Fissile Materials Disposition

Program Mission

In the aftermath of the Cold War, significant quantities of weapons-usable fissile materials (primarily plutonium and highly enriched uranium) have become surplus to national defense needs both in the United States and Russia. The threat that nuclear weapons or materials could fall into the wrong hands through theft or diversion is a clear and present danger. The danger exists not only in the potential for proliferation of nuclear weapons, but also in the potential for environmental, safety and health consequences if surplus fissile materials are not properly managed. The Department of Energy's (DOE) Office of Fissile Materials Disposition is responsible for implementing a path forward for the disposition of U.S. surplus weapons-usable fissile materials, providing key negotiation and technical support for efforts to attain reciprocal actions for the disposition of surplus Russian plutonium, and storage of surplus U.S. fissile materials pending disposition.

The efforts undertaken by the Office of Fissile Materials Disposition contribute to the Administration's efforts to reduce the nuclear danger and the threat of proliferation by irreversibly disposing of the Nation's surplus plutonium and highly enriched uranium, and concluding and helping implement a bilateral agreement with Russia to irreversibly dispose of surplus Russian plutonium.

U.S. Surplus Fissile Materials Disposition

U.S. Plutonium Disposition

In accordance with a January 2000 Record of Decision covering the storage and disposition of surplus weapons-usable fissile materials, the Department is proceeding with a hybrid plutonium disposition strategy that includes immobilization of approximately 17 MT of surplus weapons plutonium with ceramic material and irradiation of up to 33 MT of surplus plutonium as mixed oxide (MOX) fuel in existing, domestic, commercial reactors to achieve the spent fuel standard. The surplus plutonium disposition facilities will be located at the Savannah River Site in Aiken, South Carolina.

To date, approximately 38.2 MT of weapons-grade and 14.3 MT of non-weapons grade plutonium has been declared surplus to national security needs. The surplus material is primarily in the form of pits (nuclear weapons components), metal, and oxides. The Department is disposing of approximately 10.6 MT of plutonium (weapons and non-weapons grade) as spent fuel and high-level waste. Current negotiations with Russia are centered around 34 MT of weapons grade plutonium which will become part of the bilateral agreement. Seventeen MT of material which is unsuitable for irradiating as MOX fuel will be immobilized; however if further material is deemed unsuitable, this amount could increase. The 50 MT of surplus weapons-usable plutonium analyzed in the storage and disposition programmatic environmental impact statement includes an additional 8 MT of weapons-grade plutonium that may be declared surplus in the future.

In FY 2001, DOE will continue design of two disposition facilities: the Pit Disassembly and Conversion Facility and the MOX Fuel Fabrication Facility, and begin design of the Immobilization and Associated Processing Facility. Construction of the Pit Disassembly and Conversion Facility is planned for FY 2002, however, the Administration will not begin construction unless there is a bilateral agreement in place with Russia. FY 2001 efforts also include continuation of 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; continue tests and demonstrations of non-pit plutonium conversion and first-stage immobilization; and continue the MOX fuel lead test assembly program.

U.S. Uranium Disposition

The Program's efforts continue to focus on implementing the July 1996 Record of Decision to disposition as much as possible of the surplus highly enriched uranium (HEU) by down-blending it with other uranium materials to commercially-usable low enriched uranium, thereby advancing U.S. nonproliferation goals, reducing storage and security costs, and providing revenues to the Treasury from the commercial sale of these surplus assets over time. The remaining surplus HEU, unsuitable for commercial use, can be disposed of as waste without down-blending.

To date, approximately 174.3 MT of U.S. HEU has been declared excess to national security needs (by comparison, Russia will disposition 500 MT of HEU by down-blending it and selling it to the U.S.). A small fraction (18 MT) of the U.S. surplus material is in the form of spent fuel or other waste, and does not require down-blending to make it non-weapons-usable. Because of the various forms of HEU and the availability dates from weapons dismantlement and site cleanup operations, disposition will take place over an estimated 15-to-20-year period. Title to 50 MT has already been transferred to the United States Enrichment Corporation (USEC). An additional 13 MT was transferred to USEC in 1994 pursuant to the Energy Policy Act of 1992. DOE expects that an additional 33-38 MT of off-specification HEU will be down-blended and transferred to the Tennessee Valley Authority (TVA) between 2002 and 2007 for use in its reactors. Ten MT of high quality excess HEU (currently under IAEA safeguards at the Oak Ridge Reservation), a total of four MT of HEU derived from scrap materials, and ten MT of research reactor fuel will also be down-blended for commercial sale. In addition, approximately 32 MT, currently restricted from commercialization due to international agreements, will be disposed of after FY 2009.

Recent HEU vulnerability assessments and Defense Nuclear Facility Safety Board (DNFSB) technical assessments on U-233 have identified environmental, safety and health vulnerabilities in the current U-233 inventory. One MT of U-233 located at the Oak Ridge National Laboratory (ORNL) and the Idaho Environmental and Engineering Laboratory (INEEL) is being evaluated to determine a multi-year disposition strategy. The evaluation, in conjunction with the efforts to address the DNFSB 97-1 recommendations, will determine the most cost-effective path forward for the U-233 inventory.

In FY 2001, DOE will continue to ship surplus HEU to USEC for blend down; implement a detailed interagency agreement with TVA which will include construction of capital improvements at the Savannah River Site for disposition of 33 MT of off-specification HEU by blend down and irradiation in TVA reactors (funded in the Environmental Management budget in FY 2001); and begin preparation for the blend- down and sale of 10 MT of HEU currently under IAEA safeguards (generating receipts to

partially offset future budget requests). In addition, the department will continue to determine the path forward for future disposition of approximately one MT of U-233.

Supporting Activities

The Department is reducing the number of sites where plutonium is stored . Surplus plutonium pits from Rocky Flats and SRS have been moved to Pantex to be stored, along with other surplus pits residing at Pantex, in upgraded facilities pending disposition. In August 1998, the Department issued an amended Record of Decision to remove all surplus non-pit plutonium from Rocky Flats by 2002, in accordance with the Department's June 1998 Accelerated Closure Pilot Project which calls for closing the site by 2006. In FY 2000, DOE will begin shipment of the surplus non-pit material from Rocky Flats to building 105-K at the Savannah River Site. The planned transfer of non-pit material from the Hanford Site to the expanded storage vault in the Actinide Packaging and Storage Facility (APSF) at SRS has been placed on hold pending a reevaluation of the need for APSF. In FY 2001, DOE will begin funding storage costs for approximately 21 MT of surplus plutonium residing at Pantex and 2 MT of surplus plutonium at the plutonium processing facility at LANL. In addition, the program will begin funding storage costs for approximately 85 MT of surplus HEU residing at Y-12.

Russian Surplus Fissile Materials Disposition

Russian Plutonium Disposition

Negotiations are currently underway and a bilateral agreement is expected to be in place for the disposition of surplus Russian plutonium in the spring of 2000. The rates and facilities to be constructed will be outlined in the agreement. Discussions include a plutonium conversion facility, a MOX fuel fabrication facility, and reactor modifications. The emergency appropriation in FY 1999 will provide initial funding to begin design of Russian disposition facilities to be specified in the agreement. Efforts are underway to solicit support from other nations for the disposition of surplus Russian plutonium.

Advanced Reactor Technology

The Department is providing initial funding to develop the gas turbine modular high temperature reactor (GT-MHR) technology as an option for adding plutonium disposition capacity to Russia's existing nuclear reactors. This program requires matching contributions or contributions in kind from Russia as well as support from the international community to fully develop the technology.

