOE. The Method of Performance has been changed to reflect procurement of a single contract for design and construction. Cost estimate has been updated to reflect FY99 developments.

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	1Q 2000	4Q 2001	4Q 2001	2Q 2003	58,769	62,656
FY 2001 Budget Request (Preliminary Estimate)	1Q 2000	4Q 2001	4Q 2001	2Q 2003	58,769	62,656

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriation	Obligations	Costs
2000	6,000	6,000,	4,262
2001	7,000	7,000	5,656
2002	36,000	36,000	29,998
2003	9,769	9,769	18,275
2004	0	0	578

3. Project Description, Justification and Scope

Proposed construction project - We live in a rapidly changing world in which threats involving the proliferation of weapons of mass destruction (NBC - nuclear, biological and chemical) and their potential use by rogue states or terrorists loom over all of us. The Department of Energy Office of Nonproliferation and National Security (DOE-NN) and the Office of Intelligence (DOE-IN) have the responsibility for major programs to counter these threats. Most are time urgent and have sensitive national security implications. For example, controlling nuclear materials in states of the Former Soviet Union, countering nuclear smuggling, safeguarding nuclear materials and weapons and, most recently, countering threats involving chemical and biological agents and helping enable the START process to continue downsizing nuclear weapon stockpiles. These programs are truly important to the security of the United States and the world, and the national laboratories through DOE-NN and DOE-IN are the major agents responsible for carrying out this work. Los Alamos is an essential supporter of these DOE programs acting through its Threat Reduction Directorate, which is responsible for about 25 percent of the Laboratory's budget.

The Laboratory has consolidated major programs and capabilities in detection R&D, intelligence, nuclear safeguards and emergency response in an organization called Nonproliferation and International Security Division (NIS). This organization is the Laboratory's prime responder to DOE-NN and DOE-IN programmatic needs, including approximately $120M per year in funded effort for DOE plus about $30M in related work for other federal agencies. Unfortunately, the full potential for this synergistic organization has not been realized because of the handicap of NIS Division being located in substandard facilities scattered across the 43-square-mile Los Alamos site. NIS operations are scattered over six Los Alamos technical areas with NIS personnel housed in 47 different structures, many of which are old and substandard. This situation is intolerable given the criticality of effective NIS response to the national emergency declared by President Clinton in Executive Order 12938.

Based on a recent study of a similar R&D organization the following improvements in scientific collaborations and technical communications are projected:

- Increases in number of scientific collaborations - Collaboration rate strongly facilitated. Upper speculative bound is 87% increase. Likely increase is at least 10%.
- Increase in frequency of technical communications - Collaboration increase exponentially with proximity. Internal communications will at least double and very likely will increase by much more than double.

In addition, the study provided a preliminary estimate of the following less dramatic but quantifiable productivity improvements in addition to the non-quantifiable but very significant scientific creativity and productivity gains:

- Savings in support-function consolidation - 0.85% of NIS labor budget (about $0.5 million per year).
- Savings of intra-division travel time - 2.0% of NIS labor budget (about $1.2 million per year).

Los Alamos proposes to consolidate this unique national resource physically as well as organizationally near the Laboratory hub by co-locating all NIS activities in new and existing facilities within convenient walking distance in TA-3 (except for the high-security nuclear activities in TA-18/36 which would be

desirable or practical to move). TA-18 is a Special Nuclear Materials (SNM), Materials Control and Accountability (MCA) Category I Facility and has special security and safety requirements that would be very difficult to move. To accomplish this consolidation will require the construction of a major new facility – the Nonproliferation and International Security Center (NISC). This consolidation will enhance program synergy and effectiveness by co-location of the NIS nonproliferation, arms control, treaty verification, and intelligence functions near the scientific, technological, and information sources that support these programs.

Los Alamos initiated Preliminary design in FY2000. To address several urgent new requirements to which DOE-NN and DOE-IN must respond and to which the full capabilities of the national laboratories, especially Los Alamos, must be applied. Specific examples include:

- Former Soviet Union (FSU), Nuclear Materials Protection, Control, and Accounting (MPC&A) Program B - The threat to U.S. national security from the loss of significant quantities of FSU nuclear material has been reduced but is far from eliminated. Until these vast amounts of material are safeguarded fully, this threat remains grave.
- Helsinki Agreements - Agreements reached recently by Presidents Clinton and Yeltsin in Helsinki, including preliminary START III treaty parameters, add significantly to the technical challenges facing DOE-NN and DOE-IN.
- Nuclear, Biological, and Chemical (NBC) Proliferation and Terrorism - DOE-NN and DOE-IN are now responsible for developing and providing detection, assessment, and response technologies across the entire NBC spectrum. Reducing the NBC threat requires timely warning (intelligence) and advanced detection technology (monitoring). Adequate intelligence and monitoring require the application of leading-edge science and technology across a broad spectrum.

Los Alamos recently launched major efforts aimed at countering nuclear smuggling and chemical or biological weapons and is prepared to launch a major effort in support of the recent Helsinki Accords to continue the START process. NISC will give an appropriate focus and stature to Los Alamos efforts in nonproliferation, arms control, and national security commensurate with the contributions the Laboratory is making and on an equal footing with the Laboratory's historic nuclear weapons mission.

The NISC facility will be a new structure rising four stories above a one-level basement. A one-story high-bay area and basement will be provided on the west end of the structure. The high-bay area will be used to support the development of special equipment and instruments. About 465 people will be housed in this 164,000 square foot facility. The second, third, and fourth floors each contain approximately 30,000 square feet. The ground floor includes about 36,000 square feet while the basement is around 37,000 square feet. The roof is accessible by stairs and freight elevator and this area is about 1,000 square feet. The fourth floor, housing intelligence activities, will be an accredited SCIF. Access to the SCIF will be limited to one location that will be controlled by a guard during normal operating hours. The third floor will contain program management and safeguard assessment functions. Anticipating that SCIF related activities could increase, the third floor will be constructed in such a manner that it could become an accredited SCIF in the future. Laboratories for physics, electronics, and instrumentation development along with technical work spaces and administrative functions will be distributed throughout the second and first floor, as well as the basement. Conference rooms will be provided on every floor with larger facilities being located on the first floor. A portion of the basement will be devoted to optic laboratories.

In addition, the basement will house nuclear safeguard technology activities. These activities will be classified as radiological because of the use of sealed radioactive sources to execute their mission. The basement also will contain vaults to store the sealed sources including special nuclear materials (SNM). Two specially shielded rooms will be included for high radioactive research activities. These “shielded rooms” will require 5-ton bridge cranes. Because of the classified nature of many of the activities in this facility, the building, with the exception of the high bay area and machine shop, will be accessible to cleared personnel only.

A structural steel framing system of construction utilizing cost-effective design concepts will be employed to provide maximum open space, flexibility and economy for the upper floors of NISC. A 30 ft. x 30 ft. structural module was selected to accommodate a 10 ft. x 12 ft. office typical element. Floors will be concrete over metal deck supported by steel beams and girders. A 16 ft. floor to floor height was selected for the upper floors while the basement with its heavier industrial occupancy will be 20 ft., floor to floor. The basement walls will be constructed of reinforced concrete. Passenger and elevators service all floors. In addition to these elevators, an industrial type (10 ton) elevator will service the basement from the loading dock outside the high-bay entrance. The high-bay also will contain a 10-ton bridge crane to accommodate the loading and unloading of heavy instrumentation. The building will be heated, cooled and ventilated from modular indoor air handling units on each floor. Chilled water will be provided for cooling while heating will be accomplished by hot water. Variable air volume (VAV) air conditioning units will deliver conditioned air to the occupied spaces. Units will provide a minimum amount of outside air at all times. When outdoor ambient conditions are favorable, an economizer cycle will provide “free” cooling with outside air. The same type of system will be included in the high bay and machine shop, but will be roof mounted. The main building chillers will also be located on the roof of the high bay structure. Temperature control will be from room thermostats. A complete packaged direct digital control (DDC) automatic temperature control system will be included. Roof drains will be connected to site storm drain system. Roof drains will be de-coupled as they penetrate the roof, fourth floor, and third floor. An automatic wet-pipe fire protection system will be extended throughout the building. The system will be hydraulically designed and conform to NFPA 13 for Ordinary Hazard Group II as a minimum or as determined PHA. Plumbing fixtures including electrical water coolers will be selected to provide access to individuals with disabilities. The building will require the installation of a 3-phase outdoor unit substation that will include walk-in switchboard. Power will run to each electrical room where it will be distributed. Isolation power will be available for sensitive electronic equipment and computer loads. Power will be distributed throughout the building at 480Y/277V and 208Y/120V. Motors one horsepower or greater will be supplied with power at 480V. Generally, lighting will be flourescent and powered at 277V. The building will be equipped with communication systems that include telephone, open data communications, and a protected transmission system. The SCIF will require an internal warning light signaling system as well as an intrusion alarming system.

Site improvements will include a new service drive to access the high bay assembly area and machine shop functions as well as normal deliveries. A concrete walk with steps will provide pedestrian access to the main entrance to the building. Disabled access will be provided by means of a concrete walk with appropriate ramps. Existing surface drainage and new building roof drainage will be conveyed to existing storm drainage systems. The site, which is a one square block parking area, contains three office-transportable structures as well as a vacated gasoline refueling and service facility. Removal of these facilities will be accomplished by the Laboratory in FY99 and deleted from NISC. Gasoline storage tanks,

fuel lines, and pumps were removed by the Laboratory in 1997 and will not be part of NISC. Existing asphalt paving will be removed and the site will be re-graded. Access drives and parking areas will receive base course and asphaltic concrete paving. The parking areas will be stripped to accommodate approximately 250 cars. Non-paved areas surrounding the building will be landscaped. Landscaping will consist of ground cover and trees similar to those on site. Landscaped areas will be irrigated by an automatic underground system as required.

Water service for both portable and fire protection will consist of an 8-inch pipe construction, approximately 70 feet long, into an existing 10-inch water main that lies adjacent to the site. A new 6-inch sewer line approximately 100 feet long will convey sanitary waste from the new building to an existing manhole. An existing 8-inch steam line with a 4-inch condensation line is located across the street from the building site. These lines will be connected together at a steam pit south of the building from which a 4-inch steam line and 3-inch condensation line will be extended into the building. A 2500-kVA, 13.2KV-480Y/277V, 3-phase outdoor secondary substation, which will include a walk-in switchboard with secondary feeders routed to each of the basement electrical rooms, will be located along the west side of the building in a service enclosure. Power to this secondary substation will be an underground feed from 13.2KV circuit. The primary feeder cable to the new unit substation will be 3-#4/0 15KV shielded, type MV90 conductors approximately 200 ft. in length and run in a concrete encased ductbank to switchgear unit. Two separate feeders will be installed.

NISC will vacate space in all or parts of seven permanent structures at both the TA-35 and TA-3 Technical Areas. In addition, about 21 trailers and transportables, representing about 22,056 square feet will be removed and salvaged.

Related Construction Project - The Strategic Computing Complex (SCC), an FY 2000 Line Item project, is designed to be constructed directly to the north of the proposed NISC project. A proposed early construction start date of February 2000 is scheduled for this facility. The Laboratory's SCC and NISC teams will coordinate, via an interface agreement, the design of facility and site features to ensure compatibility of the two facilities as the designs are developed. In addition, construction execution issues will be addressed. The construction of SCC will reduce the scope of site work originally planned for NISC. The NISC site was originally planned to accommodate approximately 950 cars, however with the construction of SCC, the site will only accommodate about 250 cars.

4. Details of Cost Estimate [a]

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs, (Design, Drawings, and Specifications $3,022)	4,318	4,318
Design Management costs (0.52% of TEC)	304	304
Project Management costs (1.37% of TEC)	805	805
Total Design Costs (9.23% of TEC)	5,427	5,427
Construction Phase		
Improvements to Land	1,110	2,588
Buildings	32,299	30,775
Special Equipment	2,030	2,030
Utilities	482	482
Standard Equipment	3,483	3,483
Removal Cost less salvage	175	418
Inspection, design and project liaison, testing checkout and acceptance	1,948	1,947
Construction Management (2.70% of TEC)	1,585	1,585
Project Management (2.41% of TEC)	1,419	1,419
Total Construction Costs	44,531	44,727
Contingencies		
Design Phase (1.33% of TEC)	791	781
Construction Phase (13.65% of TEC)	8,020	7,834
Total contingencies on NISC (14.99% of TEC)	8,811	8,615
Total, Line Item Costs (TEC)	58,769	58,769

5. Methods of Performance

The following alternative procurement strategy is the result of the study identified in the 1998 CPDS. NISC is pursuing a single contract to be "awarded for design and construction of the facility". A two-phased procurement will be employed to select a qualified contractor. Phase I selected three qualified firms. These selected firms submitted technical and price proposals during Phase II. A contract award is pending.

[a]Cost estimate is based on Conceptual Design Report of March 1999. Escalation is applied according to DOE approved escalation rates (1/98 version) (FY98-2.4%, FY99-2.5%, FY00-2.6%, -FY01-2.6%, FY02-2.5%, FY03-2.6%,FY04-2.9%).

6. Schedule of Project Funding

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project cost						
Facility cost						
Design	0	0	4,262	2,380	0	6,642
Construction	0	0	0	3,276	48,851	52,127
Total line item TEC	0	0	4,262	5,656	48,851	58,769
Total Facility Costs (Federal and Non-Federal)	0	0	4,262	5,656	48,851	58,769
Other Project Costs						
Conceptual design costs	588	30	0	0	0	618
Project execution plan	33	47	0	0	0	80
NEPA documentation costs	48	32	0	0	0	80
Other ES&H costs	157	47	19	11	92	326
Other project related costs	191	753	61	155	1,623	2,783
Total Other Project Costs	1,017	909	80	166	1,715	3,887
Total Project Cost (TPC)	1,017	909	4,342	5,822	50,566	62,656

7. Related Annual Funding Requirements [a]

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility maintenance/repair costs [b]	1,500	4,345
Annual Programmatic Effort Related to Facility [c]	68,364	61,065
Utility Costs	150	N/A
Total related annual funding	70,014	65,410
Total operating costs (operating from FY 2003 through FY 2033)	2,100,420	N/A

[a]Estimated life of project - - 30 years

[b]Thirteen man years that includes Facility Management staff, full-time craft persons and purchased services. Last year's estimate was in error gross square footage was used in lieu of net.

[c]Calculated for FY 2003 by applying escalation to projected FY1999 costs for the NIS groups to be located in NISC. Difference from previous estimate due to the fact that previous estimate was based on unescalated FY 1998 costs.

8. Design and Construction of Federal Facilities

All DOE facilities are designed and constructed in accordance with applicable Public Laws, Executive Orders, OMB Circulars, Federal Property Management Regulations, and DOE Orders. The total estimated cost of the project includes the cost of measured necessary to assure compliance with Executive Order 12088, "Federal Compliance with Pollution Control Standards"; section 19 of the Occupational Safety and Health Act of 1970, the provisions of Executive Order 12196, and the related Safety and Health provisions for Federal Employees (CFR Title 29, Chapter XVII, Part 1960); and the Architectural Barriers Act, Public Law 90-480, and implementing instructions in 41 CFR 101-19.6.

The project will be located in an area not subject to flooding determined in accordance with Executive Order 11988.

DOE has reviewed the GSA inventory of federal scientific laboratories and found insufficient space available, as reported by the GSA inventory.

Arms Control & Nonproliferation

Program Mission

Arms Control and Nonproliferation is the focal point within the Department for activities which support the President's arms control and nonproliferation policies, goals and objectives, as well as statutorily-mandated activities. The major functional areas of the program include: Policy and Analysis; Reduced Enrichment Research and Test Reactor (RERTR); International Safeguards; Export Control Operations; Treaties and Agreements; International Security; and International Materials Protection, Control, and Accounting (MPC&A). The program provides leadership and representation for the Department in the international arms control and nonproliferation community and the U.S. Government's interagency process, as well as for the U.S. Government in national and international arms control and nonproliferation negotiations, agreements and interactions.

Program Goal

Reduce the threat of nuclear proliferation by integrating and orchestrating the Department's assets and efforts, including those of its national laboratories and contractors, by providing major policy and technical support to the U.S. Government's foreign policy and national security objectives in the areas of arms control and nonproliferation, and to the international arms control and nonproliferation community. The Department provides policy and technical leadership for national and global nonproliferation efforts to reduce the continuing and new global nuclear dangers.

Program Objectives

- Secure Nuclear Materials and Expertise in Russia, the Newly Independent States (NIS), and the Baltics.
- Limit Weapons-Usable Fissile Materials.
- Promote Transparent and Irreversible Nuclear Reductions.
- Strengthen the Nuclear Nonproliferation Regime.
- Control Nuclear Exports.

Performance Measures

- Continue International MPC&A upgrades to improve the security of over 650 metric tons of weapons-usable highly-enricheduranium (HEU) and plutonium located in over 400 buildings at more than 40 Russian sites. Continue to improve security for trucks and railcars used to transport nuclear material, security regulations and training programs.

Implement a program designed to consolidate material into fewer, more secure buildings and to blend down the excess HEU into a non-weapons grade form.

- # Replace unilateral nuclear export controls with multilateral controls. Initiate negotiations for the adoption of upgrades to multilateral export controls for nuclear propulsion and nuclear weapons codes, strengthening the nuclear nonproliferation regime.
- # Continue efforts to ensure transparent and irreversible nuclear reductions by supporting analysis and technology development for transparency activities related to START III and other initiatives focused on verified warhead dismantlement.
- # Under Initiatives for Proliferation Prevention (IPP), engage weapons scientists, engineers and technicians in peaceful projects at their institutes.
- # Complete ratification and implementation of U.S. protocol for International Atomic Energy Agency (IAEA) "Strengthened Safeguards System," including supporting U.S. responsibilities for declarations and on-site inspections at DOE facilities.
- # Maintain integrity of the spent fuel canisters in long-term storage at Nyongbyon nuclear site prior to their removal from North Korea.
- # Develop technical means to allow IAEA verification of U.S. excess nuclear weapons material without revealing classified information.
- # Maintain international safeguards at DOE facilities in fulfillment of U.S. treaty obligations under the U.S./IAEA Safeguards Agreement.
- # Place additional U.S. excess nuclear weapons material under IAEA inspection under the "Trilateral Initiative;" develop IAEA verification regime for U.S. excess materials and Russian excess material to be placed in the Mayak Fissile Material Storage Facility.
- # Transfer responsibility for all non-Russian nuclear facilities where material protection, control, and accounting upgrades have been completed to International Safeguards for continuing activities to sustain achievements.
- # Support continuing efforts to gain ratification of the Comprehensive Test Ban Treaty (CTBT) and steps to facilitate its subsequent implementation.
- # Maintain core competency as technical experts to U.S. Government (USG) agencies in nuclear export control discussions, through workshops and exchanges, strengthening the nuclear nonproliferation regime.
- # Engage the Baltics, Caucasus and Central Asia in nuclear export control initiatives, minimizing the risks of proliferation.
- # Continue leadership to reduce and limit the use of HEU and plutonium in civil energy fuel cycles, and especially those in regions or countries of proliferation concerns.
- # Expand applications of cooperative monitoring as an approach to reduce regional or bilateral tensions.

- Under the Nuclear Cities Initiative (NCI), assist in the development of suitable and gainful civilian employment for skilled scientific personnel in the 10 nuclear cities as the Ministry of Atomic Energy (MINATOM) begins to down size its nuclear weapons facilities.
- Maintain entire in-pool inventory of spent fuel canisters at the BN-350 reactor in Aktau, Kazakhstan. The in-pool inventory of 2,000 assemblies will be secured in welded stainless steel canisters and returned to in-pool storage under improved physical security and IAEA safeguards. Prepare for and initiate canister shipment to dry storage facility.

Significant Accomplishments and Program Shifts

- By the end of FY 2000, International MPC&A program will have successfully completed installation of site-wide MPC&A system at 35 sites and building-wide upgrades at large storage buildings at the remaining 20 sites, improving security of over 100 metric tons of material. Upgrades will have begun on over 400 metric tons of the remaining material. Also, 18 trucks and 31 railcars will have been hardened, MPC&A training and educational programs will be underway, and national regulations and material trucking systems will have been implemented. A pilot program on material consolidation and blend-down will have been implemented also. Efforts are significantly expanding with the Russian Navy to secure some of the most sensitive naval nuclear facilities; material consolidation efforts are expanding to improve security and reduce costs; securing spent fuel of proliferation concern is required; and programs to support the long-term sustainability of installed MPC&A systems must addressed.
- Implement IAEA verification on U.S. excess material to promote international confidence in irreversible removal of such material from weapons. Facilities under IAEA inspection include those for plutonium storage, HEU storage, and HEU downblending. Increasing focus is being placed on developing international verification approaches for fissile material disposition programs.
- Broaden IPP involvement with institutes formerly engaged in the development and production of biological and chemical weapons.
- After the completion of the canning of the spent nuclear fuel at Nyongbyon, activities will shift to minimize the corrosion of the spent fuel and maintain the integrity of the storage canisters prior to removal from North Korea.
- Continue activities that strengthen the international nonproliferation regime by supporting such global treaties as the Nuclear Non-Proliferation Treaty (NPT) and the CTBT; advancing a negotiating mandate for the Fissile Material Cutoff Treaty (FMCT); promoting full compliance with the IAEA strengthened safeguards protocol; and progressing on START III and other regional arms control programs in areas of high tension.
- Prepare U.S. facilities for transparent nuclear warhead reductions and assist Russian technical experts to develop methods and techniques for commensurate activities.