Supporting Technologies and Oversight

U.S.-Russian collaboration on plutonium disposition technologies is needed to help Russia prepare for reciprocal implementation of future plutonium disposition actions and agreements . This work will complete the technical knowledge base, identify viability of certain technologies, and demonstrate the practical usefulness of some of the technologies that might be employed for disposition of surplus weapons plutonium. FY 2001 activities involve a demonstration-scale surplus plutonium conversion system, design of equipment for the manufacture of lead test assemblies for MOX fuel qualification, and

Moscow-based work for plutonium disposition in Russia. In addition, funding for oversight of activities in Russia outlined in the bilateral agreement will be conducted.

Program Goals

- Reduce the global nuclear danger caused by the possible diversion or reuse of nuclear materials by disposing of these surplus materials in accordance with terms set forth in agreements between the United States and Russia.

- Provide safe, secure, and cost effective storage of surplus U.S. weapons-usable fissile materials, pending disposition.

Program Objectives

There are four national security objectives in the Fissile Materials Disposition Strategic Plan upon which this program and budget are based:

- Eliminate stockpiles of surplus weapons plutonium.

- Eliminate stockpiles of surplus highly enriched uranium.

- Engage Russia to dispose of stockpiles of Russian surplus weapons plutonium.

- Reduce the number of sites where surplus plutonium is stored.

Strategies

- Demonstrate the capability to disassemble weapons components (pits) and convert the plutonium metal into forms suitable for disposition and international inspection.

- Downblend inventories of surplus HEU and off-specification HEU for peaceful use as commercial reactor fuel.

- Support 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.

- Utilize existing DOE facilities and infrastructure and upgrade, as necessary, for the storage of surplus plutonium to meet safety, security, and inspection requirements pending disposition.

Performance Measures

For FY 2001, the Fissile Materials Disposition Program will support the following performance measures:

U.S. Surplus Fissile Materials Disposition

Plutonium Disposition

Complete disassembly and conversion of all surplus pit types at the ARIES demonstration system at LANL.

Initiate Title II design for the Pit Disassembly and Conversion Facility within the design baseline.

Award a contract for construction of the Pit Disassembly and Conversion Facility in FY 2002.

Complete demonstrations with non-pit plutonium metal conversion and first-stage immobilization sufficient to begin design of the Immobilization and Associated Processing Facility.

Initiate Title I design for the Immobilization and Associated Processing Facility within the design baseline.

Begin preparation of facility modifications to fabricate MOX test bundles in the Duke Power reactor as part of the lead test assembly (LTA) program.

Continue fuel design and analysis and submit topical reports to the Nuclear Regulatory Commission (NRC).

Perform engineering analyses to support future submittal of reactors license amendments to NRC to irradiate MOX fuel.

Initiate Title II design for the MOX Fuel Fabrication Facility within the design baseline.

Provide repository impact data updates for the immobilized plutonium form to Civilian Radioactive Waste Management (RW).

U.S. Uranium Disposition

Ship an additional 9 MT from the 50 MT of surplus HEU to USEC for down-blending to LEU for sale and subsequent use in commercial nuclear reactors, resulting in 20 MT shipped through FY 2001.

Continue management of the Off-Specification HEU Blend Down Project in accordance with the Interagency Agreement with TVA.
Continue to determine the path forward for U-233 disposition.

Supporting Activities

- # Initiate design of shipping containers to transfer surplus pits from Pantex to the Pit Disassembly and Conversion Facility.

- # Complete temperature tests to determine if active cooling is necessary for storage of surplus plutonium pits in Zone 4 at Pantex..

- # Begin funding responsibilities for storage operations for surplus HEU and plutonium at three DOE sites.

Russian Surplus Fissile Materials Disposition

Russian Plutonium Disposition

- # Continue to implement a bilateral agreement with Russia for disposing of plutonium in Russia and support development of international financing.

Advanced Reactor Technology

- # Continue research and development and preliminary design of the nuclear fuel and power conversion system for the GT-MHR in Russia, assuming substantial international financing is realized.

Supporting Technologies and Oversight

- # Begin facility upgrades for a demonstration-scale plutonium conversion system in Russia.

- # Complete final design of LTA manufacturing equipment and line for VVER-1000.

Significant Accomplishments and Program Shifts

During FY 1999 and early FY 2000, implementation of the Fissile Materials Disposition Program continued in accordance with the Strategic Plan and resulted in the following accomplishments:

U.S. Surplus Fissile Materials Disposition

U.S. Plutonium Disposition

Pit Disassembly and Conversion

- Successfully disassembled and converted multiple surplus pit types in the ARIES demonstration system at LANL.
- Awarded a contract to design a Pit Disassembly and Conversion Facility and initiated Title I design.

Immobilization and Associated Processing

- Developed formula for ceramic baseline immobilization form.
- Developed acceptance criteria to identify materials in the surplus inventory suitable for immobilization.
- Submitted data on immobilized waste form for the High Level Waste (HLW) repository NRC license application.
- Initiated development of a Request for Proposal to solicit proposals for the selection of a contractor to design an Immobilization and Associated Processing Facility.

Reactor Based Technologies

- Initiated MOX Fuel Fabrication Facility design activities.
- Continued tests of MOX fuel made from weapons-derived plutonium in the Advanced Test Reactor (ATR) in Idaho. Initiated post irradiation examination of MOX fuel from the ATR tests.
- Initiated dialogue with the NRC on MOX Fuel Fabrication Facility licensing strategies and reactor license amendments.

Repository Impacts

- Provided updated repository impact data on immobilized plutonium form to RW.

U.S. Uranium Disposition

Highly Enriched Uranium (HEU)

- Shipped 4 MT of the 50 MT of surplus HEU to USEC for downblending to LEU for sale and subsequent use in commercial nuclear reactors.

- Negotiated an Interagency Agreement for the transfer and subsequent blend down of approximately 33 MT of surplus off-specification HEU to the TVA.

- Installed four LTAs in TVA's Sequoyah reactor made from off-specification HEU.

U-233

- Started engineering disposition studies for U-233 material to prepare for analyzing the environmental impacts of disposition planned for FY 2002.

Supporting Activities

Surplus Plutonium Pit Storage

- Analyzed cost and environmental feasibility of continuing to store surplus pits at Pantex in Zone 4 versus Zone 12.

- Initiated Memorandum of Understanding with Defense Programs regarding upgrades in Zone 4 for magazines housing surplus pits.

NEPA

- Issued a supplement to the draft Surplus Plutonium Disposition EIS. The supplement analyzed the potential impacts of irradiating MOX fuel in six reactors at three locations. This information was used in the final EIS.

- Issued an environmental assessment (EA) on the fabrication and transportation of a small quantity of MOX fuel to Canada as part of the Parallex project.

- Issued a final Surplus Plutonium Disposition EIS and ROD on site selection for three plutonium disposition facilities in January 2000.

Russian Surplus Fissile Materials Disposition

Russian Plutonium Disposition

- Continued U.S./Russian negotiations on a plutonium disposition agreement which includes annexes on description of covered materials, disposition end states, and program schedules. The agreement is expected to be signed in the spring 2000.

- Continued international financing dialogue with G-8 member countries and European Union representatives.

- Developed a roadmap of potential Russian plutonium disposition activities in support of the bilateral agreement, including schedule and dictionary of logic elements.

- Initiated cost seminars on disposition of Russian plutonium to determine the level of international financial assistance required.

- Shipped Parallex fuel pins from the U.S. to Atomic Energy of Canada Ltd. (AECL) facilities in Chalk River, Canada.

Advanced Reactor Technology

- Reached agreement on joint U.S./Russian GT-MHR preliminary design work scope and awarded design contract.

Supporting Technologies and Oversight

- Continued a preliminary feasibility study on a plutonium conversion system in Russia.

- Verified applicability of reactor physics and thermal hydraulic codes and checked calculations for VVER-1000.

- Completed small-scale tests in Russia to demonstrate ability to immobilize Russian plutonium.

- Established international dialogue to coordinate conversion and reactor activities associated with Russian plutonium disposition.

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
Fissile Materials Disposition					
U.S. Surplus Fissile Materials Disposition					
Operations and Maintenance	88,127	104,821	-3,440 [c]	101,381	135,517
Construction	48,000	31,126	0	31,126	38,000
Subtotal, U.S. Surplus Fissile Materials Disposition	136,127	135,947	-3,440	132,507	173,517
Russian Surplus Fissile Materials Disposition					
Russian Plutonium Disposition	200,000	0	0	0	0
Operations and Maintenance	27,995	29,945	0	29,945	40,000
Subtotal, Russian Surplus Fissile Materials Disposition	227,995 [d]	29,945	0	29,945	40,000
Program Direction	4,588	7,343	0	7,343	9,918
Subtotal, Fissile Materials Disposition	368,710	173,235	-3,440	169,795	223,435
Use of Prior Year Balances	-1,469 [e]	-49,000[d]	0	-49,000	0
General Reduction		-2,807	2,807	0	0
Offset of Proposed Supplemental			-40,000	-40,000	0
Add-Back of Proposed Supplemental			40,000[d]	40,000	0
Total, Fissile Materials Disposition	367,241	121,428	-633	120,795	223,435

Public Law Authorization:
PDD-13 Nonproliferation and Export Control Policy - 9/93
Public Law 103-337 Establishes Permanent DOE Office - 10/94
PDD-41 Improving Nuclear Security in Russia - 10/95
Public Law 104-134 USEC Privatization Act - 4/96
Public Law 105-261 Licensing of Certain Mixed Oxide Fuel Fabrication and Irradiation Facilities -10/99
Public Law 106-61 National Defense Authorization Act of FY 2000 - 10/99

[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”

[c]Government-wide recission of .38% (.633M) and share of EWD reduction for contractor travel (2.807M)

[d]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.

[e]Share of EWD reduction for use of prior year unobligated balances assigned to this program.

Funding by Site

(dollars in thousands)

	FY 1999[a]	FY 2000[a]	FY 2001[b]	$ Change	% Change
Albuquerque Operations Office					
Los Alamos National Laboratory	27,034	37,003	40,295	3,292	8.9%
Pantex	169	750	13,000	12,250	
Sandia National Laboratory	2,910	1,050	2,000	950	90.5%
Total, Albuquerque Operations Office	30,113	38,803	55,295	16,492	42.5%
Chicago Operations Office					
Argonne National Laboratory	1,845	1,739	2,000	261	15.0%
MOX Fuel Fabrication Facility Design	28,000	12,375	15,000	2,625	21.2%
MOX Fuel Fabrication & Irradiation Contractor (DCS)	8,268	14,550	15,080	530	3.6%
Pit Disassembly & Conversion Facility Design	20,000	18,751	20,000	1,249	6.7%
Chicago Operations Office	1,134	802	1,351	549	68.5%
Total, Chicago Operations Office	59,247	48,217	53,431	5,214	10.8%
Federal Energy Technology Center	5,690	2,250	1,550	-700	-31.1%
Idaho Operations Office					
Idaho National Environmental and Engineering Laboratory	120	400	50	-350	-87.5%
Idaho Operations Office	0	0	0	0	
Total, Idaho Operations OIffice	120	400	50	-350	-87.5%
Nevada Operations Office	830	1,150	1,150	0	0.0%
Oakland Operations Office					
Lawrence Livermore National Laboratory	25,169	21,742	21,000	-742	-3.4%
Oakland Operations Office	1,630	9,056	10,700	1,644	18.2%
Total, Oakland Operations Office	26,799	30,798	31,700	902	2.9%
Oak Ridge Operations Office					
Oak Ridge National Laboratory	19,648	12,405	14,885	2,480	20.0%
Y-12	1,995	2,150	22,000	19,850	923.3%
Total, Oak Ridge Operations Office	21,643	14,555	36,885	22,330	153.4%
Richland Operations Office					
Pacific Northwest Laboratory	2,268	2,354	2,000	-354	-15.0%
Total, Richland Operations Office	2,268	2,354	2,000	-354	-15.0%

(dollars in thousands)

	FY 1999[a]	FY 2000[a]	FY 2001[b]	$ Change	% Change
Savannah River Operations Office					
Westinghouse Savannah River	12,593	16,599	19,695	3,096	18.7%
Savannah River Operations Office	0	420	1,216	796	189.5%
Total, Savannah River Operations Office	12,593	17,019	20,911	3,892	22.9%
Washington Headquarters	4,768	5,944	7,000	1,056	17.8%
All Other Sites	4,639	1,705	513	-1,192	-69.9%
Immobilization & Associated Processing Facility Design	0	0	3,000	3,000	
Russian Plutonium Disposition	200,000	7,000	10,000	3,000	42.9%
Subtotal, Fissile Materials Disposition	368,710	169,795	223,435	53,640	31.6%
Use of Prior Year Balances	-1,469	-49,000	0	49,000	
General Reduction					
Offset of proposed Supplemental		-40,000			
Add-Back of Proposed Supplemental		40,000			
Total, Fissile Materials Disposition	367,241	120,795	223,435	102,640	

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”

Site Description

Chicago Operations Office

The Chicago Operations Office (CHO) provides project management support for the MOX fuel program which includes cost and schedule development, tracking, and reporting; performance reporting; integration of management data; and contract management support. In addition, CHO provides contract management support for the Pit Disassembly and Conversion design contract.

Lawrence Livermore National Laboratory

The Lawrence Livermore National Laboratory (LLNL) serves as the lead laboratory in the development of technologies that will lead to immobilization of surplus plutonium materials into disposition forms that meet the spent fuel standard, and the acceptance criteria for the future High Level Waste (HLW) repository. LLNL develops technical and engineering data on the preferred ceramic plutonium form (using can-in-canister technology) to support facility design and qualification for repository disposal. LLNL supports the design of an immobilization facility which will contain systems for converting various incoming plutonium materials into a uniform oxide feed, blending the oxide feed with other materials into ceramic discs and placing these discs into small cans, which in turn are placed into a larger canister subsequently filled with high level vitrified waste. LLNL also performs research and development tasks

and design support for the pit disassembly and conversion demonstration and full-scale facility. In addition, LLNL is conducting initial immobilization feasibility studies to support disposition of surplus Russian plutonium.