Assist the CTBT Organization in development of the verification and on-site inspection regime to include conducting trial inspections at DOE facilities and cooperative activities with Russia and other key states.

Begin work on the long-term disposition aspect of the program for the plutonium-bearing spent fuel at the BN-350 reactor in Kazakhstan.

Funding Profile

(dollars in thousands)

	FY 1999 [a] Current Appropriation	FY 2000 [a] Original Appropriation	FY 2000 [b] Adjustments	FY 2000 Current Appropriation	FY 2001 [c] Request
Arms Control & Nonproliferation					
Policy and Analysis	23,996	27,521	-1,161	26,360	24,787
Reduced Enrichment Research and Test Reactor (RERTR)	6,000	5,822	-356	5,466	5,822
International Safeguards	21,366	21,851	-1,176	20,675	17,166
Export Control Operations	14,205	14,052	-806	13,246	14,060
International Materials Protection, Control, and Accounting (MPC&A)	139,753	150,000	-5,382	144,618	149,856
Treaties and Agreements	3,645	3,583	-504	3,079	3,225
International Security	47,278	48,171	-667	47,504	57,954
Chem/Bio R&D [d]	0	10,000	-10,000	0	0
Subtotal, Arms Control & Nonproliferation	256,243	281,000	-20,052	260,948	272,870
Use of Prior-Year Balances	-2,276	0	0	0	0
General Reduction [e]	0	-8,932	+8,932	0	0
Total, Arms Control & Nonproliferation	253,967	272,068	-11,120	260,948	272,870

Public Law Authorization:

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

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

Public Law 106-65, "National Defense Authorization Act FY 2000"

[a] Amounts reflected in these columns were appropriated under "Other Defense Activities."

[b] Includes Government-wide rescission of 0.38% ($1,120,000).

[c] Amounts reflected in this column are requested under "Other Nuclear Security Activities" appropriation.

[d] Amount originally appropriated under the Arms Control and Nonproliferation Decision Unit was transferred to the Nonproliferation and Verification R&D Decision Unit to correctly align Appropriation Conference language and base table.

[e] Share of Energy and Water Development reduction for contractor travel and directed savings.

Funding by Site

(dollars in thousands)

	FY 1999[a]	FY 2000[a]	FY 2001[b]	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	36,881	36,646	38,901	+2,255	+6.2 %
Pantex	1,541	1,850	1,790	-60	-3.2 %
Kansas City Plant	1,145	940	1,070	+130	+13.8 %
National Renewable Energy Laboratory	1,837	3,210	3,210	0	0.0 %
Sandia National Laboratory	62,656	62,162	61,742	-420	-0.7 %
Albuquerque Operations Office	3,006	9,228	9,476	+248	+2.7 %
Total, Albuquerque Operations Office	107,066	114,036	116,189	+2,153	+1.9%
Chicago Operations Office					
Argonne National Laboratory	16,088	11,972	12,330	+358	+3.0 %
Brookhaven National Laboratory	18,082	19,668	19,565	-103	-0.5 %
New Brunswick Laboratory	439	504	486	-18	-3.6 %
Total, Chicago Operations Office	34,609	32,144	32,381	+237	+0.7 %
Oakland Operations Office					
Lawrence Berkeley National Laboratory	1,663	2,650	2,650	0	0.0 %
Lawrence Livermore National Laboratory	34,626	32,682	35,312	+2,630	+8.0 %
Oakland Operations Office	6,684	17,194	16,787	-407	-2.4 %
Total, Oakland Operations Office	42,973	52,526	54,749	+2,223	+4.2 %
Oak Ridge Operations Office					
Oak Ridge National Laboratory	25,273	26,581	27,081	+500	+1.9 %
Richland Operations Office					
Pacific Northwest National Laboratory	22,282	26,669	27,270	+601	+2.3 %
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	661	700	700	0	0.0 %
Savannah River Operations Office	10,690	4,499	4,380	-119	-2.6 %
Nevada Operations Office	200	175	165	-10	-5.7 %
Washington Headquarters	12,489	3,618	9,955	+6,337	+175.2 %
Subtotal, Arms Control & Nonproliferation	256,243	260,948	272,870	+11,922	+4.6 %
Use of Prior-Year Balances	-2,276	0	0	0	0.0 %
Total, Arms Control & Nonproliferation	253,967	260,948	272,870	+11,922	+4.6 %

[a] Amounts reflected in these columns were appropriated under "Other Defense Activities."

[b] Amounts reflected in this column are requested under "Other Nuclear Security Activities" appropriation.

Site Description

Albuquerque Operations Office

In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex. In support of International MPC&A, inventories nuclear materials and establishes a self-sustaining security infrastructure in Russia, particularly sustainability issues and material conversion and consolidation.

Argonne National Laboratory

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations, particularly those related to the fuel cycle; training and assistance to Ukraine on export controls; and administers the Nonproliferation Graduate Program. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia. In support of RERTR objectives, develops low-enriched uranium (LEU) fuels to convert research and test reactors; conducts safety analysis of reactors; expedites return of U.S.-origin research reactor spent nuclear fuel from overseas; develops processes for producing molybdenum-99; and develops advanced high-density LEU fuels for Russian/Chinese designed reactor. In support of Kazakhstan Spent Fuel Activities, designs and fabricates the equipment required to safely stabilize, package, and store the nuclear material under the U.S.-Kazakhstan BN-350 Nuclear Material Disposition project. In support of International Safeguards, promotes peaceful use of atomic energy and bilateral cooperation efforts through "sister lab" arrangements; and provides support to DOE in the area of international material protection, control and accountability upgrades/sustainability through training, project management, and technical evaluation/review. In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts

from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Brookhaven National Laboratory

In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a consolidation effort and self-sustaining security infrastructure in Russia, particularly at the Luch Site, and on material maintenance of the database of MPC&A site data and progress. In support of Policy and Analysis efforts, supports the control and elimination of nuclear weapons material by assisting in the implementation of the U.S.-Russian agreement to shutdown production reactors and, developing nuclear monitoring technology; provides analytical and technical support to ongoing negotiations and in preparation for the implementation of agreements and treaties, such as the FMCT negotiations, by providing technical support related to safeguards/verification of fissile material processing, and hosts workshops to move negotiations forward in the Conference on Disarmament (CD); and support negotiations for the implementation of transparent and irreversible nuclear reductions to confirm that Russian nuclear weapons are being dismantled and the excess fissile materials removed are not reused for military purposes. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by providing support in U.S. policy formulation for IAEA safeguards and supporting preparations for implementation of IAEA strengthened safeguards at DOE facilities. In support of IPP, creates nuclear/chemical/biological projects with NIS institutes to prevent "brain drain," facilitate broad access to former weapons facilities and openness between DOE laboratory scientists and their NIS colleagues, provide long-term commercial employment at NIS institutes, involve other USG agencies with similar interests, and enhance technology for environmental safety of nuclear materials. In support of NCI, creates permanent commercial jobs to employ displaced nuclear weapons scientists and to carry out program objective of creating economic opportunities in the closed nuclear cities of the Russian Federation.

Idaho National Engineering and Environmental Laboratory

In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Kansas City Plant

In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Lawrence Berkeley National Laboratory

In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Lawrence Livermore National Laboratory

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluation, in particular, end user analyses and specific weaponization technologies; multilateral negotiation within the Nuclear Suppliers Group (NSG); and training and assistance to potential nuclear suppliers on export controls, with special emphasis on Russia and the Southern Tier States. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in the Russia, particularly for various Navy and defense sites, and on the national nuclear information system. In support of Policy and Analysis efforts, supports the control and elimination of nuclear weapons material by assisting in the implementation of the U.S.-Russia agreement to shutdown production reactors, provides analytical and technical support to ongoing negotiations and in preparation for the implementation of agreements and treaties such as FMCT and CWC, specifically providing conference and technical support to the Biological Weapons Convention (BWC) compliance protocol; supports bilateral negotiations with Russia to implement transparent and irreversible nuclear reductions which would confirm that Russian nuclear

weapons are being dismantled and the excess fissile materials that are removed are not reused for military purposes by providing technical input on Warhead Dismantlement Regime Protocol for START III and Radiation Measurements technical input for the Laboratory-to-Laboratory, Mayak Transparency, and Processing, Packaging, and Implementation Agreement (PPIA) Transparency programs; provides detailed technical expertise on the nuclear weapons and nuclear power programs in states of proliferation concern; promotes effective implementation of On-Site Inspections (OSI) under the CTBT by providing technical expertise in the areas of monitoring, development of equipment specification, procurement, and the conduct of inspection simulations; supports the interagency and U.S. delegations to the CTBT Preparatory Commission (PrepCom) and its verification Working Group; analyzes nuclear proliferant activity in South Asia, the Middle East and Northeast Asia; provides expertise in seismic monitoring, test site transparency geophysical phenomena associated with nuclear testing, and nuclear weapons testing issues; maintain minimal contact for U.S. scientific cooperative non-weapons programs including exchanges in such areas as nonproliferation, arms control, and verification technology. In support of International Safeguards, improves the cost effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: providing DOE technical support to the U.S./Russia/IAEA Joint Working Group; identifying U.S. excess fissile material vulnerabilities; and operating the Information Tracking and Analysis (ITA) program which tracks and analyzes foreign nuclear activity to satisfy statutory requirements and international obligations and to support U.S. nonproliferation policy. In support of IPP, funding is used to work with the states of the Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Los Alamos National Laboratory

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations, in particular the weaponization technologies; multilateral negotiation within the NSG; training and assistance to Kazakhstan and other NIS on export control laws; and provides for development and implementation of the Proliferation Information Network System (PINS) and the NSG Information Sharing System. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia, particularly for various Navy and defense sites. In support of Kazakhstan Spent Fuel Activities, and in close coordination with the IAEA, designs and fabricates the nuclear material measurement accounting and monitoring equipment required to safeguard material inventories during packaging, transportation, and storage operations. In support of Policy and Analysis efforts, supports the control and elimination of nuclear weapons material by assisting in the implementation of U.S.-Russian agreements to shutdown production reactors by providing staff for U.S. monitoring teams and technical

support on monitoring plutonium; supports the DOE position for FMCT negotiations, by providing technical support related to Hanford site facilities and safeguards/verification of plutonium reprocessing; promotes effective implementation of OSI under the CTBT by providing technical expertise in visual (ground and air) inspections and geographic data integration; provides expertise in monitoring and nuclear weapons testing issues in support of the interagency and U.S. delegations to the CTBT PrepCom and its verification Working Group; maintain U.S. scientific cooperative non-weapons programs including exchanges on such subjects as nonproliferation, arms control, and verification technology; as a design laboratory, supports the Warhead Dismantlement and Transparency program (WDT), specifically focusing on Mayak Transparency efforts in the development of radiation signatures. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: serving as the leading contributor for strengthening of nuclear safeguards in Asia and the Pacific Rim countries; participating in "sister lab" arrangements; assisting DOE in providing support to the IAEA for development and implementation of environmental sampling, unattended nondestructive assay systems, and remote monitoring systems; providing DOE technical support to the U.S./Russia/IAEA Joint Working Group; developing technologies for safeguarding of nuclear materials declared excess to the U.S. and Russian weapons programs; providing support to DOE in the area of international material protection, control and accountability upgrades/sustainability through training, project management, and technical evaluation/review; and providing support to implementation of IAEA safeguards at DOE facilities. In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

National Renewable Energy Laboratory

In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Nevada Operations Office

In support of Policy and Analysis efforts, supports the interagency and U.S. delegations to the CTBT PrepCom and its verification Working Group for the implementation of the CTBT verification system and U.S. ratification of the Treaty; provides expertise and analysis during OSI and in the development of equipment specifications; and manages the conduct of inspections at the test site.

New Brunswick Laboratory

In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia, particularly development of measurement standards.

Oakland Operations Office

In support of the Democratic Peoples Republic of Korea (DPRK) Spent Fuel Activities, works to minimize corrosion of spent fuel and maintain integrity of storage canisters, prior to the spent fuel's ultimate disposition, in accordance with the October 1994 "Agreed Framework" signed by the U.S. and DPRK governments. In support of Kazakhstan Spent Fuel Activities, provides the lead in procurement activities for the transportation phase of the U.S.-Kazakhstan BN-350 Nuclear Material Disposition project, including the transportation casks and the associated loading and unloading equipment transportation services, and the storage activities performed by Kazakhstan. In support of Policy and Analysis efforts, facilitates DOE support to arms control and regional security activities performed by universities and nonprofit organizations. In support of International Safeguards, manages the ITA program which tracks and analyzes foreign nuclear activity to satisfy statutory requirements and international obligations and to support U.S. nonproliferation policy.

Oak Ridge National Laboratory

In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in the Russia, particularly for various Navy and civilian sites. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: encouraging safeguards technology development through cooperation agreements with Latin American countries; providing technical support for the Subcommittee on Technical Program and Cooperation; providing technical support to the Trilateral Initiative (U.S./Russia/IAEA Working Group); supporting preparations for implementation of IAEA safeguards at DOE facilities; providing support to DOE in area of international material protection, control and accountability upgrades/sustainability through training, project management, and technical evaluation/review; and implementing IAEA safeguards at Oak Ridge. In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between

scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of Policy and Analysis efforts, the Oak Ridge Y-12 (OR Y-12) facility provides analytical and technical support to ongoing FMCT negotiations and preparation for the implementation of such agreements and treaties; provides technical support related to safeguards and verification measures and uranium enrichment processes and facilities; supports work with Russia to negotiate and implement transparent and irreversible nuclear reductions, to confirm that Russian nuclear weapons are being dismantled and the excess fissile materials that are removed are not reused by demonstrating various transparency techniques, to analyze START III monitoring options at OR Y-12, and to manage all Laboratory-to-Laboratory program contracts focusing on analytical impacts on monitoring plants; provides detailed technical expertise on the nuclear weapons and nuclear power programs in states of proliferation concern, and the use of cooperative monitoring and energy security to further international engagement in arms control activities. In support of Export Control Operations, the OR Y-12 facility provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations, particularly fuel cycle technologies; multilateral negotiations within the NPT Exporters Committee; training and assistance to Russia on export controls; and to the interagency Nuclear Export Violations Working Group. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Pacific Northwest National Laboratory

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations, in particular those requiring DOE Part 810 authorization; training and assistance to potential nuclear suppliers on export controls, in particular Ukraine and Russia; and technology security. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia, with emphasis on material control and accounting at various civilian sites and coordination with the Ministry of Interior (MVD) and MINATOM. In support of the DPRK Spent Fuel Activities, provides fuel canning technical support, working in accordance with the "Agreed Framework" signed by the U.S. and DPRK governments. In support of Kazakhstan Spent Fuel Activities, provides technical support for the transportation phase of the U.S.-Kazakhstan BN-350 Nuclear Material Disposition project, and analyses on transportation options and costs and overall project baseline cost and schedule tracking. In support of Policy and Analysis efforts, supports the control and elimination of nuclear weapons by assisting in the implementation of the U.S.-Russian agreement to shutdown Russian plutonium production reactors and storage sites, and by providing staff support during monitoring visits to shutdown U.S. production reactors at the Hanford site; provides analytical and technical support to ongoing negotiations and in preparation for the implementation of such agreements and treaties as the BWC Compliance Protocol and related technical papers, and for support to FMCT negotiations related to Hanford site facilities, safeguards/verification of plutonium reprocessing, and utilization of Hanford facilities to demonstrate such approaches for fissile material reprocessing; supports U.S.-Russian bilateral negotiations for implementation of transparent and irreversible nuclear reductions in order to confirm that Russian nuclear

weapons are being dismantled, and to ensure that excess fissile materials removed are not reused by providing a weapons design expert and Executive Secretary to the Mayak Transparency and PPIA negotiations; provides detailed technical expertise on the nuclear weapons and nuclear power programs in states of proliferation concern, cooperative monitoring, and energy security used by the U.S. to prevent nuclear weapons testing and a nuclear arms race; promotes effective implementation of the CTBT verification system by providing technical expertise in the area of radionuclide monitoring. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: conducting technical consultations on information analysis software and hardware tools and expertise in environmental sampling and analysis; developing equipment to analyze production of special nuclear material; providing support to DOE in the area of international material protection, control and accountability upgrades/sustainability through training, project management, and technical evaluation/review; supporting preparations for implementation of IAEA safeguards at DOE facilities; promoting the effective safeguarding of nuclear materials through bilateral safeguards agreements with Argentina, Brazil, European Atomic Energy Community (EURATOM), South Korea, and Japan, emphasizing information management sampling; and supporting the further implementation of IAEA safeguards at DOE facilities in the U.S. through the development of approaches, technical consultation to sites, trilateral discussions with the Russian Federation, and policy analysis. In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Pantex

In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia, particularly at various defense sites. In support of Policy and Analysis efforts, supports U.S.-Russian negotiation and implementation of transparent and irreversible nuclear reductions to confirm that Russian nuclear weapons are being dismantled and the excess fissile materials that are removed are not reused for military purposes by specifically supporting START and beyond.

Sandia National Laboratory

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations, in particular, certain weaponization technologies; and training and assistance to potential nuclear suppliers on export controls, both domestically and abroad. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in Russia, with an emphasis on physical protection at various defense, naval, and civilian sites. In support of the DPRK Spent Fuel Activities, provides inspection tools and support to minimize corrosion of spent fuel and maintain integrity of storage canisters, prior to the spent fuel's ultimate disposition, in accordance with the "Agreed Framework" signed by the U.S. and DPRK governments. In support of Kazakhstan Spent Fuel Activities, designs and procures the physical security system upgrades at the BN-350 reactor facility and determines the security requirements for transportation activities and at the storage facility. In support of Policy and Analysis efforts, provides analytical and technical support to ongoing FMCT negotiations by providing technical physical protection support related to nuclear material safeguards/verification; supports U.S.-Russian negotiations to implement transparent and irreversible nuclear reductions, in order to confirm that Russian nuclear weapons are being dismantled and excess fissile materials removed are not reused for military purposes, specifically focusing on Laboratory-to-Laboratory WDT efforts; provides leadership and support to international use of cooperative monitoring as an approach to build arms control and reduce regional tensions; provides technical expertise in the areas of inspections, data surety and authentication, and training programs; supports the interagency and U.S. delegations to the CTBT PrepCom and its verification Working Group; provides OSI expertise in key areas of the development of the CTBT International Data Center, protection of data transmitted, and verifiable assessments; participates in U.S. scientific cooperative programs on non-weapons programs, including such subjects as nonproliferation, arms control, and verification technology. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: providing technical support for IAEA and United Nations Special Commission (UNSCOM) inspections; assisting DOE when it leads U.S. interagency physical protection visits; participating in International Physical Protection Advisory Service (IPPAS) missions implementing physical protection improvements; providing support to DOE in the area of international material protection, control and accountability upgrades/sustainability through training, project management, and technical evaluation/review; and providing assistance to the IAEA in implementing remote monitoring systems to streamline nuclear safeguards. In support of IPP, funding is used to work with the states of the former Soviet Union to minimize the risks of weapons of mass destruction proliferation. This is done by creating nuclear/chemical/biological projects in the NIS institutes to prevent "brain drain," to facilitate broad access to former weapons facilities, to provide openness between scientists in the DOE National Laboratories and their NIS colleagues, to provide long-term commercial employment at NIS institutes, to involve other USG agencies with similar interests, and to enhance technology for safety and accountability of special nuclear materials. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Savannah River Operations Office

In support of Export Control Operations, provides unique technical support in the areas of nuclear and nuclear-related dual-use export license evaluations within its area of expertise (e.g., tritium production); and technology security and nonproliferation domestic training. In support of International MPC&A, installs equipment, inventories nuclear materials, and establishes a self-sustaining security infrastructure in the Russia. In support of the DPRK Spent Fuel Activities, provides direct contract procurement support and manages the fuel canning site contractor to minimize corrosion of spent fuel and maintain integrity of storage canisters, prior to the spent fuel's ultimate disposition, in accordance with the "Agreed Framework" signed by the U.S. and DPRK governments. In support of Kazakhstan Spent Fuel Activities and through a contractual arrangement, provides on-site staff and expertise to manage the nuclear material packaging operations at the BN-350 reactor facility. In support of Policy and Analysis efforts, supports the control and elimination of nuclear weapons by assisting in the implementation of the U.S.-Russia Plutonium Production Reactor Agreement (PPRA) by providing staff for U.S. monitoring teams to shutdown Russian plutonium production reactors and subject storage sites, supporting monitoring visits to shutdown U.S. production reactors at the Savannah River Site, developing nuclear monitoring technology, and working with foreign nuclear programs to reduce all civilian use of plutonium and HEU. In support of International Safeguards, improves the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material by: developing verification techniques for excess fissile material storage and disposition options at the Savannah River Site; and supporting UNSCOM and IAEA by providing technical experts, analyses, equipment and training. In support of NCI, funding is used to create sustainable jobs in non-weapons industries for nuclear weapons experts, to help retrain the work force, to attract capital and promote a business friendly atmosphere in the closed cities in order to discourage weapons experts from selling their knowledge to proliferators, and to assist the Russians in their announced intention to reduce the size of their nuclear weapons complex.