Los Alamos National Laboratory

The Los Alamos National Laboratory (LANL) serves as the lead laboratory in the development and demonstration of a weapons pit disassembly and conversion process. This process establishes a basis for conversion of all surplus weapon pit types into an oxide powder form suitable for inspection and disposition. The Advanced Recovery and Integrated Extraction System (ARIES) at LANL serves as the current system demonstration project. A production-scale facility will be supported through the development of a knowledge base from the demonstration facility activities. The pit disassembly and conversion team consists of LANL, LLNL, and Sandia National Laboratory (SNL). LANL has the lead on MOX fuel technology supporting Oak Ridge National Laboratory (ORNL) in the program's efforts to transform the plutonium powder produced from surplus weapons pits to commercial spent nuclear fuel. LANL performs a spectrum of research and development tasks and technical support for a MOX fuel fabrication facility which will convert the plutonium oxide powder to MOX fuel suitable for use as a fuel source in U.S. commercial nuclear reactors. LANL is capable of producing MOX fuel for reactor test demonstration purposes. LANL also serves as the lead for the design of a plutonium conversion line in Russia which will convert surplus Russian plutonium from metal to oxide for fabrication into MOX fuel or other disposition approaches and provides storage for surplus plutonium at the plutonium processing facility.

Oak Ridge National Laboratory

The Oak Ridge National Laboratory (ORNL) serves as the lead laboratory in the development of technologies that will enable disposition of surplus plutonium materials by irradiating as MOX fuel in commercial reactors. ORNL performs aqueous processing analyses for MOX fuel, develops technical and engineering data on fabrication of domestic lead fuel assemblies to reactor specifications, and conducts reactor licensing. ORNL also serves as the lead for the Canadian Parallex heavy water reactor (CANDU) fuel and irradiation experiments. Physics support is also provided for analysis of several reactor types for disposition of Russian plutonium. In addition, ORNL provides storage for surplus HEU at Y-12 and serves as the lead for U-233 disposition activities. The Y-12 Site and the Oak Ridge Operations Office serve as the lead for all HEU disposition activities**.**

Savannah River Site

The Savannah River Site (SRS) serves as the lead in the disposition of off-specification HEU at TVA; provides technology support for immobilization of surplus plutonium in the areas of ceramic form development and immobilization process and equipment development; and supports disposition evaluation of U-233. In addition, SRS provides support in the industrial scale facility design effort as the selected site for the disposition facilities.

All Other Sites

The Argonne National Laboratory (ANL) and the Pacific Northwest National Laboratory (PNNL) provide support to LLNL by performing immobilization performance testing activities. . The Sandia National Laboratory (SNL) provides support for pit disassembly and conversion, Russian activities, and U.S. common technologies and integration activities. The Pantex Site provides upgraded storage of surplus pit materials from Rocky Flats and SRS. The Nevada Operations Office (NV) contracts for repository analysis support associated with disposition technologies. The Federal Energy Technology Center (FETC) contracts for environmental analysis support for disposition technologies and supports Russian activities. The Oakland Operations Office serves as the lead for the development of gas reactor technology in Russia for plutonium disposition.

U.S. Surplus Fissile Materials Disposition

Mission Supporting Goals and Objectives

The United States policy is to seek to eliminate, where possible, accumulation of stockpiles of surplus plutonium and highly enriched uranium, and to ensure that where these materials already exist they are subject to the highest standards of safety, security, and international accountability. After review of the fissile material required to support the nuclear weapons program and other national security needs, 38.2 MT of weapons-grade plutonium and 174.3 MT of HEU were declared excess to national defense needs. In addition, the Department considers 14.3 MT of non-weapons-grade plutonium to be surplus. Subsequently, President Clinton ordered that 200 MT of fissile material be permanently withdrawn from the U.S. nuclear stockpile. The Fissile Materials Disposition program objectives focus on disposing of inventories of surplus U.S. weapons-usable plutonium and highly enriched uranium with reciprocal actions for disposition of surplus Russian plutonium.

U.S. Plutonium Disposition

The Department plans to dispose of quantities of surplus plutonium by immobilizing it in ceramic form surrounded by vitrified high level waste and by irradiating surplus plutonium as mixed oxide (MOX) fuel in existing, domestic reactors. While both approaches are viable for the disposition of surplus weapons usable plutonium, the program needs to optimize the technical approach by completing the necessary process development and small-scale technology tests, including "can-in-canister" immobilization tests and tests of MOX fuel fabrication and irradiation.

As a first step to disposition, the Pit Disassembly and Conversion Facility will convert the plutonium from pits into oxide powder which will serve as feed material for the MOX disposition approach and for international inspection. The ARIES prototype system will continue production mode operations. Title II design of a Pit Disassembly and Conversion Facility will begin in FY 2001. Procurement of long-lead equipment in FY 2001 for the Pit Disassembly and Conversion Facility is essential to maintain the construction start schedule of FY 2002.

For the immobilization approach, the Department needs to finalize the process for formulating plutonium in ceramic materials, the production processes, and the assessment of the impact of impurities on the surplus plutonium forms. Title I design of a Immobilization and Associated Processing Facility will begin in FY 2001.

For the approach of MOX irradiation in existing reactors, the Department has selected a private consortium to provide MOX fuel fabrication and irradiation services, and finalize experiments on fuel performance. Title II design of a MOX Fuel Fabrication Facility will begin in FY 2001.

U.S. Uranium Disposition

The program will continue to ship 50 MT of surplus HEU to USEC for blend down to commercially-usable LEU. Continued implementation of a detailed interagency agreement with TVA will include construction of capital improvements at the Savannah River Site for disposition of 33 MT of off-specification HEU by blend down and irradiation in TVA reactors (funded in the Environmental Management budget in FY 2001). The off-specification HEU project may require $200-$300M for infrastructure improvements and operations at DOE facilities. TVA has agreed to contribute $10,000,000, under the authority of section 301 of the Energy and Water Appropriations Act for FY 1993, to complete design and begin construction of this project. The alternate disposition path of blending to waste would cost approximately $900M. In addition, the program will begin preparation for the blend- down and sale of 10 MT of HEU currently under IAEA safeguards (generating receipts to partially offset future budget requests)**.**

Approximately one MT of U-233 is commingled with one MT of HEU and 14 MT of thorium oxide at various DOE sites. Disposition of U-233 is not as urgent a priority as HEU or plutonium, however, U-233 is a weapons-usable material and timely disposition would satisfy DNFSB recommendations for repackaging/stabilization and storage upgrades. Continued evaluations will result in a path forward for this material.

Supporting Activities

The storage of surplus pits at Pantex may require upgrades to Zone 4 magazines. The extent of these upgrades was evaluated in FY 1999 and it was learned that for certain surplus pits, active cooling may be necessary. This possibility may be mitigated based on the results of one-year full-scale temperature tests at Pantex. These tests will utilize thermistors which will be installed in the magazines in FY 2000 to monitor temperatures. These tests will be completed in early FY 2001. Additional thermistors will be installed on all surplus pit storage magazines to monitor the storage environment to assure that conditions remain within estimated parameters. Funding responsibility for storage of approximately 21 MT of surplus plutonium residing in 36 magazines in Zone 4 at Pantex and 2 MT of surplus plutonium residing at the Plutonium Processing Facility at LANL was transferred to this program from Defense Programs in FY 2001. Costs for operations associated with storage of surplus pits include safeguards and security, thermal monitoring, surveillance and maintenance operations. These storage costs will continue until the material is moved to the disposition site which is estimated to begin in FY 2005 and end in FY 2015. Repackaging of surplus pits at Pantex into the sealed insert storage containers will continue to be performed by Defense Programs in FY 2001. Stabilization of the surplus plutonium at LANL will also continue to be performed by Defense Programs in FY 2001.