Policy and Analysis

Mission Supporting Goals and Objectives

Policy and Analysis provides technical expertise and analytical support for arms control and nonproliferation treaty and agreement policy formulation, negotiation, and implementation at DOE facilities and in regional security. Assistance is provided to the State Department for increased contact with potential proliferant states to explore motives driving proliferation aspirations, and to engage DOE technical resources for training, confidence-building measures, implementation and verification of treaties, cooperative monitoring, and application of technology to facilitate proliferation prevention and reversal of nuclear weapons buildup. Resources are applied for global and regional arms control and nonproliferation treaties (NPT, CTBT, FMCT) and cooperative analysis of nuclear fuel cycles that can destabilize international relations and threaten regional security. Analysis is performed on measures and verification options for a multilateral fissile material production cutoff convention and bilateral cutoff with Russia; implementing a reciprocal monitoring regime for U.S./Russian nuclear weapon dismantlement and fissile material disposition; developing and refining procedures for confirming stockpiles of materials removed from weapons, and alternative cost-effective dismantlement transparency, verification, and chain of custody measures. In addition, analysis is performed on verification of nuclear-weapon-free zones, securing HEU in the former Soviet Union (FSU), regional confidence-building, and evaluation of the impacts of warhead dismantlement and transparency initiatives. Assistance is also provided for implementation of the U.S./Russian agreement for exchange of technical information on nuclear warhead safety and support of projects for continued employment of FSU scientists in non-weapon activities.

Performance Measures

- # Limit weapons-usable fissile materials through worldwide stockpile reductions of plutonium and HEU, the shutdown of production reactors, focusing on proliferation implications of and solutions for key nuclear fuel cycle decisions, and development and implementation obligations under Agreements for Cooperation with other states.
- # Provide analytical and technical support to ongoing negotiations and in preparation for implementation of agreements and treaties such as the FMCT, BWC, and Chemical Weapons Convention (CWC), on such issues as transparency, inspection of and preparation for treaty implementation at sensitive DOE facilities, and verification. Develop implementation strategies and prepare DOE facilities to ensure compliance with arms control and nonproliferation treaties, agreements, and initiatives. Develop appropriate compliance demonstration procedures and methodologies allowing for the protection of national security and proprietary information.
- # Work with Russia to negotiate and implement transparent and irreversible nuclear reductions, to confirm that Russian nuclear weapons are being dismantled, and to ensure that excess fissile materials removed from dismantled Russian nuclear weapons are not reused in new nuclear weapons. Core elements of this program include the Laboratory-to-Laboratory WDT, HEU Purchase Agreement Transparency, Mayak Fissile Material Storage Facility Transparency, and START and beyond.

Continue to support technical programs on regional nonproliferation and security exchanges, involving such tools and concerns as cooperative monitoring, verification, arms control and nonproliferation training, and trans-border environmental impacts that erode regional stability in South Africa, the Middle East, South Asia, Central and Northeast Asia. Reformulate and transition the U.S. scientific cooperative non-weapons program with Chinese scientific counterparts.

Support continuing efforts to gain ratification of the CTBT and steps to facilitate its subsequent implementation, including addressing U.S. responsibilities in the PrepCom and developing procedures for OSI both internationally and at DOE facilities.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Policy and Analysis	23,996	26,360	24,787	-1,573	-6.0%
Total, Policy and Analysis	23,996	26,360	24,787	-1,573	-6.0%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Program Objective— Limit Weapons-Usable Fissile Materials			
Under the direction of the U.S.-Russian PPRA, conduct seven monitoring visits to shutdown Russian and U.S. reactors, operating Russian reactors, and Russian plutonium oxide storage facilities, and participate in two meetings of the Joint Implementation and Compliance Commission (JICC). Implement agreements for cooperation and peaceful uses of nuclear energy to include exchanges of nuclear material accounting records and international consultations.	1,520	1,520	1,520

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Program Objective— Promote Transparent and Irreversible Nuclear Reductions			
Conduct eight weeks of negotiations, consultations anticipated to last several weeks, and maintain technical experts to support deliberations, studies, and domestic and international exercises and/or conduct multilateral verification workshops. Additional funds, redirected from the scientific cooperative program funding line, will be used to conduct three site visits to assess monitoring impacts and requirements under a FMCT, continue international consultations on verification of former military plants in the nuclear weapons states, and conduct a mock on-site inspection. Additional funds will also support efforts to conduct multi-agency cooperative assessments, on-site inspection simulations, and complex data surveys to support the compilation of treaty and agreement mandated declaration submissions.	750	750	2,000
Promote transparent and irreversible nuclear reductions by working with the Russian Federation to negotiate treaty and other legally binding agreements which allows confirmation that Russian nuclear weapons are being dismantled and that excess fissile materials removed from dismantled Russian nuclear weapons are not reused in the production of new nuclear weapons. The core elements of this program include the negotiation of a START III Treaty, currently planned to begin immediately following ratification of START II by the Russian Duma, which will actually mandate the elimination of quantities of nuclear weapons in addition to further reductions in nuclear delivery systems. Through Laboratory-to-Laboratory WDT efforts, maintain a technical dialog with Russian scientific and technical organizations.	11,110	14,849	13,276
Program Objective— Strengthen the Nuclear Nonproliferation Regime			
Support technical and policy analysis efforts in nuclear weapons arms control, confidence building, and other regional security actions, and support activities such as the Cooperative Monitoring Center and other programs that promote regional stability, security, and nonproliferation efforts in South Asia, Northeast and Central Asia, South Africa, and Middle East regions consistent with USG policy. Additional funds, redirected from the scientific cooperative program funding line, will help support the Cooperative Monitoring Center and to maintain communications with Chinese scientific counterparts on non-weapons programs. . .	6,200	5,500	6,145

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Support continuing efforts to gain ratification of the CTBT and steps to facilitate its subsequent implementation, inecluding providing technical experts to domestic and international meetings of the CTBT PrepCom and Working Group B, drafting and refining procedures for OSI, conducting trial inspections and table top exercises, and continuing cooperative CTBT related projects with Russia, France, and Israel.	2,196	1,846	1,846
Support for the scientific cooperative programs and exchanges with Russian and Chinese scientific counterparts on nonproliferation, arms control and verification technology, have been redirected to be managed under the WDT lab-to-lab and regional arms control programs and funds have been redirected to support additional treaties and negotiations requirements.	2,220	1,895	0
Total, Policy and Analysis	23,996	26,360	24,787

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Decrease in funding level associated with Warhead Dismantlement and Transparency efforts in order to fund other high priority Arms Control subprogram areas.	-1,573
Funds redirected from U.S. scientific cooperative programs to support new CWC activities including a diagnostic laboratory, and upcoming and long-term maintenance of BWC efforts and the FMCT.	+1,250
These funds, redirected from U.S. scientific cooperative programs, will be combined with existing regional arms control funds to develop capabilities for addressing the proliferation of weapons of mass destruction in the Middle East, South and East Asia, and to support a reduced level of contact with Chinese scientific counterparts.	+645
Funding for the scientific cooperative programs and exchanges is redistributed as shown above.	-1,895
Total Funding Change, Policy and Analysis	-1,573

Reduced Enrichment Research and Test Reactor (RERTR)

Mission Supporting Goals and Objectives

RERTR supports development of LEU fuels to further LEU conversion of research and test reactors; expedited return of U.S. origin research reactor spent fuel from overseas; and development of targets and chemical processes for producing molybdenum-99 using LEU.

Performance Measures

- # Continue cooperative activities with Russian laboratories on implementation of Russian agreements and the development of LEU fuels for Russia.
- # Support the return of U.S.-origin spent nuclear research reactor fuel from abroad under DOE's Foreign Research Reactor Spent Fuel Acceptance Program.
- # Continue discussions with Chinese research reactor fuel developers on plans for converting Chinese designed and exported reactors.
- # Continue development of high density LEU fuels for research reactors in the United States, Western Europe, South America, and South Korea.
- # Continue development of LEU targets for molybdenum-99 production, including U.S.- Korean, U.S.-Argentine, and U.S.-Australian cooperation on production using LEU.
- # Continue conversion efforts of U.S. reactors and European reactors.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
RERTR	6,000	5,466	5,822	+356	+6.5%
Total, RERTR	6,000	5,466	5,822	+356	+6.5%

Detailed Program Justification

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Program Objective— Limit Weapons-Usable Fissile Materials			
Maintain the program's computational database, develop analytical capabilities, study foreign research and test reactors conversion feasibility, and assist U.S. reactor conversion.	700	850	850
Develop fabrication techniques for research and test reactor fuels of very-high-density, low-enrichment uranium for use in research reactors unable to use current technology LEU fuels. Qualify new LEU fuels, and demonstrate the same performance with the new LEU fuels as achieved with current HEU fuels.	3,022	3,144	3,500
Develop alternative targets and chemical processes to allow use of LEU to produce molybdenum-99, for use in medical applications, including develop target fabrication technology, chemical process technology for recovery and purification, and/or adapt technology for disposing of radioactive waste, and obtain FDA approval to market the drug using LEU instead of HEU.	800	800	800
Provide the Executive Branch with a technical/economic evaluation of each significant request for export of HEU, and support implementation of the USG's policy on the return of foreign research reactor spent fuel.	150	150	150
Enable Russia to complete its RERTR program, established in 1978, by supporting Russian institutes participating in the program, providing reactor analyses and fuel expertise from U.S. experts, and jointly assessing the feasibility of converting Soviet-designed reactors (e.g., in the Czech Republic, Hungary, Poland, Kazakhstan, Uzbekistan, Ukraine, etc.).	1,028	322	322
Encourage establishment of a Chinese RERTR program by supporting the design and operation of research and test reactors that would use LEU fuel, supporting the development and fabrication of LEU fuels for Chinese-designed reactors, and converting from HEU to LEU fuels.	300	200	200
Total, RERTR	6,000	5,466	5,822

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Increased funding brings the program back to previous level, and supports expanded activity of conversion of Russian origin research reactors and further development of fabrication techniques of high density research and test reactor fuels.	+356
Total Funding Change, RERTR	+356

International Safeguards

Mission Supporting Goals and Objectives

International Safeguards provides policy and technical leadership and funds efforts to strengthen the nuclear nonproliferation regime, particularly with respect to global nuclear material security. These efforts improve the cost-effectiveness of the IAEA in detecting clandestine nuclear activities and safeguarding declared nuclear material. New approaches, such as environmental monitoring, remote monitoring, and information management tools are addressed. Policy and technical support is provided to DOE program offices and sites for the implementation of IAEA inspection of U.S. excess material at DOE sites under bilateral and trilateral (with Russia) arrangements. Verification measures are developed, in coordination with the international Policy and Analysis activity and the DOE Office of Research and Development, for implementing the FMCT. IAEA technical assistance programs that promote peaceful use of atomic energy and bilateral nuclear cooperation efforts through "sister lab" arrangements are supported. Agreements for safeguards cooperation are negotiated and implemented for improved material protection, control, accountancy, and transparency with other countries, regions, and international organizations, including Argentina, Australia, Brazil, Brazilian-Argentine Agency for Nuclear Material Control and Accounting (ABACC), China, EURATOM, France, IAEA, Japan, South Africa, and South Korea. The physical protection program is managed to ensure that all countries that possess U.S.-origin nuclear materials are adequately protecting them against, theft, sabotage, and nuclear smuggling. The ITA program, which tracks and analyzes foreign nuclear activity to satisfy statutory requirements and international obligations and to support U.S. nonproliferation policy, is managed and operated. Non-Russian facilities, where security upgrades have been completed under the International MPC&A program, are transferred to International Safeguards.

Performance Measures

- # Provide technical experts, training and/or equipment to IAEA and UNSCOM for inspections in Iraq and/or North Korea.
- # Provide technical advice, support, and technologies (e.g., environmental monitoring, remote monitoring, and information management tools) to IAEA for development of new strengthened safeguards policies and methods.
- # Per the Nuclear Non-Proliferation Act (NNPA) of 1978, Section 202, provide training on safeguards and physical protection to nationals of nuclear developing countries, and lead USG teams on visits to countries with U.S.-origin nuclear material to ensure adequate physical protection.
- # Analyze and implement policy on U.S., IAEA and Russian trilateral verification program to develop and apply IAEA measures on U.S. and Russian excess nuclear weapons material.
- # Per Presidential Decision Directive (PDD) 41, continue IAEA inspections on current U.S. nuclear material under IAEA safeguards, and make additional excess fissile material available for IAEA inspections.

- # Promote peaceful use of atomic energy through support to IAEA technical cooperation activities, sister laboratory arrangements, and promotion of NPT.
- # Continue cooperation with South American, African, Asian, and European partners to strengthen safeguards on nuclear material.
- # Provide physical protection technical assistance to countries with which DOE has bilateral agreements and to the IPPAS in order to prevent nuclear smuggling.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
International Safeguards	21,366	20,675	17,166	-3,509	-16.9%
Total, International Safeguards	21,366	20,675	17,166	-3,509	-16.9%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Program Objective— Strengthen the Nuclear Nonproliferation Regime			
Provide technical assistance to IAEA and UNSCOM for inspections and wide area monitoring in Iraq and North Korea.	1,100	1,100	1,100
Develop example proposals to demonstrate the Integrated Safeguards Evaluation Methodology (ISEM); provide comparisons between existing safeguards criteria and proposals; develop evaluation reports that clearly define the impacts of integrated safeguards proposals; provide technical support on selection of alternate nuclear material; provide support to the Standing Advisory Group on Safeguards in the U.S.; support analysis of up to 250 Network of Analytical Laboratories (NWAL) samples; implement reporting mechanisms for the expanded declaration required by the Additional Protocol; conduct analyses of environmental samples to determine national security concerns at DOE facilities; formulate and coordinate policy and plans to implement the Additional Protocol for strengthened IAEA safeguards at DOE sites; direct development of measures, including managed access, to ensure protection of U.S. national security interests; conduct site visits in the NIS (Belarus, Georgia, Kazakhstan, Ukraine, Uzbekistan) and Baltic countries (Latvia, Lithuania).	4,740	4,665	4,455

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Provide safeguards training to 30 or more participants from at least 20 countries; conduct two physical protection courses.	500	500	500
Implement U.S./Russian/IAEA Trilateral Initiative by representing DOE, on a quarterly basis, to the Joint Working Group; support the Secretary of Energy at the annual principals meeting; identify excess plutonium attributes; develop and test verification measurement and information barrier technologies to prevent disclosure of sensitive data to IAEA inspectors; develop and test IAEA methods to monitor excess fissile materials; conduct vulnerability assessments on verification measurement, information barrier, and monitoring equipment; support development of legal instruments to allow implementation of IAEA verification of excess materials under this regime; implement IAEA verification of excess plutonium at one U.S. excess fissile material storage facility; integrate the IAEA verification regime into the planning process for materials disposition facilities being built in the U.S.	2,500	2,365	2,155
Implement the President's Excess Fissile Material Policy by maintaining the implementation plan for making excess fissile material available for international inspection; develop and coordinate plans to implement IAEA inspections on excess plutonium and HEU; develop verification approach for down-blending of approximately 26 metric tons of excess HEU; formulate and coordinate policy and plans to implement the safeguards agreement with the IAEA; negotiate safeguards approaches with the IAEA for inspections at DOE facilities; provide technical advice and assistance to DOE facilities to facilitate IAEA inspections while minimizing programmatic and facility operational impacts; conduct three training courses for personnel at facilities either currently or planned to go under international inspection.	2,500	2,365	2,155

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Advise the U.S. Representative to the IAEA on policy development and implementation with regard to the IAEA's technical programs; develop and coordinate U.S. policy on various areas of IAEA activity, including fuel cycle activities and new technologies; continue implementation of sister laboratory program under Article IV of the NPT to provide exchange of technical information for peaceful uses of nuclear energy; participate in evaluation of IAEA nuclear safety projects; evaluate and provide recommendations on extra budgetary spending on the IAEA technical programs through participation in the International Nuclear Technology Liaison Office (INTLO) subcommittee; provide collaboration on molybdenum-99 production from LEU between Argonne National Laboratory and Argentina's National Atomic Energy Commission; provide key technical assistance for Peru's commercial radioisotope production program; provide assistance and training in Mexico on cross border issues and issues related to the operation of the nuclear power plant; develop a baseline relationship with Morocco as they create a nuclear applications posture; work with Egypt and their new state of the art reactor on issues such as low level radioactive waste disposition and national radiation background measurements; develop cooperation program in Romania, and the first technology exchange agreement in eastern Europe in areas of production of radioisotopes and Canadian Deuterium Uranium (CANDU) reactor physics.	550	550	550

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Cooperate with ABACC and Brazilian National Nuclear Energy Commission (CNEN) agencies to acquire instrumentation and training for implementation of Strengthened Safeguards Protocol in Argentina and Brazil; support ABACC in developing non-destructive assay (NDA) verification procedures for enrichment facilities in Brazil; assist in establishing physical protection methods for use during transfer of material between Brazilian facilities; implement IAEA physical protection systems; conduct three inspector workshops with ABACC; assist Argentine Nuclear Regulatory Authority (ARN) and CNEN analytical laboratories in establishing quality assurance programs for environmental sampling analysis; cooperate with Japan Atomic Energy Research Institute (JAERI) in support of Strengthened Safeguards Protocol, to define and implement quality assurance and control procedures for clean laboratory environmental analysis; obtain IAEA acceptance of six advanced NDA or remote monitoring technologies in Japan and South Korea; assist ABACC, CNEN, and ARN in conducting initial facility studies toward adoption of IAEA Strengthened Safeguards Protocol; lead U.S. support program coordination meetings with IAEA semiannually; place an entire materials balance area at Lucas Heights, Australia under remote monitoring; complete information management, containment/surveillance, and NDA techniques tasks with EURATOM.	3,076	2,965	2,800
Lead USG teams on visits to countries with USG-origin nuclear material and host visits by physical protection officials from four new countries.	400	400	400
Expand IPPAS missions to provide four additional countries with physical protection assistance.	1,000	1,000	1,000
Operate ITA program with management and funding for the NMMSS portion transferred to Security and Emergency Operations in FY 2001; develop new nuclear waste material accounting software.	5,000	4,765	2,051
Total, International Safeguards	21,366	20,675	17,166

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
# Transfer management and funding of NMMSS from Nonproliferation and National Security to Security and Emergency Operations.	-2,500
# Reduce or delay Integrated Safeguards Methodology development, environmental sampling support, Additional Protocol implementation in the U.S., NIS site visits, Trilateral Initiative implementation, Excess Fissile Material Policy implementation, safeguards cooperation, and ITA Program operation in order to fund other high priority subprogram areas.	-1,009
Total Funding Change, International Safeguards	-3,509

Export Control Operations

Mission Supporting Goals and Objectives

Export Control Operations advance U.S. nonproliferation export control objectives by developing and implementing policies, regulations, and procedures to halt the spread of weapons of mass destruction and their related technologies; promote and extend multilateral-bilateral nuclear supply arrangements in support of U.S. nonproliferation policy; control the export of nuclear and nuclear-related equipment, materials, and technologies as mandated by law and in accordance with national security objectives; and provide leadership and training for the U.S. and international nonproliferation communities. Through the use of unique technical expertise and training, effect a second line of defense program to detect and deter the illicit trafficking of nuclear materials and key equipment.

Performance Measures

- # Continue government-to-government export control initiatives and on-going lab-to-lab cooperative agreements to develop the necessary infrastructure to ensure control over nuclear and nuclear-related dual-use equipment, material, and technology in Russia and the NIS to minimize the risks of nuclear proliferation.
- # Participate in DOE, USG, and multilateral initiatives to combat nuclear smuggling and the illicit transfer of technologies for the production and utilization of special nuclear material as well as dual-use technologies in Russia and the NIS to minimize the risks of nuclear proliferation.
- # Review and provide recommendations to the Nuclear Regulatory Commission and the Department of Commerce on nuclear and nuclear-related dual-use export licenses, representing DOE on all interagency fora (e.g., the Advisory Committee on Export Policy and the Interagency Working Group on Nonproliferation and Export Controls) in support of mandated licensing policy responsibilities.
- # Administer, for the Department, the controls on the transfer of technology and assistance under 10 CFR Part 810.
- # Ensure the viability of PINS to support the DOE export license processing system. Continue development of analytical tools which support implementation of DOE's export licensing review responsibilities under the NNPA.
- # Ensure that DOE surplus equipment and technology is disposed of in a responsible manner and that technology transfers are consistent with regard to U.S. nonproliferation policy, thus reducing inventories of surplus weapons-usable fissile materials worldwide in a safe, secure, transparent, and irreversible manner.
- # Establish a program to support U.S. Customs domestically with technical evaluations of nuclear and nuclear-related shipments, thus minimizing the risks of nuclear proliferation.
- # Conduct technology security reviews for DOE-funded foreign travel, visits and assignments to DOE facilities, technical exchanges, and export of DOE-controlled technology.