Costs for operations associated with storage of 85 MT of surplus HEU residing at Y-12 was transferred to this program from Defense Programs in FY 2001. Costs for operations associated with storage of HEU include planning, providing and maintaining storage facilities and storage operations for the safe and secure storage of surplus HEU; surveillance programs; and providing safeguards and security for surplus HEU materials and facilities. These storage costs will continue until the material is moved to the disposition (blending) site which is estimated to begin in FY 2000 and end in FY 2016.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Operations and Maintenance					
U.S. Plutonium Disposition	76,899	92,213	96,825	4,612	5.0%
U.S. Uranium Disposition	4,365	5,953	3,442	-2,511	-42.2%
Supporting Activities	6,863	3,215	35,250	32,035	996.4%
Subtotal, Operations and Maintenance	88,127	101,381	135,517	34,136	33.7%
Construction	48,000	31,126	38,000	6,874	22.1%
Total, U.S. Surplus Fissile Materials Disposition	136,127	132,507	173,517	41,010	30.9%

Detailed Program Justification

	FY 1999	FY 2000	FY 2001
U.S. Plutonium Disposition			
# Pit Disassembly and Conversion			
▸ Continue production mode testing of the ARIES prototype system at LANL which disassembles and converts surplus plutonium pits to oxide form suitable for disposition -- the first step in the hybrid plutonium disposition strategy. The prototype will continue production mode operation covering the entire population of surplus pit types, incorporating process and equipment upgrades, with sustained process throughput. These tests will support the full-scale Pit Disassembly and Conversion Facility currently in the design phase. *The decrease is due to completion of the preliminary safety analysis report for the Pit Disassembly and Conversion Facility, robotics development for handling the containerization of the oxide, and reduction in R&D work as the program moves toward full scale construction* . . .	18,379	25,357	20,386
# Immobilization and Associated Processing			
▸ Continue demonstration of equipment at LLNL which converts surplus plutonium non-pit feed material into oxide form suitable for immobilization disposition. The demonstration will continue covering all non-pit material forms, incorporating process and equipment upgrades.			
▸ Continue testing and verification of integrated systems for 1st stage immobilization (oxide to pucks) at LLNL and Clemson University. Continue development of can configurations for 2nd stage immobilization (can-in-canister) at SRS and Clemson University. Demonstration results will be documented in final technical data reports in support of the full-scale Immobilization Facility currently in the design phase.			
▸ Continue performance testing of sample ceramic material for repository disposal. *The decrease is due to purchase of test facility equipment in FY 2000.*	34,340	32,315	30,296

	FY 1999	FY 2000	FY 2001
# Reactor Based Technologies			
▸ Continue MOX fuel plutonium disposition program activities including fuel qualification and reactor licensing modifications. *The increase is due to MOX fuel program regulatory activities and fuel qualification plan*	19,920	21,950	26,750
▸ Continue lead test assembly (LTA) equipment procurement and facility modifications to support fabrication of two MOX LTAs and fund building (TA-55) tax at LANL. These assemblies will support qualification tests to be performed by Duke Power in the McGuire nuclear reactor in FY 2003. *The increase is due to facility infrastructure support service costs levied by the facility landlord*	3,600	11,510	18,243
# Repository Impacts			
▸ Update repository analyses associated with disposition technologies to support repository site recommendation report to the President	660	1,081	1,150
Total, U.S. Plutonium Disposition	76,899	92,213	96,825

U.S. Uranium Disposition

# Highly Enriched Uranium (HEU)			
▸ Conduct surplus HEU planning, project management, characterization, inventory management, and shipping container certification and procurement. *Decrease is due to completion of material characterization*	1,164	1,832	1,465
▸ Provide support for shipment of 50 MT of surplus HEU to USEC for blending	331	172	177
▸ Provide support for off-specification HEU blend down project. *The decrease is due to completion of conceptual design activities*	1,970	1,249	665
▸ Initiate blend down preparations for 10 MT of HEU (IAEA material)	0	0	700

	FY 1999	FY 2000	FY 2001
# U233 Disposition			
▸ Continue work on evaluation studies and strategy for future U-233 disposition	900	2,700	435
Total, U.S. Uranium Disposition	4,365	5,953	3,442
Supporting Activities			
# Surplus Plutonium Storage			
▸ Design, certify and manufacture (over a five-year period) a shipping container to transport surplus pits from Pantex to the Pit Disassembly and Conversion Facility.			
▸ Store 21 MT of surplus plutonium residing in 36 magazines in Zone 4 at Pantex and 2 MT of surplus plutonium residing at the Plutonium Processing Facility at LANL. Storage operations include safeguards and security, surveillance and maintenance operations and thermal monitoring (at Pantex). *The increase is due to a transfer of responsibility from Defense Programs*	678	750	13,000
# Surplus HEU Storage			
▸ Store 85 MT of surplus HEU residing at Y-12. Storage operations include safeguards and security, surveillance and maintenance operations. *The increase is due to a transfer of responsibility from Defense Programs.*	0	0	20,000
# NEPA			
▸ Prepare potential follow-up environmental assessments (EAs) in support of the original EIS and other DOE EAs which affect fissile materials disposition activities.	4,018	1,800	1,550
# Common Technologies and Integration			
▸ Conduct crosscutting technologies that support all disposition approaches and perform integration activities . . .	2,167	665	700
Total, Supporting Activities	6,863	3,215	35,250

	FY 1999	FY 2000	FY 2001
Construction			
# See "Capital Operating Expenses and Construction Summary" for details. *Increase is for immobilization design and for aqueous processing for the MOX Fuel Fabrication Facility . . .*	48,000	31,126	38,000
Total, U.S. Fissile Materials Disposition	136,127	132,507	173,517

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
U.S. Plutonium Disposition	
# The increase is due to Reactor-Based Technologies for MOX fuel program lead test assembly activities and building (TA-55) tax at LANL, partially offset by reductions in Pit Disassembly and Conversion for completion of safety reports, robotics, and decreased R&D and immobilization equipment purchases.	4,612
U.S. Uranium Disposition	
# The decrease is primarily due to the completion of initial studies on U-233 disposition	-2,511
Supporting Activities	
# The increase is due to the transfer of storage operations for surplus uranium and plutonium from Defense Programs	32,035
Construction	
# The increase is primarily due to start of design for the Immobilization and Associated Processing Facility and for incorporating aqueous processing in the design for the MOX Fuel Fabrication Facility	6,874
Total Funding Change, U.S. Fissile Materials Disposition	41,010

Russian Fissile Materials Disposition

Mission Supporting Goals and Objectives

Preventing theft or proliferation of fissile material is one critical element of U.S. nonproliferation objectives. In September 1998, President Clinton and former President Yeltsin each agreed to remove 50 MT of plutonium from their nuclear weapons programs in stages and convert this material so that it can never be used in nuclear weapons. U.S. and Russian teams are currently negotiating an agreement that accomplishes this goal. Prior year funds for cooperation with Russia on plutonium disposition have supported only small-scale tests, demonstrations and feasibility studies on the design of a 2 MT/year capacity facility to convert plutonium metal into plutonium oxide, a feedstock for MOX fuel. Congress provided $22M from FY 1992-1998 and $25M in FY 1999 under the Technical Cooperation agreement. In addition, 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 at $200M.