- # Serve as the principal U.S. agency in negotiating controls over nuclear and nuclear-related dual-use materials, equipment, and technologies, especially within the NSG and the NPT Exporter's Committee (Zangger Committee). Includes ongoing activities to harmonize unilateral and multilateral controls as mandated by PDD-13, thus strengthening the nuclear nonproliferation regime.
- # Upgrade, implement and support a computerized information sharing system in the NSG for the timely sharing of export denials among the 35 subscribing governments of the dual-use regime in a effort to strengthen the nuclear nonproliferation regime.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Export Control Operations	14,205	13,246	14,060	+814	+6.1%
Total, Export Control Operations	14,205	13,246	14,060	+814	+6.1%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Program Objective— Secure Nuclear Materials and Expertise in Russia, the Newly Independent States (NIS), and the Baltics			
Conduct two to three export control workshops for government and technical officials in Russia, Ukraine, and Kazakhstan.	300	300	300
Initiate three technical studies on nuclear proliferation to strengthen export control practices in Russia, Ukraine, and Kazakhstan.	200	200	200
Ensure that three jointly-developed nuclear export control databases are operating and assisting authorities in export control license reviews in Russia and Ukraine; and develop a system for Kazakhstan. The reduction represents a level of effort consistent with the maintenance of these systems.	300	300	100
Implement plans to educate nuclear producers and exporters on national and international norms of export control in Russia and the NIS.	300	300	300
Work with multilateral players via two seminars to engage export control officials in the Baltics and Southern Tier to familiarize them with export control procedures.	415	415	415
Continue training 100-200 Russian government officials in the establishment of an effective export control system.	400	400	400

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Develop indigenous training courses that Russian technical experts and MINATOM officials can use in training 1,000-2,000 government officials.	200	200	200
Cooperation with Russian Federation agencies on special nuclear material and dual-use commodity identification.	400	400	400
Program Objective— Strengthen the Nuclear Nonproliferation Regime			
Participate in new fast-track negotiations on plutonium isotope separation technologies and new studies on globalization of the U.S. nuclear industry. Also, investigate, via two technical studies, the likelihood to adding nuclear propulsion technologies to the control list, accelerator production of special nuclear materials and nuclear ordinance items (those that are not presently controlled either by the NSG or the Missile Technology Control Regime). Technologies such as weapons simulation codes, which may be significant under stockpile stewardship programs, also will be considered for control on a multilateral level, resulting in up to 10 new controls for the multilateral list.	1,838	1,485	1,885
Reinitiate support activities associated with the USG implementation of the Strengthened Safeguards System Protocol as the Department prepares to implement the protocols on import/export requirements.	200	0	200
Upgrade the NSG Information Sharing System to meet current industry standards and expand its capabilities to allow subscribing governments (35 terminals) to share information documents with others.	575	575	575
Program Objective— Control Nuclear Exports			
Review and provide more than 2,500 recommendations to the Department of Commerce on the dual-use commodities related to non-nuclear weapons of mass destruction (WMD), which include chemical and biological warfare (CBW) and missile items, representing DOE on all the interagency fora, including the SHIELD for CBW and the Missile Technology Advisory Committee (MTAC). The increased funding represents the rising number of export applications.	6,282	5,876	6,290
Ensure that the downsizing and dismantlement efforts throughout the DOE complex and disposal of excess materials, equipment, and technology at multiple DOE sites proceed responsibly, in strict adherence to U.S. nonproliferation policy and without inadvertent support to proliferants.	1,105	1,105	1,105

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Administer the Department's system on the transfer of nuclear technology and services required by Section 57b of the Atomic Energy Act and implemented under DOE regulations 10CFR Part 810.	685	685	685
Implement an outreach program with five DOE weapons laboratories and contractors, providing guidance regarding export-controlled technology and U.S. export control regulations to DOE and the national laboratories.	1,005	1,005	1,005
Total, Export Control Operations	14,205	13,246	14,060

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Reduce funding that supports three jointly developed nuclear export control databases to maintenance level.	-200
Conduct new fast-track negotiations on plutonium isotope separation technologies and new studies on globalization of the U.S. nuclear industry.	+400
Reinstitute support activities for implementation of protocols on import/export requirements as part of the Strengthened Safeguards System Protocol.	+200
Increased funding needed due to the trend of a rising number of export applications.	+414
Total Funding Change, Export Control Operations	+814

International Materials Protection, Control, and Accounting

Mission Supporting Goals and Objectives

International MPC&A activities are designed to support cooperation under agreements established with Russia for the protection of "direct use" nuclear materials. The focus is on key facilities and institutions that possess or process significant quantities of nuclear weapons-usable materials that are of nonproliferation concern. Expertise in the planning and implementation of systems and procedures to enhance protection of such materials is provided. These activities support the integration of nuclear materials security equipment and procedures into systems that are effective and are maintainable and sustainable by the cooperating countries. Efforts also promote the diffusion of nuclear materials security technologies, concepts, and expertise to different types of operating facilities where systems will be implemented. International MPC&A activities enhance U.S. national security and reduce the threat of nuclear proliferation and nuclear terrorism by improving the security of all weapons-usable nuclear materials (not in weapons) in Russia. The International MPC&A priority is to rapidly secure all material where it currently is kept. Goals include installing MPC&A equipment, inventorying nuclear material, changing the Soviet security culture, and establishing a self-sustaining security infrastructure. Funding provides for MPC&A upgrades for defense-related sites in Russia including uranium and plutonium cities, the nuclear weapons complex, maritime fuel locations, and transportation vehicles. MPC&A upgrades for civilian and regulatory related sites in Russia including large fuel facilities, reactor-type facilities, regulatory systems and organizations, and training programs and centers are also funded. MPC&A activities also include the consolidation of nuclear material into fewer buildings and sites and blending down excess material into non-weapons grade form. MPC&A upgrades in Kazakhstan, Ukraine, Belarus, Uzbekistan, Latvia, Georgia, and Lithuania were completed in FY 1998.

In FY 2001, this subprogram includes funding for International Emergency Cooperation (IEC) efforts transferred from the Emergency Management Decision Unit, with the remainder being funded in the Security and Emergency Operations program in FY 2001. IEC ensures that foreign governments, international organizations, and U.S. embassies receive emergency assistance in nuclear matters. This includes providing assistance in responding to nuclear material smuggling or trafficking incidents; obtaining samples of seized smuggled material for the purpose of forensic analysis; developing emergency policy and planning infrastructure, emergency operations facilities, and emergency procedures; technical and training assistance; and representing DOE and U.S. interests and policy in international fora.

Performance Measures

International MPC&A

- # Continue MPC&A upgrades on 650 metric tons of HEU and plutonium located in over 400 buildings at 40 Russian sites.
- # Complete installation of security upgrades at six Russian Navy sites, improving security on tens of tons of weapons usable material.

- # Continue installation of security upgrades at two MINATOM weapons complex sites and in buildings at the remaining eight MINATOM weapons complex sites, improving the security on tens of tons of weapons usable material.
- # Complete installation of security upgrades at two civilian sites and in buildings at four other civilian sites, improving the security on tens of tons of weapons usable material. In addition, Site Operations and Sustainability (SOS) initiative will implement 20 site level performance, training and maintenance programs; three vendor support projects; and hire five graduates from the Moscow State Engineering Physics Institute.
- # Begin to consolidate weapons usable nuclear material into fewer buildings and fewer sites, and eliminate at least 200kg of weapons grade material by converting it to non-weapons grade form.
- # Complete transportation upgrades on 48 trucks and 33 railcars, and continue work on the Federal Information System for tracking nuclear material.

International Emergency Cooperation

- # Provide an annual report on illicit nuclear materials transactions.
- # Provide rapid credibility assessment of any nuclear threats.
- # Provide rapid assessment of potential nuclear weapons or materials smuggling activities.
- # Leverage DOE capabilities and assets to ensure effective emergency cooperation and programs with foreign governments, international organizations, and U.S. embassies.
- # Promote the Department's emergency policy interests in international fora.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
International MPC&A	139,753	144,618	149,856	+5,238	+3.6%
Total, International MPC&A	139,753	144,618	149,856	+5,238	+3.6%

Detailed Program Justification

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Program Objective— Secure Nuclear Materials and Expertise in Russia			
International MPC&A			
Continue to install MPC&A security upgrades at land- and ship-based naval sites storing fresh fuel and other material of high proliferation concern, shipyards, and naval test reactor facilities. .	30,000	30,000	35,000
Continue to install security upgrades at 10 closed nuclear sites containing hundreds of tons of weapons usable material, some in weapons component form.	38,000	37,856	37,856
Continue to install security upgrades at eight large fuel facilities and 12 research reactor sites containing tons of weapons usable materials. Initiate SOS initiative to ensure continued operations of installed MPC&A systems by supporting guard force activities and vendor-to-vendor programs to improve indigenous equipment. . .	38,000	37,762	35,000
Initiate consolidation efforts to improve security and minimize long-term costs by reducing the number of buildings and sites that store weapons usable material, and the elimination of weapons usable material via blend-down to non-weapons grade form.	8,000	8,000	12,000
Continue to establish the necessary federal-level Russian infrastructure such as regulations, enforcement mechanisms, training centers, material tracking systems, and secure transportation.	25,753	31,000	25,000
International Emergency Cooperation			
Continue to operate the communicated threat assessment program to provide a national capability to assess the credibility of nuclear/ radiological and extortion threats received world-wide. Continue to strengthen the analytical data base. Funding in FY 1999 and FY 2000 for this effort was included in the Emergency Management Decision Unit, which transferred to Security and Emergency Operations in FY 2001.	0	0	4,000

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Provide support to maintain the role and visibility of the Department as a leader in the formulation of national security related policies for nuclear materials trafficking and enhance the nuclear materials trafficking hotline. In support of USG agencies, maintain data on the flow and composition of nuclear smuggling, focusing on the quality of smuggled material, the source of the material, and the intended use of the smuggled material. Enhance operational capability for response to situations to obtain samples of intercepted materials. Funding in FY 1999 and FY 2000 for this effort was included in the Emergency Management Decision Unit, which transferred to Security and Emergency Operations in FY 2001.	0	0	700
Continue liaison and interaction with international organizations (such as the IAEA, the Nuclear Energy Agency (NEA), the European Union (EU), the North Atlantic Treaty Organization (NATO), and the Arctic Council) and foreign governments (such as the United Kingdom (UK), France, Japan, South Korea, Switzerland, the Nordic Countries, and the NIS) to provide assistance in ensuring adequate emergency plans and procedures for response to nuclear/radiological situations and to support exercise planning. Funding in FY 1999 and FY 2000 for this effort was included in the Emergency Management Decision Unit, which was transferred to Security and Emergency Operations in FY 2001.	0	0	300
Total, International MPC&A	139,753	144,618	149,856

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
MPC&A upgrades for naval-related sites: increase is a result of identification of several new naval sites containing highly attractive material which is unprotected (FY 2000 @ $30M vs. FY 2001 @ $35M).	+5,000
MPC&A upgrades for civilian related sites: decrease is a result of rapid upgrades being completed. New funds required for SOS initiative (FY 2000 @ $38M vs. FY 2001 @ $35M)	-2,762
Material consolidation: increase due to the completion of the model project and initiation of material consolidation efforts at several sites (FY 2000 @ $8M vs. FY 2001 @ $12M)	+4,000
Infrastructure upgrades: decrease is the result of transportation upgrades on currently identified truck and rail cars being finalized (FY 2000 @ $31M vs. FY 2001 @ $25M)	-6,000
Transfer of funding for International Emergency Cooperation efforts from the Emergency Management Decision Unit, which was transferred to Security and Emergency Operations in FY 2001.	+5,000
Total Funding Change, International MPC&A	+5,238

Treaties and Agreements

Mission Supporting Goals and Objectives

The Treaties and Agreements subprogram supports implementation of bilateral or multilateral, Presidentially-directed or Congressionally-mandated arms control and nonproliferation initiatives, agreements and treaties. In addition, it provides for unexpected, unplanned responses to arms control and nonproliferation requirements of an immediate nature based on urgent U.S. national security needs, as well as preparations to meet new transparency or verification requirements arising out of ongoing negotiations that are consistent with U.S. national security and without compromising proliferation sensitive information.

Performance Measures

- # Continue support for Russian and other FSU activities related to specific agreements such as those resulting form the Gore/Chernomyrdin and Gore/Kiriyenko Commissions; the HEU Purchase Agreement and other opportunities to secure, through purchase, at-risk weapons-usable materials; and activities related to bilateral and trilateral excess fissile materials inspections among Russia, the IAEA, and the U.S.
- # Support the NPT, FMCT, CTBT, CWC, and BWC; address unexpected requirements concerning treaty or agreement negotiations; and support activities in response to urgent U.S. national security requirements.
- # Provide technical support and personnel to UNSCOM/United Nations to ensure no re-initiation of WMD programs in Iraq.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Treaties and Agreements	3,645	3,079	3,225	+146	4.7%
Total, Treaties and Agreements	3,645	3,079	3,225	+146	4.7%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Program Objective— Secure Nuclear Materials and Expertise in Russia, the Newly Independent States (NIS), and the Baltics			
Provide support for Russian and other FSU activities, including work on converting three plutonium production reactors in Russia and other activities under the Gore/Chernomyrdin and Gore/Kiriyenko Commissions.	300	300	300
Program Objective— Limit Weapons-Usable Fissile Materials			
Support HEU purchase agreement (buying 500 metric tons of weapons-origin HEU), and other opportunities. Secure at-risk nuclear materials in the 15 former Soviet Republics.	500	500	500
Provide support to bilateral and trilateral activities to inspect 30 metric tons of excess plutonium and hundreds of tons of excess HEU.	940	900	900
Program Objective— Strengthen the Nuclear Nonproliferation Regime			
Support additional and unexpected requirements for negotiations of the NPT, FMCT, CTBT, CWC, and BWC.	1,677	1,151	1,297
Continue technical support to UNSCOM/United Nations on Iraq.	228	228	228
Total, Treaties and Agreements	3,645	3,079	3,225

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Provides additional support for negotiations of the NPT, FMCT, CTBT, CWC, and BWC.	+146
Total Funding Change, Treaties and Agreements	+146

International Security

Mission Supporting Goals and Objectives

International Security supports the implementation of security commitments made by the Administration regarding Russia, the NIS of the FSU, and the DPRK. Specific efforts are:

Implement a nuclear spent fuel maintenance plan by continuing technical dialogue with the DPRK. Spent fuel activities in the DPRK include arresting the corrosion of the spent fuel from the 5MW research reactor in Nyongbyon, North Korea; and safely canning and storing spent fuel prior to its ultimate disposition in accordance with the "Agreed Framework" signed by the governments of the U.S. and DPRK.

Ensure safe, secure storage of spent nuclear fuel at the BN-350 Reactor in Aktau, Kazakhstan. Spent Fuel Activities in Kazakhstan support the urgent security and storage requirements for plutonium-bearing spent fuel located at the reactor. The objective of this activity is to complete canning of spent fuel rods in the pool and secure approximately three tons of weapons-grade plutonium under IAEA safeguards.

The IPP in the NIS, transferred from Defense Programs, Weapons Activities in FY 1996, was designed to reduce the global nuclear danger through focused, cooperative projects involving the ten major DOE laboratories and science and engineering institutes in Russia, Ukraine, Kazakhstan and Belarus. Some of these projects will involve cost-sharing with U.S. industry. Major initiatives include preventing "brain drain" by engaging scientists, engineers, and technicians in non-weapons-related projects; motivating participation in proliferation prevention activities; facilitating continued access to NIS facilities through technical engagement with personnel; and establishing self-sustaining commercial linkages that will support future independent commercial projects and assure a Federal exit strategy. Cooperative, cost-sharing projects are aimed at establishing direct partnerships that will provide for long-term commercial employment of key scientists, engineers, and technicians.

The NCI contributes to nonproliferation goals and reduces the global nuclear danger in direct and concrete ways. By working closely with MINATOM, USG representatives and the U.S. private sector will assist in the development of suitable and gainful employment in the commercial sector for skilled scientific personnel of the Russian nuclear complex. Of the approximately 170,000 employees who work directly at the nuclear weapons facilities in the ten nuclear cities of the Russian Federation, many are considered potential proliferation risks due to their direct knowledge of nuclear weapons technology. These individuals will likely be among those who lose their jobs when the production of the weapons facilities is scaled back. It is in the U.S. interest to support MINATOM in this undertaking to prevent the potential "brain drain" to countries with the means and the intention to gain access to nuclear technology.

Performance Measures

Spent Fuel Activities in the DPRK

- Implement long-term maintenance of water treatment and fuel canning equipment including crane maintenance replacement equipment, materials consumed in maintenance, fuel for site power and heat for winter visits; and associated shipping costs. Conduct on-site inspections in combination with follow-up trips to repair equipment or recan spent fuel if necessary.
- Carry out technical studies to analyze safety issues, characterize fuel, and develop disposition options. Train DPRK staff to maintain essential site equipment.
- Provide a trained team of U.S. experts to conduct regular health physics tests and maintain necessary certifications.
- Address and resolve problems with canister integrity, water clarity, and other issues which would impact IAEA safeguards activities.

Spent Fuel Activities in Kazakhstan

- Design and procure spent fuel cask transportation system for transporting spent fuel canisters from Aktau to Baikal-1 storage facility.
- Complete construction of underground silo storage facility for the fuel canisters at the Baikal site.
- Complete design and begin development and installation of the safeguards monitoring and physical protection systems for approximately 500 underground silos at the Baikal-1 storage facility.

Initiatives for Proliferation Prevention (IPP)

- Create cooperative, cost-sharing projects aimed at establishing direct partnerships which will provide for long-term commercial employment of key scientists, engineering, and technicians.
- Carry out other IPP project and support activities to keep NIS institutes viable as stable places of peaceful employment; to engage NIS weapons scientists, engineers and technicians in peaceful, commercial activities to prevent "brain drain;" to facilitate broad access to NIS chemical, biological and nuclear weapons facilities in order to achieve close one-to-one working relationships of DOE laboratory scientists and engineers with their NIS colleagues to promote openness and transparency; and to focus on "closed cities."
- Involve other agencies having similar technological interest, such as NIH, USDA, and Department of State, in IPP projects.
- Conduct specific projects involving technologies, the development of which supports enhanced safety, security and accountability of nuclear materials (for example, neutron emission technology to counter nuclear smuggling).

Nuclear Cities Initiative (NCI)

- Create jobs in the civilian sector in each of the target nuclear cities for nuclear scientists, engineers and technicians.

Work with MINATOM in the diversification of the economy of the nuclear cities and in creating an environment for further business development.

Carry out of a number of social initiatives including exchanges in medical, educational, and woman's leadership training programs undertaken in support of NCI job creation efforts.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Spent Fuel Activities in the DPRK	2,328	2,045	1,954	-91	-4.4%
Spent Fuel Activities in Kazakhstan	14,950	15,459	16,000	+541	+3.5%
Initiatives for Proliferation Prevention (IPP) [a]	22,500	22,500	22,500	0	0.0%
Nuclear Cities Initiative (NCI) [b]	7,500	7,500	17,500	+10,000	+133.3%
Total, International Security	47,278	47,504	57,954	+10,450	+22.0%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Program Objective— Strengthen the Nuclear Nonproliferation Regime			
Spent Fuel Activities in the DPRK			
Provide equipment replacement and maintenance, and purchase fuel sources for equipment operation in the DPRK	1,028	1,028	1,028
Conduct two, two-week visits to perform on-site inspections, prepare for two additional follow-up visits to repair equipment, and perform several technical analyses on safety, fuel composition, and disposition	700	650	650
Provide two DPRK personnel maintenance training sessions, one refresher training course for U.S. experts, and up to three health physics tests	100	50	50
Resolve eight weeks of technical problems impacting IAEA activities	500	317	226
Total, Spent Fuel Activities in the DPRK	2,328	2,045	1,954

[a] FY 1999 efforts funded at $25M from a combination of prior year balances and $22.5M in FY 1999 budget authority, including $15M as requested, $4.5M from funding for International MPC&A, and $3M from funding for other Arms Control and Nonproliferation functional areas (RERTR, International Safeguards, and Export Control Operations).

[b] FY 1999 efforts funded at $15M from a combination of prior year balances and $7.5M in FY 1999 budget authority from funding for International MPC&A.

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Program Objective— Secure Nuclear Materials and Expertise in Russia, the NIS, and the Baltics			
Spent Fuel Activities in Kazakhstan			
At the BN-350 Aktau reactor, secure spent fuel containing plutonium in welded stainless steel canisters (six assemblies per canister). The tons of spent fuel will be placed in a facility containing underground silos for long-term dry storage. The underground silos will be instrumented with nuclear material safeguards technology in order to detect with continuous, unattended monitoring from a remote location, any diversion of the spent fuel material.	15,000	15,459	16,000
Total, Spent Fuel Activities in Kazakhstan	15,000	15,459	16,000
Initiatives for Proliferation Prevention (IPP)			
Under IPP, engage about 1,200 scientists, engineers, and technicians in 20 projects to provide long-term commercial employment at nuclear (MINATOM/Academy of Science) NIS institutes. Since FY 1999, the IPP has steadily increased the number of long-term commercial projects with a larger portion of the funding being allocated to the NIS.	10,125	15,750	15,750
Engage about 500 scientists, engineers and technicians in 10 projects to provide long-term commercial employment at chemical/biological NIS institutes. Since FY 1999, the percentage of chemical/biological projects has significantly increased from 10% to more than 30% of the budget.	1,500	6,750	6,750
Engage about 300 scientists, engineers and technicians in 17 projects to prevent "brain drain" and promote openness between DOE laboratory scientists and their NIS colleagues at nuclear (MINATOM/Academy of Science) institutes. Since FY 1999, the number of research projects has decreased at nuclear facilities in favor of commercial projects.	5,325	0	0
Engage about 225 scientists, engineers and technicians in 9 projects to prevent "brain drain" and promote openness between DOE laboratory scientists and their NIS colleagues at chemical/biological institutes. Since FY 1999, the number of research projects has decreased at chemical/biological facilities in order to increase the commercial projects.	3,750	0	0
Create three projects involving other USG agencies with similar interests. With emphasis on sending more funding to the NIS rather than other USG agencies.	750	0	0

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Create five projects involving technology to enhance environmental safety, security and accountability of nuclear materials. The funding level has been reduced in order to fund more commercial projects.	1,050	0	0
Total, Initiatives for Proliferation Prevention (IPP) [a]	22,500	22,500	22,500
Nuclear Cities Initiative (NCI)			
Create approximately 1,000 permanent commercial jobs employing displaced nuclear weapons scientists and engineers.	5,000	5,000	11,650
Carry out program objective of creating commercial economic opportunities in the closed, nuclear cities of Russia.	2,500	2,500	5,850
Total, Nuclear Cities Initiative (NCI) [b]	7,500	7,500	17,500
Total, International Security	47,278	47,504	57,954

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Spent Fuel Activities in the DPRK	
Decreased time spent in resolving technical problems impacting IAEA activities.	-91
Spent Fuel Activities in Kazakhstan	
Restoral of funding due to one-time general reduction for contractor travel and directed savings applied in FY 2000.	+541

[a] FY 1999 efforts funded at $25M from a combination of prior year balances and $22.5M in FY 1999 budget authority, incuding $15M as requested, $4.5M from funding for International MPC&A, and $3M from funding for other Arms Control and Nonproliferation functional areas (RERTR, International Safeguards, and Export Control Operations).