As part of the FY 2000 budget request, the President proposed an expanded, multi-agency threat reduction initiative over five years to further reduce international security threats by expanding, increasing and accelerating U.S. and international assistance activities in Russia to address proliferation areas totaling $4.5B. FY 2000 funding for plutonium disposition is $30M. OMB, as part of the overall Expanded Threat Reduction Initiative, approved $40M for plutonium disposition for FY 2001 and $45M per year for FY 2002-2004 for a total of $205M over the five-year period. Additional outyear activities will be necessary to fully implement any conceivable agreement. While Russia will need to contribute some resources, the U.S. also seeks support for a portion of this program from the international community, both the private and public sectors.

Russian Plutonium Disposition

The DOE's Office of Fissile Materials Disposition is responsible for funding initial expenditures in the Russian Federation to implement a United States/Russian accord for the disposition of Russian excess plutonium. The $200M represents initial funding required to provide United States assistance to Russia to begin implementing a plutonium disposition accord.

The U.S objective is to negotiate an accord specifying the technological approach and the facilities to be constructed in Russia in the initial phase of United States/Russia cooperation, which would have an annual capacity of 2 MT per year. The two governments would further agree to a subsequent phase of cooperation including other international entities that would increase the rate of plutonium disposition in Russia to 4 MT per year or more.

Detailed strategies will be defined in the accord. A detailed budget justification and obligation plan will be submitted to Congress once strategies are defined. These funds will be expended in the Russian Federation over a 3-4 year period following completion of the accord. Beyond that, the Administration

plans to seek financing for a portion of this program from the international community, both the private and public sector. If, however, the program requires additional future appropriations, the Administration will consider requesting adequate resources in the normal budget process.

Advanced Reactor Technology

- A joint U.S.-Russian development program of GT-MHR technology may provide for additional capability to dispose of surplus Russian plutonium. The U.S. and Russia will continue research and development and preliminary design of a power conversion system and nuclear fuel for the GT-MHR and will have completed commitments from the international community on financing to continue development of this technology. A budget amount of $10M has been identified for this program in FY 2001. This amount will be spent on this program if, and only if, international partners (U.S., Russia, France/EU, and Japan) provide like sums to total the $80M per country over six years ($320M) necessary to accomplish the research and development for the nuclear fuel and power conversion system for this program. If the international support is not forthcoming, the $10M will be used for other parts of the Russian plutonium disposition program.

Support Technologies and Oversight

- U.S.-Russian tests and demonstrations of plutonium technologies involve initiating upgrades for a plutonium conversion demonstration-scale system, performing Russian MOX fuel qualification necessary for use in VVER-1000 reactors, and design of an immobilization large-scale test system.

- Continue oversight and management of plutonium disposition activities in Russia as defined in the U.S.-Russian accord currently being negotiated.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Operations and Maintenance					
Russian Plutonium Disposition	200,000	0	0	0	
Advanced Reactor Technology	5,275	5,000	10,000	5,000	100.0%
Supporting Technologies and Oversight	22,720	24,945	30,000	5,055	20.3%
Subtotal, Operations and Maintenance	227,995	29,945	40,000	10,055	33.6%
Construction	0	0	0	0	0.0%
Total, Russian Fissile Materials Disposition	227,995	29,945	40,000	10,055	33.6%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Russian Plutonium Disposition			
# Implement a U.S./Russian accord for disposition of excess weapons plutonium. Initial funds are primarily for design and to begin construction of Russian disposition facilities to be specified in the accord. The U.S. and Russia have agreed on rates and facilities for plutonium disposition, but Russian decisions on techniques and sites must be made after the completion of the agreement. Discussions include a plutonium conversion facility and a MOX fuel fabrication facility and modification of existing reactors. $49M of the $200M 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. These funds will be expended over a 3-4 year period following completion of the accord	200,000	0	0
Advanced Reactor Technology			
# Continue U.S. technical direction to coordinate Russian activities to support the design, plant and fuel technology development, safety analysis and licensing.			
# Continue to provide funds to Russia to carry out technology development of the GT-MHR in Russia (Russia matches contributions or provides contributions in kind). *The increase is to continue research and development and preliminary design into FY -2001 and assumes international financing of total R&D ($80M/yr for six years) is successful . . . .*	5,275	5,000	10,000

	FY 1999	FY 2000	FY 2001
Supporting Technologies and Oversight			
# Begin facility upgrades for a demonstration-scale system test facility for conversion of Russian plutonium.			
# Complete final design of equipment for the manufacture of lead test assemblies to produce prototypic VVER-1000 fuel for fuel qualification.			
# Continue analyses to support design, safety, and licensing of BN-600 modifications (assumes Japan funds).			
# Continue immobilization large-scale test system. *Increase for VVER-1000 fuel qualification*	22,720	17,945	20,000
# U.S. oversight of work performed in Russia plutonium disposition ($200M) relative to design and licensing of full-scale facilities. *Increase due to increase in spending the $200M provided in FY 1999*	0	7,000	10,000
Total, Russian Fissile Materials Disposition	227,995	29,945	40,000

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Advanced Reactor Technology	
# Increase in design and fuel qualification and testing activities pending international contributions	5,000
Supporting Technologies and Oversight	
# Increase in VVER-1000 fuel qualification activities and oversight of full-scale plutonium conversion facility/MOX facility design in Russia	5,055
Total Funding Change, Russian Fissile Materials Disposition	10,055

Fissile Materials Disposition Program Direction

Mission Supporting Goals and Objectives

Program direction provides overall management, oversight, staffing, and administrative support necessary to carry out the mission of the Fissile Materials Disposition Program. Operations are conducted in an efficient and streamlined manner consistent with National Performance Review objectives. Program direction has been grouped into four categories:

Salaries and Benefits provide for Federal personnel compensation to include SES and other awards, overtime, lump sum leave payments, transit subsidy costs, and employer's contribution to employees' benefits.

Travel includes domestic and foreign trips necessary to conduct business in carrying out the mission of the program. International travel is frequent in that Fissile Materials Disposition program officials work closely with Russian and other G-8 scientists and government officials on plutonium disposition issues.

Support Services include program analyses and office operations functions which result in improving the effectiveness, efficiency, and economy of management and general administrative services. Activities also include outreach, project scheduling, and quality assurance.

Other Related Expenses include employee training; subscriptions; building occupancy; telecommunications; supplies; copiers; postage; printing and graphics; payroll outsourcing; other miscellaneous expenses associated with office operations, and reception and representation expenses.

Performance Measures

- Undertake independent assessments of the plutonium disposition facility projects prior to start of construction and implement recommendations.

- Fully implement DOE Energy Systems Acquisition Instruction for the four line-item construction projects.

- Continue transition and establishment of contract and financial vehicles to support design and construction of major U.S. facilities and work performed in the Russian Federation.

- Integrate fissile materials disposition activities within DOE relative to mission and budget by establishing agreements with other DOE programs.

- Fully implement the Quality Assurance Program and conduct quality assurance reviews in accordance with the audit and surveillance schedules.

- Ensure adequate oversight of field activities through the establishment and monitoring of technical, cost and schedule baselines.