[b] FY 1999 efforts funded at $15M from a combination of prior year balances and $7.5M in FY 1999 budget authority from funding for International MPC&A.

	FY 2001 vs. FY 2000 ($000)
Initiatives for Proliferation Prevention (IPP)	
While the IPP funding level has remained the same, several new policy changes have been instituted since FY 1999. There has been a dramatic increase in commercial projects over research projects, and 65% of the funding must now be spent in the NIS as opposed to the required 50% in FY 1999. There is also an increased emphasis on chemical/biological projects so that in FY 2001 they will comprise 30% of the total budget. The average size of all projects has increased to $200,000 for one-year research projects and $1 million for two-year commercial projects.	
Reduction of IPP funding from nuclear, chemical and biological facilities, and from other USG agencies.	-6,900
Increased emphasis on IPP commercial projects.	+6,900
Nuclear Cities Initiative (NCI)	
Increased NCI support for accelerated closure planning and implementation in Snezhinsk and Zheleznogorsk	+5,000
Increased NCI implementation of plans to stop all nuclear weapons assembly and disassembly at the Avangard Plant in Sarov.	+5,000
Total Funding Change, International Security	+10,450

International Nuclear Safety and Cooperation

Program Mission

The program mission is to support national security by activities in international nuclear safety and cooperation. The activities are managed by the Office of Nonproliferation and National Security.

The goal is to reduce the national security and environmental risks of nuclear power plants and nuclear facilities worldwide, especially Soviet-designed reactors, and to assist the host countries to implement self-sustaining nuclear safety improvement programs capable of reaching internationally accepted safety practices. Project activities address significant safety issues primarily in Ukraine, Russia, Armenia, and Kazakhstan. Activities also support development of international nuclear safety centers.

The 1986 disaster at the Chornobyl nuclear power plant revealed many flaws in the Soviet approach to nuclear safety. Soviet-designed reactors operate in nine countries, some of which are facing difficult economic conditions. The facilities have deficiencies in training, safety procedures, and safety infrastructure. Equipment shortages are commonplace and many nuclear professionals suffer from low or erratic pay. These conditions, when combined with serious flaws in the designs of some of the reactors, pose a risk of a reactor accident.

Another major nuclear accident would cause political, economic and environmental destabilization of politically sensitive regions. This could adversely affect partner countries, as well as U.S. military and civilian personnel in the region. These concerns led to the conclusion that enhancing the safety of Soviet-era nuclear reactors and establishing improved safety infrastructures in the countries that operate them is a vital national security interest. Western countries have the capability to work with these nations to address nuclear safety challenges with a relatively modest investment. Rather than providing billions of dollars to correct all of the problems directly, the safety program helps the host countries structure their nuclear industry to address safety issues, to prevent accidents, and, as their economies improve, to increase their own funding for nuclear safety. The program also provides a modest investment in critical technologies that are immediately needed to assure the safety of the nuclear power plants. The activities address nuclear safety issues which, if not dealt with, could erode public confidence in nuclear energy worldwide.

The program supports the U.S. policy to shutdown the Chornobyl nuclear power plant. These activities include supporting the International Chornobyl Center which assists Chornobyl workers in finding alternative work. The cooperative activities provide opportunities to encourage other countries to support U.S. nuclear nonproliferation objectives and policies. These activities include the transfer of U.S. nuclear safety technology to countries such as Ukraine, which has cooperated extensively with the United States, on arms control and nonproliferation. Cooperation also includes participating in activities of the International Atomic Energy Commission, the Organization of Economic Cooperation and Development/Nuclear Energy Agency and, on a bilateral basis, with research organizations in countries such as Japan and France.

In addition to the national security need, the activities provide opportunities for U.S. industry to enter into the economies of the host countries. This could lead to significant future business opportunities.

Performance Goals

1. To improve the safety of 65 reactors at 21 Soviet-designed nuclear power plants, and to assist the 9 host countries to implement self-sustaining nuclear safety programs and internationally accepted safety practices without encouraging long-term operation of RBMK and VVER-440/230 type plants.

2. To promote nuclear safety improvements internationally by providing strong leadership in international nuclear safety organizations and centers, such as the International Atomic Energy Agency (IAEA), the European Bank for Reconstruction and Development (EBRD) (Nuclear Safety Account) and the Nuclear Energy Agency (NEA) of the Organization of Economic Cooperation and Development (OECD). Activities support the development of safety centers, and include cooperation on the safety of Soviet-designed reactors, the socioeconomic aspects of reactor shutdown, the environmental aspects associated with nuclear materials, the effects of the Chornobyl accident, and safety-based nuclear infrastructures.

3. To assist other Federal agencies carrying out a variety of related activities such as projects supporting shutdown of the Chornobyl nuclear power plant and improvement of the nuclear power infrastructure.

Performance Measures

For each performance goal, several performance measures have been identified which relate to accomplishments planned for completion in FY 2001.

1. Nuclear power plant safety.

- Complete full-scope simulator for Ukraine=s Rivne nuclear plant unit 3 and South Ukraine nuclear plant unit 1, and for Russia=s Kalinin nuclear plant unit 1.
- Complete safety parameter display systems for Ukraine=s South Ukraine nuclear plant unit 3, and Zaporizhzhya nuclear plant units 2 and 4.
- Complete in-depth safety assessment at Ukraine=s South Ukraine nuclear plant and Rivne nuclear plant, and at Russia=s Kola, Novovoronezh, and Leningrad nuclear plants.
- Complete nuclear service water system at Armenia nuclear plant.
- Complete fire protection system upgrades at the Kazakhstan BN-350 nuclear plant.
- Complete implementation of symptom-based emergency operating instructions at the Kozloduy plant and at Novovoronezh plant unit 4.

2. International nuclear safety organizations and centers.

- # Complete projects at the International Chornobyl Center in support of shutting down the Chornobyl Nuclear Plant. This includes completion of plans for shutdown and deactivation of units 1, 2, and 3. Safety analyses will also be prepared for submittal to the regulator for shutting down these units. Projects to characterize the condition of spent nuclear fuel and evaluate safe options for spent fuel management will be completed.
- # Complete, continue and initiate joint projects between the U.S. International Nuclear Safety Center and its counterparts in Russia, Kazakhstan and Ukraine.

3. Shutdown of the Chornobyl nuclear power plant and improvement of the nuclear power infrastructure. [a]

- # Complete construction of heat plant to support long-term decommissioning of the Chornobyl reactors.
- # Complete preliminary decommissioning plan for Armenia nuclear plant.
- # For the Ukraine nuclear fuel qualification program, complete basic technology transfer activities, and deliver the lead test assemblies.

[a] The program plans to receive FY 2001 funds from AID to continue or to complete these projects.

Funding Profile

(dollars in thousands)

	FY 1999 [a] Current Appropriation	FY 2000 [a] Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 [b] Request
International Nuclear Safety [c]	79,989	15,000	0	15,000	20,000
Use of Prior-Year Balances.....	-297	0	0	0	0
Total, International Nuclear Safety	79,692	15,000	0	15,000	20,000

Funding Schedule

(dollars in thousands)

	FY 1999 [a]	FY 2000 [a]	FY 2001 [b]	$ Change	% Change
International Nuclear Safety [c]	79,989	15,000	20,000	+5,000	+33.3%
Use of Prior-Year Balances.....	-297	0	0	0	0.0%
Total, International Nuclear Safety...	79,692	15,000	20,000	+5,000	+33.3%

[a] Amounts appropriated in these columns were appropriated under AOther Defense Activities.@

[b] Amounts reflected in this column are requested under AOther Nuclear Security Activities.@

[c] Total includes funding that the program received from AID for nuclear safety and cooperation activities for Ukraine, Armenia, and Kazakhstan in FY1999 ($50.1 million). Total excludes funding that the program may receive from AID for nuclear safety and cooperation activities in Ukraine, Armenia, and Kazakhstan in FY 2000 and FY 2001.

Funding by Site

(dollars in thousands)

	FY 1999 [a]	FY 2000 [a]	FY 2001 [b]	$ Change	% Change
Richland Operations Office (Washington State)					
Pacific Northwest National Laboratory	71,600	9,500	13,850	+4,350	+45.8%
Total, Richland Operations Office	71,600	9,500	13,850	+4,350	+45.8%
Chicago Operations Office					
Argonne National Laboratory (Illinois/Idaho)	5,000	3,300	3,600	+300	+9.1%
Brookhaven National Laboratory (New York)	1,500	500	500	0	0.0%
Total, Chicago Operations Office	6,500	3,800	4,100	+300	+7.9%
Idaho Operations Office (Idaho)					
Idaho National Engineering and Environmental Laboratory	700	500	850	+350	+70.0%
Total, Idaho Operations Office	700	500	850	+350	+70.0%
Washington Headquarters (Maryland and Washington DC)	189	200	200	0	0.0%
All Other Sites [c]	1,000	1,000	1,000	0	0.0%
Subtotal, International Nuclear Safety	79,989	15,000	20,000	+5,000	+33.3%
Use of Prior-Year Balances	-297	0	0	0	0.0%
Total, International Nuclear Safety	79,692	15,000	20,000	+5,000	+33.3%

[a] Amounts appropriated in these columns were appropriated under "Other Defense Activities."

[b] Amounts reflected in this column are requested under "Other Nuclear Security Activities."

[c] Funding provided to support DOE representatives at U.S. Mission to OECD in Paris, U.S. Embassy in Kiev and U.S. Embassy in Tokyo, other laboratories and miscellaneous contractors.

Site Description

Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory (PNNL) is one of DOE=s multi-program national laboratories. It serves as the lead laboratory for the Soviet-designed reactor safety activities. PNNL provides management, technical, contracting, and administrative support to the program in the areas of Soviet-designed reactor safety and international cooperation.

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 oversees the safety analysis project activities and the International Nuclear Safety Center activities.

Brookhaven National Laboratory

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

Idaho National Engineering and Environmental Laboratory

Idaho National Engineering and Environmental Laboratory (INEEL) is one ofDOE=s multi-program national laboratories. INEEL is located in Idaho. INEEL oversees International Centers for Environmental Safety activities and reactor safety analysis activities.

International Nuclear Safety
Mission Supporting Goals and Objectives

Nuclear Power Plant Safety

A series of joint U.S./host country projects improve nuclear power plant safety by transferring U.S. technology, equipment, methods and experience in the areas of training and simulators, operating and emergency procedures, safety maintenance, safety system upgrades, fire safety, reactor safety analysis, and regulatory improvement. Operator error is a significant factor in nuclear accidents, and the capability of operators is strengthened by many of the projects, including symptom-based emergency operating instructions, training, simulators, and safety parameter display systems (SPDS). Over 200 projects have been initiated with 21 Soviet-designed plant sites, U.S. national laboratories, and 46 U.S. companies.

Nuclear training centers have been established at the Balakovo site in Russia and the Khmelnytskyy plant in Ukraine. U.S.-trained instructors have trained more than 3,000 workers. Instructors developed and conducted job-specific maintenance and operations courses, along with courses in employee safety and supervisory skills. These instructors will continue to work with U.S. experts to transfer the training methodology and materials to other plants in Russia, Ukraine, and other countries with Soviet-designed reactors.

Simulator projects have been completed for training reactor operators at Khmelnytskyy unit 1 and Zaporizhzhya unit 5 full scope simulator; and Novovoronezh unit 3, Balakovo unit 4, and Chornobyl unit 3 analytical simulators. Additional simulator projects are in progress at:

- Kola unit 4 full scope simulator; Balakovo unit 4 full scope simulator upgrade; Kalinin unit 1 full scope simulator; and Bilibino analytical simulator
- South Ukraine units 1 and 3 full scope simulators; Rivne units 2 and 3 full scope simulator; and Zaporizhzhya unit 1 full scope simulator
- Trnava training center full scope simulator upgrade

Follow-on activities after completion of simulators include: maintenance and support for initial simulator operations; modification of a simulator to include SPDS capability; and provision of simulator training materials.

Management and operational safety is improved by projects to implement modern safety procedures for quality assurance, configuration management, event analysis and reporting, emergency operating instructions, safety maintenance, nondestructive examination, and use of a reliability database to prioritize activities. As part of an operator exchange program, more than 200 staff members from 21 nuclear sites have worked with personnel at 12 U.S. nuclear power plants to study approaches to safety. U.S. specialists transferred skills for developing symptom-based emergency operating instructions (EOIs) to pilot plants in the host countries. EOIs enable control room operators to stabilize a reactor during an abnormal event. Pipe lathe/weld preparation machines were provided to the five plants with RBMK reactors. Previously, workers cut pipes by hand, increasing the risk of leaks that could lead to a

loss-of-coolant accident. Valve-seat resurfacing equipment, vibration monitoring and shaft alignment systems and nondestructive examination equipment also were provided to minimize the chance of equipment failure.

SPDSs enable control room operators to assess abnormal conditions rapidly and take corrective actions. SPDS projects have been completed at Kursk unit 2; Novovoronezh units 3 and 4; Chornobyl unit 3; Khmelnytskyy unit 1; Zaporizhzhya unit 5; South Ukraine unit 1; and Armenia unit 2. SPDS projects are in progress at:

- Novovoronezh unit 5 in Russia.
- South Ukraine units 2 and 3; Rivne unit 3; Zaporizhzhya units 1, 2, 3, 4 and 6 in Ukraine.

Fire safety and other hardware upgrades are provided to selected plants. Equipment was provided to plants in Armenia, Ukraine, Russia and Bulgaria. Russia's Kola and Kursk plants and Bulgaria's Kozloduy plant received backup power systems to supply electricity during emergency shutdowns. Russia's Kursk plant and Novovoronezh plant received mobile pumping units for emergency water supplies. With U.S. support, Kola personnel substantially reduced leaks in the radiation confinement system. U.S. and host country experts have defined methodologies for conducting fire hazards analyses at Soviet-designed reactors, and pilot analyses are under way at Russia's Smolensk plant and Ukraine's Zaporizhzhya plant. After U.S. training, companies in Ukraine and in Russia have manufactured more than 800 fire doors that meet international standards. Safety upgrades are planned for the three Russian plutonium production reactors once they are converted to civilian operations. Projects on fire protection, training, safety maintenance, and EOIs have been completed to reduce risks at Chornobyl's operational unit 3 reactor. A project is planned to address the important safety issue of intergranular stress corrosion cracking.

Safety analysis activities and safety assessment infrastructure projects are being provided to pilot plants. In-depth safety assessments (ISA) are conducted to determine the most significant risks and set priorities for safety upgrades. ISA projects are in progress at:

- Kola units 1, 2 and 4; Kursk unit 1; Leningrad unit 2; Novovoronezh units 3 and 4
- South Ukraine unit 1; Rivne unit 1; Zaporizhzhya unit 5; Khmelnytskyy unit 1

Computer analysis codes and methodologies are being developed and transferred to host-country experts to assess plant safety, identify risks, and set priorities for safety upgrades. Computers for conducting analyses were provided to Bulgaria's Kozloduy plant and to Lithuania's Ignalina plant.

International Nuclear Safety Organizations and Centers

Office representatives participate in IAEA, EBRD, NEA, and coordinating committee (European Commission, Russia, Ukraine, Japan, Korea, China) activities to provide leadership and coordination of activities.

International Nuclear Safety Centers were established in the U.S., Russia, and Kazakhstan to sponsor projects to improve information sharing and safety improvements through prompt analysis of potential safety problems. The centers provide a repository of nuclear safety information and maintain a core knowledge base through shared information and leveraged funding through joint projects. Several projects are underway.

The International Chornobyl Center for Nuclear Safety, Radioactive Waste and Radioecology has been established in Ukraine. The Center provides technical support to the Ukrainian nuclear power industry and serves as a focal point for international cooperation at Chornobyl. Joint projects in data analysis, spent fuel management, and reactor closure are in progress. The Center is planned to be strengthened so that it can maintain safety and environmental databases and can coordinate fully with the other Centers. The Center will continue operations on its own after it is fully established. The Center also assists workers at Chornobyl by fostering diversification at the nearby economy through training and technology transfer.

International Centers for Environmental Safety have been established in the U.S. and Russia. The centers will develop and maintain the infrastructure necessary to manage nuclear facility cleanup, facility conversion to other uses, and waste disposition; and to develop and implement specific environmental safety projects. The centers will focus on cooperative activities to mitigate the environmental effects of defense and civil nuclear programs while contributing to the redeployment of Russian scientists. Addressing critical nuclear-related environmental issues will reduce the risk that they will lead to significant threats to human health or the environment. The centers would also serve as a means for U.S. companies to develop and demonstrate environmental technologies for use at U.S. sites and to demonstrate their capabilities in foreign markets.

Nuclear Materials Safety project activities will improve safety at nuclear materials facilities by conducting a series of workshops and training on nuclear materials safety management; conducting joint facility safety research; developing university advanced degree programs; and conducting comparative technical studies of safety processes and procedures involving fissile materials storage, conversion and transportation.

Shutdown of the Chornobyl nuclear power plant and improvement of the nuclear power infrastructure.

Activities include coordination with other Federal agencies to address decommissioning the Chornobyl plant and the effects of the Chornobyl accident, as well as a variety of special issues related to safety and

environmental aspects of nuclear power plants and other nuclear facilities, submarines, and fissile materials. At meetings with Ukrainian officials, the U.S. continues to stress the vital importance for Ukraine to keep its commitment to close Chornobyl unit 3 in 2000.

At the Zaporizhzhya plant in Ukraine, cooling ponds for storing spent fuel rods are nearly full. The U.S. has delivered equipment and trained Ukrainian personnel to build and regulate a safe, modern dry-cask storage system. The system will reduce the need to send spent fuel to Russia for reprocessing, which will alleviate national security concerns, while still allowing the plant to operate.
Nuclear safety regulatory and legislative support is in progress for several countries in order to develop a strong and independent regulatory infrastructure for nuclear facilities.

Projects are in progress to support the restructuring and commercialization of the nuclear industries so that, as economies improve, there will be increased revenues available for nuclear safety upgrades. Construction is in progress for a heat plant to support long-term decommissioning of the Chornobyl reactors. A preliminary decommissioning plan for the Armenia nuclear plant is being prepared to facilitate closure of the plant as soon as practicable. A five year program to decommission Kazakhstan's BN-350 breeder reactor is in progress. Physical security upgrades are being made to pilot plants in Ukraine. Workshops and student exchanges are ongoing.

As part of the Ukraine nuclear fuel qualification program, activities are underway to transfer technology to develop Ukraine's ability to qualify nuclear fuel for its VVER-1000 reactors from an alternate vendor.

Detailed Program Justification

		(dollars in thousands)		
		FY 1999	FY 2000	FY 2001
Nuclear Power Plant Safety				
#	Operational safety. Conduct projects to improve quality assurance; configuration management; event analysis, reporting, and lessons learned; symptom-based emergency operating instructions; safety maintenance; nondestructive examination; reliability database; andintergranular stress corrosion cracking...	4,550	2,430	5,000
#	Training and simulators. Transfer training methodologyand training courses from training centers to nuclear plants. Provide simulators and simulator support to selected plants, including simulator training, engineering support, and spare parts for Russia, Ukraine, Slovakia, and Bulgaria. Install full scope simulators at Rivne unit 2 and Zaporizhzhya unit 1.....	9,150	1,150	600
#	Engineering and technology. Test and implement improved reactor safety control system in Russia. Implement safety parameter display systems at Leningrad unit 1,Novovoronezh unit 5, Armenia unit 2, Zaporizhzhya unit 1, and Ignalina unit 2. Implement fire safety upgrades at Smolensk, South Ukraine units 1-3, Khmelnytskyy unit 1,Zaporizhzhya and Kazakhstan. Implement control and protection system upgrade at Ignalina units 1 and 2. Manufacture and install electronic modules for the control and protection system of Ignalina unit 2. Transfer technology on safer circuit breakers. Install steam isolation valves at Novovoronezh unit 3. Complete design of sodium decontamination equipment for Kazakhstan.	13,969	3,410	5,650
#	Safety assessment infrastructure. Provide U.S. safety codes and training to evaluate safety issues. Develop and assess safety codes. Complete in-depth safety analyses for Kola,Kursk, Leningrad, Novovoronezh, Balakovo, Khmelnytskyy unit 1, South Ukraine unit 1, and Rivne unit 1. Provide technical support for Ignalina unit 2 safety analysis report.....	13,406	3,260	2,900
International Nuclear Safety Organizations and Centers				
#	Participate in IAEA, EBRD, and NEA activities, coordinating committees, workshops, student exchanges.....	1,047	750	100
#	International Nuclear Safety Centers in U.S., Russia, and			

		(dollars in thousands)		
		FY 1999	FY 2000	FY 2001
	Kazakhstan. In the U.S. and Russia, complete initial analytical projects and maintain a safety database. Develop coupled thermal-hydraulic andneutronic computer codes for reactor safety analyses. In Russia, establish a computational facility for remote computing capability, address nuclear materials safety issues, and support the International Centers for Environmental Safety to lower the risks of further environmental disasters. In Kazakhstan, assemble, analyze and share nuclear safety information related to the six reactors and associated nuclear facilities, including projects with the Kazakhstan Atomic Energy Agency on safety analysis for spent fuel removal, transfer, and storage. Support the international effort to irreversibly shutdown the BN-350 breeder reactor in Aktau..	1,980	650	1,750
#	International Chornobyl Center for Nuclear Safety, Radioactive Waste and Radioecology. Characterize condition of spent fuel at Ukrainian power plants and evaluate safe options for spent fuel management. Conduct planning and safety analyses for the shutdown and deactivation of Chornobyl units 1, 2, and 3. Develop a comprehensive database on radioactive contamination inside the Chornobyl shelter and in the 30-kilometer Exclusion Zone around the plant. Establish basic capabilities for communications, information sharing and cooperative activities with other International Nuclear Safety Centers. Transfer technology on conducting safety analyses, and monitor the Chornobyl shelter implementation plan; and analyze impacts from consequences of Chornobyl accident..... ...	1,700	500	1,000
Shutdown of the Chornobyl nuclear power plant, and improvement of the nuclear power infrastructure [a]				
#	Chornobyl heat plant. Build heat plant to provide heat and electricity to allow decommissioning activities to proceed	11,280	0	0
#	Infrastructure support. Implement capacity factor improvements. Conduct trade conference. Provide nuclear safety regulatory and legislative support. Provide topical workshops and develop technical standards to strengthen the independent regulatory infrastructure for nuclear facilities	860	650	0
#	Nuclear Fuels Qualification. Provide technology transfer to Ukraine to establish the capability to obtain fuel from a qualified U.S. vendor	9,400	0	0

[a] The program plans to receive FY 2001 funds from AID to continue or to complete these projects.

		(dollars in thousands)		
		FY 1999	FY 2000	FY 2001
#	Nuclear reactor physical security. Conduct assessment and implement upgrades	940	0	0
#	Year 2000 computer problem. Provide technical support for conducting assessments and preparing contingency plans	5,570	0	0
Program Management and Administration				
#	Provide resources for senior technical management, international project support offices, financial management, quality assurance, contracts administration, information and communications products and services, and external reviews by independent, external organizations such as the National Academy of Sciences	5,840	2,200	3,000
Total, International Nuclear Safety [a]		79,692	15,000	20,000

[a] Total includes funding that the program received from AID for the nuclear safety and cooperation activities for Ukraine, Armenia, and Kazakhstan in FY1999 ($50.1 million). Total excludes funding that the program may receive from AID for nuclear safety and cooperation activities in Ukraine, Armenia, and Kazakhstan in FY 2000 and FY 2001.

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Safety parameter displays systems for Ignalina and Novovoronezh	+1,400
Technical support for Ignalina unit 2 safety analysis report	+300
Operational safety improvements in Ukraine, including emergency operating instructions, nondestructive examination of safety maintenance, and reliability database. In Russia, addressing Intergranular stress corrosion cracking issues	+2,500
Program management and administration including external reviews	+800
Total Funding Changes, International Nuclear Safety	+5,000

HEU Transparency Implementation

Program Mission

The Highly Enriched Uranium (HEU) Transparency Implementation program is responsible for monitoring the nonproliferation aspects of the February 1993 agreement between the United States and the Russian Federation and to help provide overall confidence that the objectives are being met. This Agreement covers the purchase over 20 years of low enriched uranium (LEU) derived from at least 500 metric tons of HEU removed from dismantled Russian nuclear weapons. Under the Agreement, conversion of the HEU components into LEU is performed in Russian facilities. The purpose of the program is to put into place and implement those measures agreed to by both sides that permits the United States to have confidence that the Russian side is abiding by the Agreement. The program also requires the United States to support comparable monitoring activities by the Russian Federation representatives at U.S. facilities subject to the Agreement.

Program Goal

The goal of the HEU Transparency Implementation Program is to support the implementation of United States nonproliferation policy by providing confidence that Russian LEU sold to the United States Enrichment Corporation (USEC) is derived from HEU removed from dismantled Russian nuclear weapons. Using the International Atomic EnergyAgency=s definition of a significant quantity, this would be enough HEU to make approximately 20,000 nuclear devices. Continuation of this program provides confidence that this weapons-grade material is being irreversibly processed is of paramount importance to National Security goals and Strategic objectives.

Program Objectives

Implement and support transparency monitoring activities in Russia and the United States at each country=s uranium processing facilities subject to the Agreement.

Collect and analyze monitoring and other information to help provide overall confidence that the Russians are converting HEU from dismantled nuclear weapons into LEU.

Provide assistance in the development and negotiating of new transparency measures to enhance program objectives and resultant confidence assessments.

Performance Measures

Monitor the dilution of 30 metric tons of HEU to LEU from dismantled Russian nuclear weapons for purchase by the USEC.

Conduct 24 special monitoring inspections to the four Russian facilities processing HEU into LEU for delivery to the United States.

- Maintain the permanent presence office atNovouralsk, Russia to have confidence that the LEU being purchased by USEC has been derived from HEU removed from dismantled Russian nuclear weapons.

- Maintain the U.S.-designed and fabricated uraniumhexaflouride (UF6) flow and enrichment Blend Down Monitoring System (BDMS) equipment at the blend points at theNovouralsk and Krasnoyarsk HEU dilution facilities. This includes regular procurement, replacement, and disposal of radioactive sources critical to BDMS operations. Additionally, collect and analyze resultant information from installed and operating BDMS equipment.

- In conjunction with interagency staff, compile and analyze collected data and information into an assessment of confidence of compliance with the nonproliferation and national security objectives of the HEU Purchase Agreement.

Significant Accomplishments and Program Shifts

Historical and Planned Accomplishments

HEU Transparency Implementation activities began in FY 1993 as a prescribed element of the February 1993 bilateral HEU Purchase Agreement. Significant historical and planned accomplishments are provided below.

- Provided technical, logistical, and document preparation support for various bilateral negotiation meetings resulting in the bilateral signing of a Memorandum of Understanding on Transparency (1993), a Protocol on HEU Transparency Arrangements in Furtherance of the Memorandum of Understanding (1994), and 16 Annexes to the Protocol governing transparency monitoring activities in both Russia and the U.S. (1994-1999).

- Conducted nine familiarization visits (19931998) to four Russian sites where HEU is stored and processed into LEU for delivery to the United States.

- FY 1995 through FY 1999, conducted 48 special monitoring visits to four Russian uranium processing facilities. In FY 2000 and 2001, plans are to conduct 24 special monitoring trips to the four Russian uranium processing sites each year.

- In August 1996, opened a permanent U.S. monitoring office inNovouralsk, Russia. The officehas a staff of up to four U.S. technical experts. In FY 1999, we implemented a program to include permanent presence staff as members of special monitoring visit teams to other Russian uranium facilities to enhance the quality of monitoring operations. This permanent presence office in Novouralsk, Russia will be maintained in FY 2000 and 2001.

- FY 1995-FY 1997, developed non-intrusive nondestructive assay (NDA) flow and enrichment Blend Down Monitoring System (BDMS) equipment for use on process pipes in the three Russian blending facilities. During FY 1997 conducted five technical installation visits to two Russian blending facilities and installed the electronic control units at the blend points. FY 1997-FY 1998 fabricated the flow and enrichment BDMS equipment for two of the three blending facilities, compatible with Russian laws and radiation regulations, and prepared necessary documentation required to obtain a Russian license to allow the equipment to be installed and operated in Russian nuclear processing facilities.

- In FY 1998 (April to June 1998) we installed and demonstrated the BDMS equipment at the U.S. Paducah Gaseous Diffusion Plant. This demonstration showed that the monitoring equipment will work on pipes with 1.5 percent enriched uranium as UF6 gas flow and can be safely installed and operated in uranium enrichment facilities. A Russian delegation witnessed this BDMS demonstration which served to facilitate their licensing and approval process.

- In January 1999, we installed two BDMS sets of equipment on the two blending systems at the Ural Electrochemical Integrated Plant, once licensing and operating approvals were secured. This was a very significant and unique milestone to have U.S. measurement equipment installed in Russian nuclear facilities.

- In 2000, we plan to install the BDMS equipment on the blending system pipes at the Electrochemical Plant (ECP) in Krasnoyarsk. The precise schedule for this installation is dependent upon Russian authorities approving the installation activity. In 2001, we plan to work with the third blending facility, at Seversk, to prepare for the installation of BDMS equipment at that site.

- FY 1995, started data analysis activities to evaluate confidence that the Russians are abiding by the Agreement. During FY 1997, determined through data analysis that the contents of one container of Russian LEU shipped to USEC did not appear to be derived from Russian HEU subject to the Purchase Agreement. Subsequent discussions with the Russian Government during FY 1997 and FY 1998 led to the exclusion of this container from the HEU Purchase Agreement deliveries.

- FY 1998, developed a centralized automated Data Archive, Retrieval, and Transfer (DARTS) system database for all information gathered by monitors. Also formed two assessment teams to focus upon the analysis of information on conversion and blending of HEU into LEU operations in Russian plants. Actual accountability and material transfer documents from the Russian facilities are now available for evaluation in conjunction with first-hand monitoring data. In FY 1999, we expanded access to the DARTS centralized database to enhance analysis of information and improve the quality of resultant documents.

- From initial delivery of LEU product in FY 1995 through December 1999, the HEU Transparency program has monitored the conversion and processing of 90 metrictonnes of HEU. Using the IAEA definition of significant quantity, this represents approximately 3,600 nuclear devices.

- For years 2000 and 2001, we plan to monitor the conversion and processing of 30 metric tonnes of HEU per year per contracted agreements. New contracts will be negotiated between USEC and Minatom for the next five years of deliveries, which we will monitor.

Funding Profile

(dollars in thousands)

	FY 1999[a] Current Appropriation	FY 2000[a] Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001[b] Request
HEU Transparency Implementation.....	0	15,750	-60[c]	15,690	15,190
Total, HEU Transparency Implementation.....	0	15,750	-60	15,690	15,190

Prior to FY 2000, HEU Transparency Implementation activities were funded through Uranium Programs.

Public Law 106-65, ANational Defense Authorization Act FY2000"

[a] Amounts appropriated in this column were appropriated under AOther Defense Activities@

[b] Amounts reflected in this column are requested under AOther Nuclear Security Activities@

[c] Share of 3/8 of one percent across-the-board reduction associated with the FY 2000 Omnibus Appropriations

Funding by Site

(dollars in thousands)

	FY 1999	FY 2000[a]	FY 2001[b]	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	0	1,400	1,400	0	0.0%
Sandia National Laboratories	0	2,110	2,110	0	0.0%
Total, Albuquerque Operations Office	0	3,510	3,510	0	0.0%
Chicago Operations Office					
Argonne National Lab	0	800	800	0	0.0%
Brookhaven National Laboratory	0	40	40	0	0.0%
New Brunswick Laboratory	0	550	550	0	0.0%
Total, Chicago Operations Office	0	1,390	1,390	0	0.0%
Nevada Operations Office					
Remote Sensing Laboratory	0	450	450	0	0.0%
Oakland Operations Office					
Lawrence Livermore National Laboratory	0	6,100	5,800	-300	-4.9%
Oakland Operations Office	0	850	850	0	0.0%
Total, Oakland Operations	0	6,950	6,650	-300	-4.9%
Oak Ridge Operations Office					
Lockheed Martin Energy Systems	0	3,200	3,000	-200	-6.0%
Oak Ridge Operations & Portsmouth	0	160	160	0	0.0%
Total, Oak Ridge Operations Office	0	3,360	3,160	-200	-6.0%
Richland Operations Office					
Pacific Northwest National Laboratory	0	30	30	0	0.0%
Washington, D.C. Headquarters	0	0	0	0	0.0%
Total, HEU Transparency Implementation	0	15,690	15,190	-500	-3.2%

Prior to FY 2000, HEU Transparency Implementation activities were funded through Uranium Programs.

[a] amounts appropriated in this column were appropriated under AOther Defense Activities.@
[b] amounts reflected in this column are requested under AOther Nuclear Security Activities.@

Site Description

Argonne National Laboratory

Argonne National Laboratory (ANL) is one of DOE's largest research centers. It is also the nation's first national laboratory chartered in 1946. Argonne occupies two sites. The Illinois site is surrounded by forest preserve about 25 miles southwest of Chicago's Loop. Argonne West site occupies approximately 900 acres about 50 miles west of Idaho Falls in the Snake River Valley. Argonne also maintains offices in the Washington, D.C. metropolitan area. ANL provides the HEU Transparency Implementation program with technical experts to serve as permanent and special monitors on trips to Russian facilities involved in the conversion of HEU into LEU; technical assistance in the coordination and maintenance of permanent presence monitors and monitoring activities in Russia; technical and logistical support and expertise in the planned opening of a permanent presence office in Seversk, Russia; and in data analysis and confidence assessment of information gathered from monitoring activities.

Brookhaven National Laboratory

Brookhaven National Laboratory (BNL) is a DOE scientific research laboratory located on Long Island, New York. BNL provides the HEU Transparency Implementation program with personnel to serve as technical monitors on trips to Russian facilities involved in the conversion of HEU into LEU and technical personnel to assist in the analysis of information received from monitoring activities in Russia.

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) is a DOE weapons laboratory located in Los Alamos, New Mexico. LANL provides the HEU Transparency Implementation program with non-intrusive nondestructive assay equipment for measuring the enrichment of uranium hexaflouride gas in blending pipes. This equipment was installed at Novouralsk in January 1999, and a second set is scheduled to be installed in Krasnoyarsk HEU dilution facility in early FY 2000. The third Russian blending facility at Seversk presents new and challenging equipment design and development options. This is the newest blending facility and has physical constraints, operating conditions, and support requirements different from the other two blending facilities. It is necessary to support engineering efforts to modify current BDMS designs, as well as Russian plant modifications to support future equipment fabrication and installation. The equipment will provide continuous monitoring of the enrichment level of uranium flowing through the blending pipes. This information will provide high confidence that the Russians are diluting HEU with low enriched uranium to produce reactor grade LEU for shipment to the United States. LANL personnel are also used to 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 and as special monitors at weapon component conversion facilities. LANL personnel also provide technical expertise to interpret resultant BDMS data and to trouble shoot the installed equipment.

Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) is a DOE weapons laboratory located in Livermore, California and maintains a small technical support staff in the Washington, D.C. metropolitan area. LLNL provides to the HEU Transparency Implementation program technical personnel to serve as U.S. permanent presence and special monitors to Russian facilities where HEU is converted into LEU; interpreters to serve with each special monitoring team and negotiating teams; overall coordination for all U.S. special monitoring trips; coordination of training courses for personnel to serve as monitors; health and safety monitoring including personnel radiation safety of all personnel serving on trips to Russia; procurement, maintenance, and technical troubleshooting for hand held nondestructive analysis equipment used for measuring the enrichment of uranium in closed Russian material containers; and the collection and analyses for all information obtained from monitoring activities to determine the confidence levels that the Russians are abiding by the agreement; provides logistical and technical support for the bilateral Transparency Review Committee meetings, and provides technical support at meetings dealing with transparency issues. They have developed and will maintain the automated Data Archive, Retrieval, and Transfer system, to effectively manage all accumulated monitoring data. They also provide technical support and expertise on the U.S. Portsmouth GDP and commercial reactor fuel fabrication facilities, subject to the Agreement.

Lockheed Martin Energy Systems (LMES)

Lockheed Martin Energy Systems (LMES) is a DOE contractor with personnel at Y-12 and the Oak Ridge National Laboratory (ORNL) located in Oak Ridge, Tennessee. LMES also provides funding for USEC personnel at the Portsmouth Gaseous Diffusion Plant located in Piketon, Ohio, and the Paducah Gaseous Diffusion Plant located in Paducah, Kentucky. LMES provides technical personnel to serve as U.S. permanent and special monitors to Russian facilities where HEU is converted into LEU. LMES personnel participate in the training of personnel to serve as monitors and host and conduct training classes at the Y-12 plant. ORNL personnel developed non-intrusive nondestructive assay equipment for measuring the flow of uranium hexafluoride gas in the blending pipes. This equipment was installed in one Russian dilution facility in January 1999 and planned for a second facility in FY 2000. The third facility at Seversk presents new and challenging design and development requirements. This is the newest blending facility and has physical constraints, operating conditions, and support requirements different from the other two facilities. It is necessary to support engineering efforts to modify current BDMS designs, as well as Russian plant modifications to support future equipment fabrication and installation. They are also responsible for the development, procurement, preparation of technical manuals, training of Russian and U.S. personnel, shipment of equipment, licensing in Russia, and installation of the BDMS equipment on the blending pipes in the Russian HEU dilution facilities; assist in

the analysis of information obtained from monitoring activities in Russia to support confidence levels; and, assist in hosting Russian monitoring visits to thePaducah and Portsmouth Gaseous Diffusion Plants. They also developed a demonstration test stand for the BDMS equipment and had the system licensed and installed at Paducah to demonstrate the operability and sensitivity of the equipment to be installed in the Russian facilities. LMES personnel also provide technical expertise to interpret resultant BDMS data and trouble shoot equipment operations.

New Brunswick Laboratory

New Brunswick Laboratory (NBL) is a totally owned DOE lab staffed with Federal employees. NBL provides technical experts to serve as permanent presence and special monitors on trips to Russian facilities involved in the conversion of HEU into LEU. NBL personnel serve as Team Leaders and Heads of Delegation for groups conducting HEU Transparency monitoring activities at facilities in Russia.

Oakland Operations Office

DOE's Oakland Operations Office (OAK) has offices in Berkeley and Livermore, California. Personnel at the Livermore, California office provide contract procurement and administrative oversight on contracts providing logistical and other services to U.S. monitors while conducting monitoring activities in Russia. Specifically, OAK oversees and funds a contract with thePragma Corporation in McLean, Virginia that provides direct support in Yekaterinburg, Russia, for U.S. personnel assigned to a permanent monitoring office at Novouralsk, Russia; assistance as needed for U.S. personnel serving on special monitoring visits to Russian processing facilities; and transfer of funds to Russian facilities for reimbursable expenses associated with monitoring activities, including the installation of BDMS flow and enrichment equipment on the pipes in the three Russian dilution facilities.

Oak Ridge Operations Office

DOE's Oak Ridge Operations Office (ORO) located in Oak Ridge, Tennessee, maintains and provides services as required under the bilateral transparency agreements for a permanent Russian monitoring office inside the secure area at the Portsmouth Gaseous Diffusion Plant and provides support to Russian monitors conducting monitoring activities at the Portsmouth plant. They also provide technical personnel to serve as U.S. monitors to Russian facilities where HEU is converted to LEU. ORO personnel also serve as Team Leaders and Heads of Delegation for groups conducting HEU Transparency monitoring activities at Russian facilities.

Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory (PNNL) is a DOE research laboratory located in Richland, Washington. PNNL has provided technical expertise to evaluate the applicability of advance flow technology equipment for use in Russia. PNNL also provides funding for travel costs for a PNNL employee based in Oak Ridge, Tennessee who serves as a technical expert on monitoring trips to Russian facilities involved in HEU to LEU conversion. The PNNL expert also participates in meetings associated with the technical analysis and confidence assessment of information obtained from monitoring activities.

Remote Sensing Laboratory

The Remote Sensing Laboratory (RSL) is a DOE laboratory located in Las Vegas, Nevada, and has the Washington Aerial Measurement Office at Andrews AFB. RSL provides technical experts to serve as monitors on trips to Russian facilities involved in the conversion of HEU into LEU.

Sandia National Laboratory New Mexico

Sandia National Laboratory is a DOE weapons research laboratory with facilities in Livermore, California and Albuquerque, New Mexico (SNL). SNL provides technical experts to serve as permanent presence and special monitors on trips to Russian facilities involved in the conversion of HEU into low enriched uranium (LEU); provides for the procurement, installation, replacement, and disposal of radioactive sources required for operating the BDMS flow and enrichment monitoring equipment installed in the three Russian HEU dilution facilities, by contracting with the "All Russian Technical Institute for Physics" in Schnezinsk; construction of secure housings for the enrichment monitoring equipment developed by the LANL; acts as an adviser on appropriate tamper indicating devices to ensure U.S. equipment, in Russian facilities, is not unknowingly compromised; and, coordinates Russian visits to the United States for discussions related to use of U.S. monitoring equipment in Russian facilities and Russian visits to U.S. facilities subject to Russian monitoring activities.