Funding Schedule

(dollars in thousands, whole FTEs)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Chicago					
Salaries and Benefits	440	730	918	188	25.8%
Travel	44	72	83	11	15.3%
Support Services	0	0	0	0	
Other Related Expenses		0	350	350	
Total, Chicago	484	802	1,351	549	68.5%
Full Time Equivalents	4	7	7	0	
Oakland					
Salaries and Benefits	0	46	100	54	117.4%
Travel	0	10	15	5	50.0%
Support Services	0	0	0	0	
Other Related Expenses	0	0	50	50	
Total, Oakland	0	56	165	109	194.6%
Full Time Equivalents	0	0	1	1	
Savannah River					
Salaries and Benefits	0	365	766	401	109.9%
Travel	0	25	50	25	100.0%
Support Services	0	0	0	0	
Other Related Expenses	0	0	400	400	
Total, Savannah River	0	390	1,216	826	211.8%
Full Time Equivalents	0	4	8	4	100.0%

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Headquarters					
Salaries and Benefits	2,796	3,913	4,593	680	17.4%
Travel	315	330	345	15	4.5%
Support Services	232	916	1,231	315	34.4%
Other Related Expenses	761	936	1,017	81	8.7%
Total, Headquarters	4,104	6,095	7,186	1,091	17.9%
Full Time Equivalents	28	39	42	3	7.7%
Total Fissile Materials Disposition					
Salaries and Benefits	3,236	5,054	6,377	1,323	26.2%
Travel	359	437	493	56	12.8%
Support Services	232	916	1,231	315	34.4%
Other Related Expenses	761	936	1,817	881	94.1%
Total, Program Direction	4,588	7,343	9,918	2,575	35.1%
Full Time Equivalents [a]	32	50	58	8	16.0%

The Department of Energy 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 R&D program missions. The Department will develop a comprehensive plan that will focus on building and sustaining a talented and diverse workforce of R&D 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 Fissile Materials Disposition includes $100,000 for the Scientific Retention and 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 crucial for effective job performance will be a key element of the initiative.

[a]FTEs above FY 2000 request of 39 (+11) were funded from prior balances.

Detailed Program Direction Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Salaries and Benefits			
Federal Staff provide management oversight and technical support for the disposition of fissile materials declared surplus to national defense needs, support to the Russian disposition effort, and storage of surplus pending disposition. *The increase is for funding for +11 FTEs over the FY 2000 funding request for 39 FTEs and +8 FTEs in FY 2001 over the FY 2000 level. Five of the +8 FTEs are in the field for oversight and project management of U.S. plutonium and HEU disposition facility and gas reactor activities and +3 at Hqs. to support increases for support functions, Russian program, and oversight of Pit Disassembly and Conversion Facility activities*	3,236	5,054	6,377
Travel			
Funding supports domestic and foreign trips required to provide management oversight, public outreach, and technical support to the program, and ensure cooperation and collaboration with Russia and other nations on the disposition of plutonium. *Increase is due to expanded threat reduction mission which requires frequent international travel and disposition site employee travel* .	359	437	493
Support Services			
Funding supports office operations functions designed to improve overall effectiveness. *The increase is for moving remaining support services from program funding in accordance with Congressional direction, ADP support, and outreach activities*	232	916	1,231

	FY 1999	FY 2000	FY 2001
Other Related Expenses			
Supports employee training, office automation support activities funded by the Working Capital Fund, and reception and representation expenses for fissile material disposition activities. *The increase is attributable to the field office charges for FTE overhead (+16 FTEs), and reception and representation funding*	761	936	1,817
Total, Program Direction	4,588	7,343	9,918

Explanation of Funding Changes

from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Salaries and Benefits	
# The increase is for funding for +11 FTEs over the FY 2000 funding request for 39 FTEs and +8 FTEs in FY 2001 over the FY 2000 level. Five of the +8 FTEs are in the field for oversight and project management of U.S. plutonium and HEU disposition facility and gas reactor activities, and +3 at Hqs. for support activities, Russian, and oversight and project management of disposition activities. Salary adjustments in accordance with allowable inflation factors are also included.	1,323
Travel	
# Increase is due to expanded threat reduction mission which requires frequent international travel and disposition site employee travel	56
Support Services	
# The increase includes remaining support services activities moved from program funding in accordance with Congressional direction, ADP support, and outreach activities	315
Other Related Expenses	
# The increase will cover space, AOSS equipment and other miscellaneous costs for all the field FTEs for the first time (+16). Reception and representation funding also contributed to the increase	881
Total Funding Change, Program Direction	2,575

Support Services

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Technical Support Services					
Outreach	0	350	400	50	14.3%
Total, Technical Support Services	0	350	400	50	14.3%
Management Support Services					
Project Scheduling/Program Support/Quality Assurance [a]	0	250	381	131	52.4%
ADP Support	95	100	150	50	50.0%
Administrative Support Services	137	216	300	84	38.9%
Total, Management Support Services	232	566	831	265	46.8%
Total, Support Services	232	916	1,231	315	34.4%

Other Related Expenses

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Training	25	25	30	5	20.0%
Working Capital Fund	570	744	800	56	7.5%
Other	166	167	987	820	491.0%
Total, Other Related Expenses	761	936	1,817	881	94.1%

[a]Quality Assurance activities moved from program funding in accordance with Congressional direction

Capital Operating Expenses & Construction Summary

Capital Operating Expenses

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Capital Equipment	970	8,200	8,000	(200)	-2.4%
Total, Capital Operating Expense	970	8,200	8,000	(200)	-2.4%

Construction Projects

(dollars in thousands)

	Total Estimated Cost (TEC)	Prior Year Approp-riations	FY 1999	FY 2000	FY 2001	Unappropriated Balance
99-D-141 Pit Disassembly & Conversion Facility	346,192	0	20,000	18,751	20,000	287,441
00-D-142 Immobilization & Associated Processing Facility	547,000	0	0	0	3,000	544,000
99-D-143 Mixed Oxide Fuel (MOX) Fuel Fabrication Facility	398,186	0	28,000	12,375	15,000	342,811
Total, Construction		0	48,000	31,126	38,000	1,174,252

Detailed Breakouts

(dollars in thousands)

	Previous Approp.	FY 1999 Approp.	FY 2000 Approp.	FY 2001 Request
Other Project Costs Exceeding $3 Million				
1. Pit Disassembly & Conversion Facility	47,482	17,409	24,357	19,986
2. Immobilization & Associated Processing Facility	64,682	34,340	30,465	30,296
3. MOX Fuel Fabrication Facility	10,291	2,809	4,780	6,570
Total	122,455	54,558	59,602	56,852

99-D-141, Pit Disassembly and Conversion Facility - Title I & II Design, Savannah River Site, Aiken South Carolina

(Changes from FY 2000 Congressional budget Request are denoted with a vertical line [|] in the left margin)

Significant Changes

Public Law 106-60, the Energy and Water Development Appropriations Act for FY 2000, provided only $18,751,000 of the $28,751,000 requested for this construction project.

The cost of long-lead equipment increased from $21,355,000 to $26,355,000 due to revised disassembly oxide conversion system estimate.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(A-E and technical design only)*	2Q 1999	4Q 2001	2Q 2001	4Q 2004	N/A	N/A
FY 2001 Budget Request *(Preliminary Estimate)*	3Q 1999	1Q 2002	1Q 2002	3Q 2005	[a]	

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Design & Long Lead Equipment			
1999	20,000	20,000	12,000
2000	18,751	18,751	18,000
2001	20,000	20,000	23,751
2002	15,000	15,000	20,000

[a]Preliminary cost estimates for the Pit Disassembly and Conversion Facility are based upon conceptual estimates. The preliminary estimates are: Total Estimated Cost (TEC) -- approximately $346,000,000 and Total Project Cost (TPC) -- approximately $586,000,000. These estimates are used for the purpose of requesting design and long lead equipment funding only. Future construction funding will be based upon Title I cost estimates. The Administration will not construct new facilities for disposition of U.S. plutonium unless there is a bilateral agreement with Russia.