Highly Enriched Uranium (HEU) Transparency Implementation

Mission Supporting Goals and Objectives

- *Provide support to U.S. facilities subject to Russian monitoring* - Under the terms of the Transparency agreements the Russian Federation may conduct monitoring visits to the Portsmouth Gaseous Diffusion Plant (PGDP) and to the five U.S. nuclear fuel fabricators that process material received from Russia subject to the Agreement. Support includes conducting pre-Russian visit trips; preparation of summary reports tracking HEU from Russia through U.S. facilities; providing interpreters for the visits; and maintaining a permanent Russian monitoring office at the Portsmouth plant.

- *Assist Russian personnel while in the U.S.* - Russia has the right to conduct up to 10 five-day monitoring trips to the U.S. nuclear fuel fabricators each year and up to six visits to the Portsmouth Gaseous Diffusion Plant each year. Additionally, Russia may have up to four individuals staff a permanent monitoring office at the Portsmouth plant. Support includes providing escorts while the Russians are in the U.S. to answer questions, provide miscellaneous assistance as requested, and provide security escorts at Portsmouth.

- *Conducting both special and permanent monitoring activities in Russian facilities* - Russian processing of HEU into LEU is being conducted at five processing plants located at four sites. Existing agreements permit the U.S. monitors to conduct up to six special monitoring visits at each site and staff a permanent presence office. During FY 2000, one U.S. permanent presence office was maintained at the Ural Electrochemical Integrated Enterprise (UEIE) in Novouralsk, Russia. Activities include maintaining a pool of 200 technical experts that can serve as monitors; training of U.S. personnel serving as monitors, team leaders, and technical installers; coordinating trips to Russia; monitoring personnel's health; and providing necessary monitoring equipment designed and supplied by DOE national laboratories.

- *Perform analysis and confidence assessments* - Collect, analyze, and evaluate all monitoring information and information from other sources to support a confidence assessment of Russian compliance with the Agreement.

- *Develop new transparency measures* - Evaluate the effectiveness of existing monitoring activities, develop improved measures, and implement improvements as appropriate. Develop, fabricate, install and use special monitoring nondestructive assay instruments to fulfill monitoring objectives.

- *Provide support in the development and negotiation of Transparency agreements including providing representation activities* - The addition of new Russian facilities and changes to existing facilities requires the development and negotiation of facility specific agreements governing monitoring activities at those facilities. The Transparency program personnel provide recommendations on draft language, propose negotiation strategies, and provide technical and logistical support at bilateral meetings. Interagency coordination of strategies and implementing details is included in this activity.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Russian Monitoring in the U.S.	0	250	250	0	0.0%
Technical Support, Management, Health, Data Analysis, Confidence Assessment...	0	4,840	4,840	0	0.0%
Permanent Monitoring Office in Russia....	0	4,130	3,830	-300	-7.3%
Special Monitoring Visits to Russia	0	4,260	4,260	0	0.0%
Monitoring Equipment	0	2,210	2,010	-200	-9.1%
Total, HEU Transparency Implementation.....	0	15,690	15,190	-500	-3.2%

Prior to FY 2000, HEU Transparency Implementation Activities were funded through Uranium Programs.

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Russian Monitoring in the U.S.			
# Portsmouth PPO Support	0	125	125
# U.S. Nuclear Fuel Fabricator Support.....	0	125	125
# Assistance to Russians during monitoring visit.....	0	0	0
Total, Russian Monitoring in the U.S.....	0	250	250
Technical Support, Management, Health, Data Analysis, Confidence Assessment, and Negotiation Support			
# Management.....	0	1,500	1,500
# Health Monitoring and Analysis.....	0	1,025	1,025
# Data Analysis and confidence Assessment.....	0	1,540	1,540
# Negotiation Support	0	775	775
Total, Technical Support, Management, Health, Data Analysis, Confidence Assessment, and Negotiation Support.....	0	4,840	4,840

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Permanent Monitoring Office in Russia			
# Office in Novouralsk, Russia	0	1,830	1,830
# Initiate support for a second office in Russia	0	100	100
# Local logistical support	0	500	500
# Russian facilities reimbursements	0	600	600
# Coordination	0	600	400
# Monitoring Training	0	500	400
Total, Permanent Monitoring Office in Russia	0	4,130	3,830
Special Monitoring Visits to Russia			
# Plant visits (24 in FY00 and FY01)	0	2,390	2,390
# Russian facilities reimbursements	0	170	170
# Coordination	0	1,000	1,000
# Monitoring Training	0	700	700
Total, Special Monitoring Visits to Russia	0	4,260	4,260
Monitoring Equipment			
# Hand held portable nondestructive assay units plus seals	0	710	710
# Fabricate and install BDMS flow and enrichment units	0	0	0
# Equipment maintenance and sources	0	1,500	1,300
Total, Monitoring Equipment	0	2,210	2,010
Total, HEU Transparency	0	15,690	15,190

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Share of the remaining $6.7M for Program Direction annualized requirement for staffing ramp-up initiated by FY 2000 reprogramming request	-500
Total funding change, HEU Transparency Implementation	-500

Long-Term Nonproliferation Program for Russia

Program Mission

The Long-Term Nonproliferation Program for Russia will establish a series of new initiatives to respond to recognized but previously unaddressed threats to U.S. national security. This expanded component will supplement on-going Departmental programs and establish new and accelerated solutions to the most serious dangers presented by the Russian nuclear weapons complex and civilian nuclear facilities.

The program, building upon successful on-going projects, will take advantage of new opportunities presented by the Russians to dramatically reduce the production of plutonium; enhance the proliferation-resistance of nuclear fuel cycle technologies; accelerate the planned downsizing of the Russian nuclear weapons complex through the closure of facilities and consolidation of nuclear materials into fewer locations; and expand nuclear material protection activities to the most sensitive Russian Navy sites.

Program Goal

Prevent the further accumulation of separated civil plutonium at the Mayak facility by offering incentives, including a program for the joint research and development to enhance the proliferation resistance of nuclear fuel cycle technologies (this program will be co-managed with the DOE Office of Nuclear Energy, Science and Technology), the construction of a dry spent fuel storage facility at Mayak, and the exploration of options for permanent disposition in Russia of spent nuclear fuel and high level waste (this program will be co-managed with the DOE Office of Civilian Radioactive Waste Management). These initiatives will also help address continuing USG concerns over Russia's nuclear cooperation with Iran.

In cooperation with existing Russian plans for weapons complex downsizing, accelerate closure by up to two years of weapons production capabilities at Russian nuclear weapons assembly and disassembly plants.

Implement new MPC&A strategy to simplify the nuclear security threat in Russia by consolidating plutonium and highly-enriched uranium (HEU) to fewer sites and into fewer buildings and converting HEU to low-enriched uranium (LEU), rendering it less attractive to would-be proliferators.

Expand upon ongoing work with the Russian Navy by upgrading security at the Russian Navy's most sensitive sites and consolidating all materials in the Northern and Pacific fleets into centrally located facilities.

Achieve the return of weapons usable spent and fresh fuel inventories to Russia from the most vulnerable former Soviet research reactors outside Russia and facilitate the safe shutdown and conversion of these research reactors to LEU fuel use.

Achieve expanded emergency response capabilities for an improved response system with data exchange between the Department of Energy and MINATOM crisis centers for rapid, reliable, real-time communication in the event of an emergency.

Program Objectives

- # Prevent Further Accumulation of Separated Civil Plutonium by Russia at Mayak
- # Develop a Joint Program to Enhance the Proliferation Resistance of Existing Nuclear Systems and Develop New Concepts for Next-Generation Proliferation Resistant Reactor Systems
- # Consistent with existing Russian plans, accelerate closure of production capabilities at Russian Weapons Assembly and Disassembly Plants
- # Implement New MPC&A Strategy to Strengthen Nuclear Security in Russia Through Consolidation and Conversion of Materials
- # Expand MPC&A Program into a New Category of Russian Facilities: highly Sensitive Russian Navy Nuclear Sites
- # Strengthen U.S./Russian Emergency Response Cooperation

Performance Measures

Performance measures related to the Nonproliferation Program for Russia are primarily qualitative rather than quantitative. The approach would be to establish programs that target root causes and eliminate nuclear-related problems created by the collapse of the Soviet Union. Some specific performance measures are:

- # Reduce the proliferation threat presented by nuclear materials located at highly sensitive Russian Navy nuclear sites. Consolidate plutonium and HEU to fewer sites and into fewer buildings, and convert HEU to LEU.
- # Prevent further accumulation of separated plutonium from spent civilian reactor fuel at Mayak, which currently results in the separation of two tons of plutonium per year. Support design, licensing, and construction of dry storage facility for civilian reactor spent fuel at the site, as alternative to current reprocessing activities.
- # Launch joint research program to explore development of Russian repository for permanent storage of spent nuclear fuel and high-level nuclear waste.
- # Identify, prioritize, develop and implement technological modifications to existing Russian nuclear power systems to enhance proliferation resistance. Identify requirements and develop designs that reduce the proliferation threat of existing and future reactors, nuclear fuel cycles, and facilities.
- # Consistent with existing Russian plans, accelerate shutdown of nuclear weapons activities and convert Russian serial production facilities to non-weapons related commercial activities. Provide civilian employment opportunities for scientists and technicians currently working in these facilities.
- # Facilitate and accelerate efforts, bilaterally and in cooperation with the International Atomic Energy Agency (IAEA), to return weapons-usable Soviet-origin research reactor fuel to Russia and initiate joint program for the conversion to LEU fuel of Soviet-origin research reactors using HEU fuel.

Funding Profile

(dollars in thousands)

	FY 1999 Current Appropriation	FY 2000 Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 Request
Long-Term Nonproliferation Program for Russia					
Nonproliferation and Nuclear Fuel Cycle	0	0	0	0	70,000
Nonproliferation and Russian Nuclear Infrastructure	0	0	0	0	30,000
Subtotal, Long-Term Nonproliferation Program for Russia	0	0	0	0	100,000
Use of Prior-Year Balances	0	0	0	0	0
General Reduction	0	0	0	0	0
Total, Long-Term Nonproliferation Program for Russia	0	0	0	0	100,000

Public Law Authorization:

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

Funding by Site

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	0	0	14,400	+14,400	+100%
Sandia National Laboratory	0	0	9,000	+9,000	+100%
Albuquerque Operations Office	0	0	2,000	+2,000	+100%
Total, Albuquerque Operations Office	0	0	25,400	+25,400	+100%
Chicago Operations Office					
Argonne National Laboratory	0	0	20,150	+20,150	+100%
Brookhaven National Laboratory	0	0	4,000	+4,000	+100%
Total, Chicago Operations Office	0	0	24,150	+24,150	+100%
Oakland Operations Office					
Lawrence Livermore National Laboratory	0	0	7,500	+7,500	+100%
Oakland Operations Office	0	0	19,400	+19,400	+100%
Total, Oakland Operations Office	0	0	26,900	+26,900	+100%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	0	0	2,000	+2,000	+100%
Richland Operations Office					
Pacific Northwest National Laboratory	0	0	17,550	+17,550	+100%
Idaho Operations Office					
Idaho National Engineering & Environmental Laboratory	0	0	2,000	+2,000	+100%
Nevada Operations Office	0	0	1,000	+1,000	+100%
Savannah River Operations Office	0	0	1,000	+1,000	+100%
Subtotal, Long-Term Nonproliferation Program for Russia	0	0	100,000	+100,000	+100%
Use of Prior-Year Balances	0	0	0	0	0.0%
Total, Long-Term Nonproliferation Program for Russia	0	0	100,000	+100,000	+100%

Site Description

Argonne National Laboratory

ANL will support the new Russian Initiative with efforts to prevent the further accumulation of separated civilian plutonium at the Mayak RT-1 facility by conducting dry storage concept analysis and assessments for safety by developing long-term maintenance requirements and by conducting criticality, facility, and site analyses; support the spent fuel and nuclear waste collaboration with specific site characteristics and site specific engineered materials, package, spent fuel and waste form studies; support efforts to enhance the proliferation resistance of nuclear fuel cycle technologies; support the RERTR Acceptance program activities.

Brookhaven National Laboratory

BNL will support expanded MPC&A activities with technical assistance for equipment installation, nuclear materials inventory, and materials consolidation.

Idaho National Engineering and Environmental Laboratory

INEEL will support efforts to enhance the proliferation resistance of nuclear fuel cycle technologies.

Lawrence Berkeley National Laboratory

LBNL will support the new Russian Initiative with efforts to: support the spent fuel and nuclear waste collaboration with specific site characteristics important to repository development studies.

Lawrence Livermore National Laboratory

LLNL will support the new Russian Initiative with efforts to: support the spent fuel and nuclear waste collaboration with specific site characteristics and site specific engineered materials, package, spent fuel and waste form studies, and assist in the development of an underground engineering test laboratory in granite; support efforts to enhance the proliferation resistance of nuclear fuel cycle technologies; advance the closure of Russian SPF at Sarov and Zarechnyy, and their conversion to non-weapons related commercial activities; support the Situation Crisis Center and Emergency Cooperation exercise with development, execution, and evaluation, and other training activities.

Los Alamos National Laboratory

LANL will support the new Russian Initiative with efforts to prevent the further accumulation of separated civilian plutonium at the Mayak RT-1 facility by updating systems and procedures for spent fuel accounting, physical security, and fuel handling systems; support the spent fuel and nuclear waste collaboration with specific site characteristics studies, and assist in the development of underground engineering test laboratory in granite; support efforts to enhance the proliferation resistance of nuclear fuel cycle technologies; advance the closure of Russian SPF at Sarov and Zarechnyy, and their conversion to non-weapons related commercial activities.

Nevada Operations Office

Nevada Operations Office will support the new Russian initiative by conducting facility and site analyses and assisting in the design and installation of communications and networking systems and equipment to ensure a successful emergency program to protect the health and safety of the public, the environment and workers.

Oakland Operations Office

The Oakland Operations Office will support the new Russian Initiative with efforts to: serve as a conduit for funds to U.S.-Russian contractors and other entities in efforts to prevent the further accumulation of separated civil plutonium at the Mayak RT-1 facility; and to entities associated with RERTR acceptance activities; specifically for funds associated with the fabrication of equipment and operations associated with movement and dry storage.

Oak Ridge National Laboratory

ORNL will support the new Russian Initiative with efforts to: advance the closure of Russian SPF at Sarov and Zarechnyy and their conversion to non-weapons related commercial activities.

Pacific Northwest National Laboratory

PNNL will support the new Russian Initiative with the efforts to prevent further accumulation of separated civilian plutonium at the Mayak RT-1 facility by supporting fuel transport equipment design, procurement, licensing, and fabrication, by conducting dry storage concept analysis, by conducting assessments for safety, by assisting with the development of long-term maintenance requirements, by conducting criticality, facility, and site analyses, and by conducting joint U.S.-MINATOM assessments of Mayak spent fuel inventories, fuel characteristics and conditions; advance the closure of Russian SPF and Sarov and Zarechnyy and their conversion to non-weapons related commercial activities; support efforts to enhance the proliferation resistance of nuclear fuel cycle technologies; support RERTR acceptance activities; support the Situation Crisis Center and Emergency Cooperation exercise with development, execution, evaluation, and other training activities.

Sandia National Laboratory

SNL will support the new Russian Initiative with efforts to prevent further accumulation of separated civilian plutonium at the Mayak RT-1 facility through physical security assessments; support the spent fuel and nuclear waste collaboration with the development of an underground engineering test laboratory in granite; advance the closure of Russian SPF at Sarov and Zarechnyy, and their conversion to non-weapons related commercial activities.

Savannah River Operations Office

The Savannah River Operations Office will support the new Russian Initiative with efforts to: advance the closure of Russian SPF at Sarov and Zarechnyy and their conversion to non-weapons related commercial activities; help manage on-site/in-country operations (including contracting and procurement) associated with RERTR acceptance activities.

Nonproliferation and the Nuclear Fuel Cycle

Mission Supporting Goals and Objectives

The mission of the Nonproliferation and the Nuclear Fuel Cycle activities is to dramatically reduce nuclear proliferation threats posed by Russian civilian nuclear power programs. Subprogram activities will seek to prevent further accumulation of separated civil plutonium at Mayak; develop a spent fuel storage facility in Russia; and develop a joint program to enhance the proliferation resistance of nuclear fuel cycle technologies..

Activities to prevent the further separation of civil plutonium will suspend the annual separation of two tons of weapons-usable plutonium at the Mayak RT-1 reprocessing plant. Safe, secure, long-term, dry spent fuel storage concepts will be evaluated and implemented at the RT-1 facility. U.S.-backed design and construction of a dry spent fuel storage facility at Mayak will be integrated with other nuclear material storage initiatives underway. In addition to employing significant numbers of otherwise displaced Mayak workers, these efforts will eliminate any further addition to Russia's already enormous plutonium stockpile. The strategy is to rapidly initiate the storage facility project and demonstrate USG commitment by analyzing design possibilities and building consensus among parties on preferred concepts and technologies.

Joint activities to enhance the proliferation resistance of nuclear fuel cycle technologies will help control the nuclear material inventories associated with current and future civil nuclear power reactors, and develop a Russian nuclear infrastructure and expertise to reduce proliferation problems posed by nuclear power systems. Through U.S.-Russia cooperative efforts, the program will bring a common perspective on proliferation resistance into the Russian nuclear power development sector. The primary objective of this joint program is to enhance the proliferation resistance of existing Russian systems and develop new concepts for next-generation proliferation resistant reactor systems that incorporate safety, environmental and economic considerations. The project will be co-managed with the Office of Nuclear Energy, Science, and Technology. It also will assist Russia in establishing a commitment to proliferation-resistant technology in nuclear power development and deployment. The program will also reinforce U.S. efforts under the Initiatives for Proliferation Prevention (IPP) program and related activities planned as part of the Nuclear Cities Initiative (NCI) to employ nuclear weapons scientists at Russian nuclear research and development institutes. Implementation of the program is dependent on the Russians' adherence to their commitment not to engage in nuclear cooperation with Iran beyond the Bushehr Unit 1 project.

The United States and Russia will increase significantly research collaboration on long-term solutions that address the accumulation of plutonium-bearing nuclear spent fuel. This will include further developing the science underlying repositories, exploring other possibilities to manage spent fuel and high-level radioactive waste, and researching the issues involved in international consolidation of spent fuel storage.

Performance Measures

- # Select technically sound, safe, and secure approaches to fuel packaging and storage.
- # Demonstrate USG commitment to prevent the further separation of civilian plutonium in Russia by completing design work for facility modifications and fuel storage canisters.
- # Develop impact assessments and technical evaluations for geological disposal in Russia of spent fuel and nuclear waste that address near and long-term storage, safety, safeguards, environmental impacts, and regulatory standards.
- # Establish a center to serve as an "umbrella" organization for participating laboratories, institutes, companies, and organizations working on the Russian spent-fuel repository program. This center will perform non-site specific technical analyses, as well as scientific research and development of engineering technologies for geological repositories.
- # Establish a set of criteria for evaluating the proliferation resistance of nuclear fuel cycle technologies.
- # Develop metrics for reviewing and assessing existing operating reactors and associated facilities in Russia and the U.S. for proliferation resistance.
- # Identify needs for technology research and development for enhancing the proliferation resistance of nuclear reactor systems.
- # Initiate technical development of high priority opportunities for reducing proliferation threats and existing or potential new sectors and associated facilities.
- # Provide security upgrades for existing separated plutonium at Mayak.
- # Complete an accounting of plutonium in Russia (the 'Plutonium Registry').

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Nonproliferation and the Nuclear Fuel Cycle	0	0	70,000	+70,000	+100%
Total, Nonproliferation and the Nuclear Fuel Cycle	0	0	70,000	+70,000	+100%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Prevent the Further Separation of Civil Plutonium			
Effort to reduce inventories and secure weapons-usable fissile materials from the RT-1 reprocessing plant at Mayak will require additional funds to support dry storage concept analyses and assessments; safety and safeguards activities; long-term maintenance requirements analyses; criticality assessments; facility and site analyses; updating the Mayak facility systems and procedures for spent fuel accounting, physical security, fuel handling systems, packaging equipment designs; procurement of fuel fabrication; licensing; and lab-to-lab assessments of the Mayak Spent Fuel inventories.	0	0	38,000
Expanded MPC&A for Plutonium Stored at Mayak			
Securing weapons-usable material from the RT-1 reprocessing plant at Mayak will require additional funds to support the design and implementation of upgrades to protect approximately 30MT of material. Planned activities include physical protection and material control and accounting upgrades at the facility and site boundaries, as well as near the material storage locations. These upgrades will be designed to provide protection against theft and diversion. An example of an easily sustainable upgrade is the protection of material by the use of large concrete blocks placed over approximately 10,000 material canisters to provide significant delay to adversaries	0	0	5,000
Plutonium Registry			
Work with Russia to develop an unclassified plutonium registry inventory database at Mayak.	0	0	2,000
Spent Fuel Storage and Geological Repository Cooperation Research and Planning [a]			
Funds will support the initial research on a geological repository in Russia to dispose of high level radioactive waste and fissile materials, such as spent nuclear fuel and civil plutonium from			

[a] **Activities will be co-managed with Department's Office of Civilian Radioactive Waste Management.**

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Russia. A center for geological repository technology will be established to develop a scientific plan, conduct feasibility studies and perform site selection technical assessments for the development of a geological repository in Russia. A Russian geologic repository program will have to assess the issues of selecting one or two geologic repository sites. Technical issues of site selection criteria and methodologies, site characterizations, reliance on the natural and engineered barriers, and allowing import of either foreign or other Russian radioactive waste all require resolution and technical assistance. Safety, safeguards, environmental impacts, regulatory standards and international regulations will be key technical elements for fissile materials storage, transportation and disposal studies to be performed. If Russian law is amended to permit the storage and disposal of foreign spent nuclear fuel in Russia, funds may also be used to support feasibility studies and licensing reviews for a spent fuel storage facility.	0	0	5,000
Enhance Proliferation Resistance of Nuclear Reactors and Fuels Research and Development Program [a] [b]			
Funds will support R&D activities to improve existing, operating reactors and associated facilities in Russia and the development of technologies to modify nuclear fuel cycles for improvement of proliferation resistance that incorporate safety, environmental and economic considerations; conduct enhanced analysis of specific facilities; and conduct joint research and development leading to a new nuclear fuel cycle design to achieve the proliferation resistance objectives, describe the technical approach; and estimate the performance, time, and costs associated with prototype development and total system deployment.	0	0	20,000
Total, Nonproliferation and the Nuclear Fuel Cycle	0	0	70,000

[a] **This program is dependent on Russian adherence to their commitments not to sell nuclear technology to Iran beyond that involved in the Bushehr Unit 1 project.**

[b] **Activities will be co-managed with the Office of Nuclear Energy, Science and Technology**.

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Prevent the Further Separation of Civil Plutonium	
# Funding required to initiate new program to prevent the further accumulation of separated civil plutonium at the Mayak facility.	+38,000
Expanded MPC&A at Mayak Facility	
# Funding required to provide security upgrades for existing separated plutonium at Mayak.	+5,000
Plutonium Registry	
# Funding required to initiate program for development of unclassified plutonium registry inventory database at Mayak.	+2,000
Spent Fuel Storage and Geological Repository Cooperation Research and Planning	
# Funding required to explore technical and policy measures that would be required to open a geologic repository facility in Russia, and to create a storage and disposal site in the Russian Federation for spent fuel.	+5,000
Enhancing Proliferation Resistance of Nuclear Reactors and Fuels Research Program	
# Funding required to initiate joint research and development program with Russia to reduce the proliferation threat from materials generated by civil nuclear power reactors and the supporting fuel cycle. [a]	+20,000
Total Funding Change, Nonproliferation and the Nuclear Fuel Cycle	+70,000

[a] **This program is dependent on Russian adherence to its commitments not to sell nuclear technology to Iran beyond that required for the Bushehr Unit 1 project.**

Nonproliferation and the Russian Nuclear Infrastructure

Mission Supporting Goals and Objectives

The mission of this program is to (1) reduce the proliferation threat presented by nuclear materials located at highly sensitive Russian Navy nuclear sites, (2) consolidate plutonium and Highly Enriched Uranium (HEU) to fewer sites and into fewer buildings, and convert HEU to low enriched uranium (LEU), (3) facilitate the return of Russian Soviet-supplied HEU reactor fuel, (4) accelerate closure of serial production facilities, and (5) expand on the situation crisis center to strengthen emergency response in the Russian nuclear complex.

The work at the Russian Navy nuclear sites will build on and expand ongoing work with the Russian Navy by consolidating all materials in the Northern and Pacific fleets into centrally located facilities. This work will secure nuclear materials of an extremely sensitive nature at some of the Russian Navy's most sensitive facilities. The Russian Navy has given DOE unprecedented access to these sites and this work will further U.S. national security goals to secure vulnerable nuclear materials in Russia.

The material consolidation and conversion work will address a critical element of the MPC&A program's existing strategy to simplify the nuclear security situation in Russia by expanding consolidation of plutonium and HEU into fewer sites and fewer buildings, and converting much of this material to low enriched uranium, rendering it less attractive to would-be proliferators. The funding for this program will enable the consolidation of four to five metric tons of nuclear material and the closing down of two Russian sites per year, by expanding the initial successes of the current work to include plutonium plus additional stockpiles of HEU.

The Russian Research Reactor Spent Fuel Acceptance program will reduce nuclear nonproliferation threats posed by HEU fuel at former Soviet research reactors outside Russia. The program will facilitate the return of spent and fresh fuel inventories to the Russian Federation and the safe shutdown or conversion of research reactors to LEU fuel use. In addition, an accelerated spent fuel return project will be initiated at a high priority research reactor site as a pilot project. Countries where Soviet research reactors are located include Serbia, Romania, North Korea, Bulgaria, Ukraine, and Libya. Significant risk reduction will be realized by removing aging spent fuel and converting or shutting down these sites around the world.

In cooperation with existing Russian programs, the accelerated closure of Serial Production Facilities will advance the closure of the weapons production capabilities at Sarov (Avangard) and Zarechnyy (Penza-19), and their conversion to non-weapons related commercial activities, employing scientists and technicians now working in the Russian nuclear weapons industry. The program will also establish and operate Nuclear Transparency Centers in Russia to employ former scientists at Avangard and Penza-19 by conducting technology demonstrations and modeling different warhead dismantlement monitoring regimes.

Expanding on the situation crisis center to strengthen emergency response will provide assistance to Russia in developing a robust emergency management system capable of responding to the threat of serious accidents with potential world-wide impacts and a wide range of potential accidents at

MINATOM facilities. The cooperation will focus on providing prototype core elements of an emergency program, including communications and networking equipment and training; development and implementation of procedures and policy for response; training of personnel; readiness assurance; and an exercise evaluation and appraisal program. These core elements will be integrated at the Situation Crisis Center, which becomes the national command center during an emergency, facilitating a successful national program to respond effectively to accidents in order to mitigate consequences; notify, instruct, and protect affected populations; protect the environment; and protect workers. The results of this program will be a safer Russian response system with data exchange between DOE and MINATOM crisis centers for rapid, reliable bilateral communication in the event of an emergency.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Nonproliferation and the Russian Nuclear Infrastructure	0	0	30,000	30,000	+100%
Total, Nonproliferation and the Russian Nuclear Infrastructure	0	0	30,000	30,000	+100%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Materials Protection, Control, and Accounting: New Initiatives for Russian Navy Nuclear Sites and Materials Conversion and Consolidation			
Additional funds will implement new 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 low-enriched uranium, rendering it less attractive to would-be proliferators. In addition, the funds will enable the DOE to expand the MPC&A program into a new category of Russian facilities: highly sensitive Russian Navy nuclear sites.	0	0	15,000

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Accelerated Closure of Serial Production Facilities			
Implement strategic plans for closure of warhead production capabilities at Avangard and Penza-19, including development of biomedical production and MPC&A technology production; establish Nuclear Transparency Centers (Avangard and Penza-19) and develop warhead dismantlement monitoring technologies; and provide support and training to displaced warhead production workforce.	0	0	10,000
Situation Crisis Center and Emergency Cooperation			
Expand emergency management and response cooperation to networking of Russian nuclear complex facilities with MINATOM Situation and Crisis Center.	0	0	2,000
Russian Research Reactor Spent Fuel Acceptance Program			
Facilitate negotiations and consent from participating countries; complete internal USG assessment of vulnerabilities posed by HEU stockpiles at FSU research reactors; initiate bilateral discussion between Russian Federation and host country officials on accelerated take back pilot project; seek agreement on U.S. assisted spent and fresh fuel return to Russian reactor site location, reactor conversion, or shutdown commitments; and resolve any issues associated with fuel disposition; assess Russian Federation and host country fuel loading and transport equipment inventories and condition of fuel, make recommendations and procure equipment or upgrades where appropriate; develop packaging procedures for safe transport of spent fuel; develop fuel loading and transport contracts, address labor issues, and procure necessary fuel loading and transport equipment; negotiate safe shipment routes; and initiate fuel loading and shipment operation of pilot project.	0	0	3,000
Total, Nonproliferation and the Russian Nuclear Infrastructure . .	0	0	30,000

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Materials Protection, Control and Accounting: New Initiatives for Russian Navy Nuclear Sites and Materials Conversion and Consolidation	
Funding required to implement new phases of the Materials Protection, Control and Accounting program. Funds will support security upgrades at newly accessed sensitive Russian Navy nuclear sites and expand implementation of evolving strategy to simplify the nuclear security situation in Russia by (1) consolidating proliferation attractive nuclear material to fewer sites and buildings and (2) converting much of this material to LEU, rendering it less attractive to would be proliferators.	15,000
Accelerated Closure of Serial Production Facilities	
Funding required to initiate new programs to establish transparent and irreversible nuclear reductions, and to transfer both Russian facilities and its displaced workforce in peaceful activities.	10,000
Russian Research Reactor Spent Fuel Acceptance Program	
Funding required to initiate new program to reduce nuclear nonproliferation threats posed by HEU fuel and initiate safe shutdown or conversion to LEU fuel used at Russian Federation research reactors outside Russia.	3,000
Crisis Center and Emergency Cooperation	
Funding required to expand emergency response cooperative activities between U.S. and Russia, protecting the public and the environment from the consequences of accidents at nuclear facilities in Russia.	2,000
Total Funding Change, Nonproliferation and the Russian Nuclear Infrastructure	30,000

Nonproliferation and National Security Program Direction

Mission Supporting Goals and Objectives

[NOTE: *The FY 2000 Defense Authorization Act established the National Nuclear Security Administration (NNSA) within the Department of Energy (DOE) as a separately organized agency. For FY 2001, NNSA will be funded through two appropriations; Weapons Activities and a new account Other Nuclear Security Activities.*

The budget request for the Nonproliferation and National Security (NN) program direction reflects the transfer of NN to NNSA Other Nuclear Security Activities and the reorganization and transfer of the Nuclear Safeguards and Security, Security Investigations, and Emergency Management programs to the newly established Security and Emergency Operations (SO) organization under Other Defense Activities.]

The NN Program Direction budget provides for all Federal personnel required at DOE Headquarters, two field offices, and embassies in Moscow, Tokyo, Paris, and Kiev to carry out the program's mission in a cost effective and efficient manner.

Program Goal

Provides the salaries and benefits, travel, support service contracts, and other related expenses associated with the overall management, direction, and administration of the following programs:

Verification and Control Technology

- Nonproliferation and Verification Research and Development
- Arms Control and Nonproliferation

International Nuclear Safety

Highly Enriched Uranium Transparency Implementation Program

Long-Term Nonproliferation Program for Russia

Program Objectives

- To provide salaries and benefits for NN Federal compensation including overtime, awards, lump sum leave payments, transit subsidy, contributions to employee benefits, and associated escalation.
- To provide travel funds that are required to carry out program mission while away from official duty stations, per diem allowances as well as local travel. Travel is an essential part of staff duties in order to conduct hands-on operations both domestically and internationally, participate in highly technical agency and interagency committees, and to ensure appropriate Government representation in policy meetings.
- To provide support services contracts funding for multiple program areas:

- **S** provide technical, analytical, administrative, and operational support in multiple program areas such as arms control; research and development; and highly enriched uranium; international nuclear safety. The daily operation and associated technical direction of the contracts remain with Federal program managers in each organization.

- **#** To provide other related expenses, including the working capital fund (space, utilities, general printing, graphics, copying, supplies, telephones, etc.), general office automation support, operation and maintenance of equipment, training, and other miscellaneous services.

The DOE has conducted detailed workforce analyses that have identified current and projected staffing disciplines. During 1999, DOE conducted a systematic analysis of critical staffing needs within the context of current and projected research and development program missions. The Department will develop a comprehensive plan that will focus on building and sustaining a talented and diverse workforce of research and development technical managers. The plan will include innovative recruitment strategies, retention incentives, comprehensive training and development programs for new and current employees, and succession planning. The FY 2001 program direction request for NN includes $1M for the Scientific Retention Recruitment Initiative. This will enable the recruitment of experienced scientists and related support staff (full-time equivalents) in areas of emerging interest to the Department's science mission. Funds will also be used to motivate and retain highly skilled, top-performing technical managers with, for example, retention allowances and performance awards. Additionally, training in areas of crucial for effective job performance will be a key element of the initiative.

Performance Measures

The principal objective of Program Direction is to provide the appropriate level of funding in the four categories supported in this budget: Federal salaries and benefits, travel, support services, and other related expenses.

- **#** The ultimate measure for success in the Program Direction subprogram is whether the Federal personnel in the various programs in NN have their salaries and benefits provided, travel funding is adequate to allow the appropriate amount of onsite supervision by the Federal staff, and the level of support services provided to the Federal staff is adequate to allow NN to perform its programmatic goals and objectives.

- **#** The performance measure for the support of the business line activities funded under the Working Capital Fund (WCF) is to control costs associated with these business lines where possible and to adequately fund these activities through the budget process. NN regularly monitors all business lines funded in the WCF and has reduced, to the extent possible, utilization of services provided through this fund. Further per capita reductions, in keeping with good business practices, in utilization of the services provided through this fund is a performance measure NN sets for itself in this account.

Funding Schedule

(dollars in thousands, whole FTEs)

	FY 1999[a]	FY 2000[a]	FY 2001[b]	$ Change	% Change
Chicago					
Salaries and Benefits	3,894	4,069	0	-4,069	-100.0%
Travel	150	153	0	-153	-100.0%
Support Services	0	0	0	0	
Other Related Expenses	1,593	1,627	0	-1,627	-100.0%
Total, Chicago	5,637	5,849	0	-5,849	-100.0%
Full Time Equivalents	53	56	0	-56	-100.0%
Nevada					
Salaries and Benefits	621	450	100	-350	-77.7%
Travel	46	46	0	-46	-100.0%
Support Services	400	379	0	-379	-100.0%
Other Related Expenses	4	4	0	-4	-100.0%
Total, Nevada	1,071	879	100	-779	-88.6%
Full Time Equivalents	5	5	1	-4	-80.0%
Oakland					
Salaries and Benefits	0	110	115	+5	-4.5%
Travel	0	0	0	0	0%
Support Services	0	0	0	0	0%
Other Related Expenses	0	20	15	-5	-25.0%
Total, Nevada	0	130	130	0	0%
Full Time Equivalents	0	1	1	0	0%
Headquarters					
Salaries and Benefits	39,897	34,850	21,120	-30,170	-58.8%
Travel	2,232	2,503	2,000	-1,047	-34.3%
Support Services	27,822	30,829	9,000	-51,591	-85.1%
Other Related Expenses	17,195	13,960	9,200	-37,478	-80.2%
Total, Headquarters	87,146	82,142	41,320	-120,286	-74.4%
Full Time Equivalents	335	350	177	-173	-49.4%
Total Nonproliferation and National Security					
Salaries and Benefits	44,412	39,479	21,335	-18,144	-45.9%
Travel	2,428	2,702	2,000	-702	-25.9%
Support Services	28,222	31,208	9,000	-22,208	-71.1%
Other Related Expenses	18,792	15,611	9,215	-6,396	-40.9%
Subtotal, Program Direction	93,854	89,000	41,550	-47,450	-53.3%
Use of Prior Year Balances	(1,318)				
Total, Program Direction	92,536	89,000	41,550	-47,450	-53.3%
Full Time Equivalents	393	412	179	-233	-56.5%

[a] Amounts reflected in these columns were appropriated under "Other Defense Activities."

[b] Amounts reflected in this column are requested under “Other Nuclear Security Activities.”

Comparable Funding Schedule

Other Nuclear Security Activities/Nonproliferation and National Security

(dollars in thousands, whole FTEs)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Oakland					
Salaries and Benefits	0	110	115	+5	+4.5%
Travel	0	0	0	0	0%
Support Services	0	0	0	0	0%
Other Related Expenses	0	20	15	-5	-25.0%
Total, Oakland	0	130	130	0	0.0%
Full Time Equivalents	0	1	1	0	0%
Nevada					
Salaries and Benefits			100	+100	+100.0%
Travel			0	0	0%
Support Services			0	0	0%
Other Related Expenses			0	0	0%
Total, Nevada	0	0	100	+100	+100.0%
Full Time Equivalents			1	1	+100.0%
Headquarters					
Salaries and Benefits	12,631	12,650	21,120	+ 8,470	+ 66.9%
Travel	1,152	1,175	2,000	+825	+70.2%
Support Services	8,668	8,265	9,000	+735	+ 8.8%
Other Related Expenses	5,609	5,835	9,200	+ 3,365	+57.6%
Total, Headquarters	28,060	28,925	41,320	+13,395	+46.3%
Full Time Equivalents	110	111	177	+67	+6.0%
Total Nonproliferation and National Security					
Salaries and Benefits	12,631	12,760	21,335	+ 8,575	+ 67.2%
Travel	1,152	1,175	2,000	+ 825	+70.2%
Support Services	8,668	8,265	9,000	+ 735	+8.8%
Other Related Expenses	5,609	5,855	9,215	+3,360	+57.3%
Subtotal, Program Direction	28,060	28,055	41,550	+13,495	+48.1%
Use of Prior Year Balances	(60)				
Total, Program Direction	28,000	28,055[a]	41,550	+13,495	+48.1%

[a]Does not reflect pending reprogramming for additional Federal employees and restructure of the Moscow Office by reducing the number of contractor employees at Headquarters and funding of the Tokyo and Paris embassies in Program Direction as supported by the FY 2000 Energy and Water Development Appropriation Conference Report.

[b]Reflects FTEs. FY 1999 end of year onboards 123; increase of 56 onboards requested.

(dollars in thousands, whole FTEs)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Full Time Equivalents	110[b]	111[b]	179	+68	+61.2%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
To meet expanded program requirements and achieve improvements supported by the FY 2000 Energy and Water Development Appropriation Conference Report, NN will federalize functions, expand and restructure the operations at the Moscow Embassy, transfer the Tokyo and Paris embassies functions to program direction, and hire additional Federal employees to perform critical functions.			
Salaries and Benefits			
Headquarters federal staffing is driven by specific functional responsibilities as well as management and direction requirements.			
# NN is the focal point within the Department for activities that support the President's nonproliferation policy, goals and objectives, and activities which assist other Departmental and field elements achieve their missions.			
# Staff directs and manages multiple technology and research and development tasks.			
# The staff also directs and manages multiple projects designed to reduce risks at nuclear power plants worldwide.	44,412	39,479	21,335
Travel			
# Includes domestic and foreign trips necessary to conduct nonproliferation and national security business.			
# International travel is necessary due to the continuous work with international agencies and the Former Soviet Union republics. Domestic travel includes national security assistance and interface with field offices, laboratories and local governments.			
# Nonproliferation issues and program interface also require domestic travel.	2,428	2,702	2,000

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Support Services			
# Provides an invaluable resource of highly specialized and analytical expertise required to meet critical nonproliferation and national security issues.			
# Provides technical expertise capable of addressing technology advancements and the dynamic changing environment associated with weapons returns, arms control, and nonproliferation.			
# Provides support to objectives of the arms control materials protection, control and accounting program.			
# Provides technical analyses and support of future proliferation detection and treaty verification; and to review and assess technology and program status.	28,222	31,208	9,000
Other Related Expenses			
# Includes Headquarters space, utilities, general printing, graphics, copying, supplies, telephones, general automation support, payroll outsourcing, postage, and other miscellaneous expenses associated with office operations.			
# Includes the reimbursable expenses associated with the National Archives and Records Administration (NARA) records center.			
# Provides for official reception and representation expenses for national security and transparency activities.			
# NN funding for the Working Capital Fund is included in this subprogram.			
# Includes NN's allocated share of ongoing Department activities that provide benefit to NN. In FY 2000 these activities included the Diversity Partnership program	18,792	15,611	9,215
Total, Program Direction	93,854	89,000	41,550

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Salaries and Benefits	
# Transfer Nuclear Safeguards and Security, Security Investigations, and Emergency Management program salaries and benefits and related expenses to the Security and Emergency Operations (SO) program	-26,719
# Salaries and Benefits increase to fund the pay raise plus the annualized amount for 68 additional Federal FTEs (56 onboards). The plan is to (1) federalize functions presently performed by 15 technical support service contracts and 13 Management and Operating technical support personnel on assignment to Headquarters from the national laboratories and hire an additional 25 Federal employees to perform critical functions, (2) expand and restructure operations at the Moscow Embassy; and (3) transfer costs and operations of the Paris and Tokyo overseas offices from program to program direction	+8,575
Travel	
# Transfer Nuclear Safeguards and Security, Security Investigations, and Emergency Management program travel related expenses to SO	-1,527
# Increase to travel for additional Federal staff and related Permanent Change of Station (PCS) moves, travel associated with the expansion of overseas offices, new Department travel system assessments, and escalation	+825
Support Services	
# Transfer Nuclear Safeguards and Security, Security Investigations, and Emergency Management program support services related expenses to SO	-22,943
# The increase funds a new classified local area network (LAN) and upgrades ($2M) and is offset by the reduction of 15 support services contractors ($1.3M)	+735
Other Related Expenses	
# Transfer Nuclear Safeguards and Security, Security Investigations, and Emergency Management program other related expenses to SO	-9,756
# Other related expenses increase for escalation and increased Working Capital Fund (space, supplies, phones), information technology support, computer purchases and upgrades due to increased Federal staffing	+3,360
Total Funding Changes, Program Direction.	-47,450

Support Services

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Technical Support Services	24,290	26,527	5,950	-20,577	-77.5
Management Support Services	3,932	4,681	1,050	-3,631	-77.5
Classified LAN Support			2,000	+2,000	+100%
Total Support Services	28,222	31,208	9,000	-22,208	-71.1%

Other Related Expenses

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Working Capital Fund	9,380	9,523	5,000	-4,523	-47.4%
Training	517	412	185	-227	-55.1%
Other[a]	8,895	5,676	4,030	-1,646	-29.0%
Total, Other Related Expenses	18,792	15,611	9,215	-6,396	-40.9%

[a]Other includes equipment and the operation and maintenance of equipment.