3. Project Description, Justification and Scope

In the aftermath of the Cold War, significant quantities of weapons-usable plutonium have become surplus to national defense needs both in the United States and Russia. The Department issued a Record of Decision (ROD) on the Storage and Disposition of Surplus Weapons-Usable Fissile Materials in January 1997. This decision calls for DOE to pursue a hybrid approach for plutonium disposition that allows for immobilization of surplus weapons plutonium in ceramic matrix and irradiating some of the surplus plutonium as mixed oxide fuel (MOX) in existing, domestic reactors. In order to implement the hybrid approach, surplus classified nuclear weapons-components (pits) must first be disassembled and the resulting plutonium converted to an unclassified oxide powder form. No such facilities currently exist in the United States. A Pit Disassembly and Conversion Facility will provide the U.S. with the capability to transform classified plutonium weapons pits to an unclassified oxide form suitable for disposition and international inspection.

The Pit Disassembly and Conversion Facility is a complex consisting of a hardened building that will contain the plutonium processes in a safe and secure manner and conventional buildings and structures that will house support personnel, systems and equipment. The plutonium processing building will be a material access area of approximately 150,000 square feet, and house the following key systems: pit shipment, receiving, assay and storage; pit plutonium metal extraction and conversion to oxide; and plutonium oxide packaging, assay, storage and shipment. Also included are facilities for recovery, decontamination, and declassification of other special nuclear material and non-special nuclear material resulting from pit disassembly. In addition, there are facilities to accommodate IAEA safeguards involving specific portions of the processes and facility. The conventional buildings and structures, requiring approximately 50,000 square feet, will house offices, change rooms, an analytical chemistry laboratory, a central control station, waste treatment, packaging, storage and shipment systems. This facility is equipped with lag storage for pit materials on the front-end and one-year lag storage for oxide on the back-end. The facility will be operational for ten years (at 3.5 mt/yr maximum throughput capacity) beginning in FY 2006, after which the facility will be decontaminated and decommissioned over a three- to four-year period.

The Pit Disassembly and Conversion Facility project consists of: design and construction of the buildings and structures; design, procurement, installation, testing and start-up of equipment to disassemble pits and convert the plutonium from pits to oxide form; as well as associated supporting equipment, components and systems. The facility will not be NRC licensed. Four sites (Hanford, Idaho National Engineering and Environmental Laboratory, Pantex, and Savannah River) were considered for the full-scale Pit Disassembly and Conversion Facility. In December 1998 the DOE identified Savannah River Site as the preferred location to build the Pit Disassembly and Conversion Facility. A final decision to locate the facility at the Savannah River Site was made in January 2000 in the ROD following the issuance of an Environmental Impact Statement.

In order to complete the detailed design (Title II) which begins in FY 2001, equipment design information is needed. A purchase order needs to be placed to obtain the design information and assure

delivery on schedule during the construction phase. Design development of such equipment is anticipated to take up to approximately one year. Procurement of equipment design information would need to start early in FY 2001. The long-lead equipment is expected to be installed in the facility about FY 2003 and will take approximately two years to design and fabricate. As a result, the long-lead equipment would be evaluated to determine which equipment would need to be released for manufacturing early to support the project schedule. No equipment manufacturing would begin unless there is a bilateral agreement with Russia. Title I preliminary design is underway and will determine the final construction baseline which will be updated in the FY 2003 budget cycle and used to measure performance. Current construction estimates are based on a conceptual design for a new facility with established general support infrastructure in accordance with the conceptual design report.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs, (Design, Drawings, and Specifications)	33,383	33,383
Design management costs @ 10% of above costs	3,908	3,908
Total, design phase	37,291	37,291
Contingencies at approximately 27% of above costs		
Design phase	10,105	10,105
Long lead equipment [a]	26,355	21,355
Total Agency Requirement (Design and Long Lead Equipment)	73,751	68,751

5. Method of Performance

A cost plus fixed-fee contract was awarded in June 1999 for the preliminary and detailed design of the Pit Disassembly and Conversion Facility. The procurement strategy includes an option for construction inspection services (Title III) which will be decided at the end of the preliminary design phase.

A purchase order for procurement of longer-lead equipment design information will be issued early in FY 2001 and a subsequent purchase order will be issued in early FY 2002 for the oxide conversion systems and analytical laboratory equipment design information.

It is anticipated that the construction procurement will be by a fixed-price contract awarded on the basis of competitive bidding. The Request for Proposals will be issued in late FY 2001 for award in early FY 2002.

[a]Equipment included in the FY 2001 long lead items are: robotic cranes and track mounted robots in the shipping and receiving system, vault doors in the storage system, material control and accountability computer system, the californium shufflers, and equipment for the disassembly oxide conversion system. FY 2002 long lead items are: additional disassembly and oxide conversion system equipment, analytical laboratory equipment, and waste assay equipment.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Design & Long Lead Equipment Cost						
Design	0	20,000	17,396	10,000	0	47,396
Plant Engineering & Design (PE&D)	0	0	0	0	0	0
Operating expense funded equipment	0	0	0	0	0	0
Total Design Costs (Federal and Non-Federal)	0	20,000	17,396	10,000	0	47,396
Other Project Costs						
R&D necessary to complete project	0	0	0	0	0	0
Conceptual design costs	0	0	0	0	0	0
Decontamination and Decommissioning (D&D)	0	0	0	0	0	0
NEPA documentation costs	0	0	0	0	0	0
Other project-related costs	0	0	0	0	0	0
Total Other Project Costs	0	0	0	0	0	0
Long Lead Equipment	0	0	1,355	10,000	15,000	26,355
Total Agency Requirement (Design & Long Lead Equipment)	0	20,000	18,751	20,000	15,000	73,751

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	[a]	N/A

[a]Related annual costs will be defined during the Title I design effort and reflected in the FY 2003 budget request.

00-D-142, Immobilization & Associated Processing Facility -Title I & II Design, Savannah River Site, Aiken, South Carolina

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

Public Law 106-60, the Energy and Water Development Appropriations Act for FY 2000, provided zero funds of the $21,765,000 requested for this construction project after the department's announcement of a one-year delay in order to make the best use of development activities.

The design cost increased from $67,936,000 to $69,685,000 due to estimates in the final conceptual design report issued after the FY 2000 budget was printed.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(A-E and technical design only)*	1Q 2000	2Q 2002	1Q 2002	1Q 2005	N/A	N/A
FY 2001 Budget Request *(Preliminary Estimate)*	4Q 2001	3Q 2004	4Q 2003	1Q 2007	[a]	

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Design			
2001	3,000	3,000	1,500
2002	35,171	35,171	24,500
2003	23,514	23,514	31,000
2004	8,000	8,000	12,685

[a]Preliminary cost estimates for the Immobilization and Associated Processing Facility are based upon conceptual estimates. The preliminary estimates are: Total Estimated Cost (TEC) - approximately $547,000,000 and Total project Cost (TPC) – approximately $828,000,000. These estimates are used for the purpose of requesting design funding only. future construction funding will be based upon Title I cost estimates.

3. Project Description, Justification and Scope

In the aftermath of the Cold War, significant quantities of weapons-usable plutonium have become surplus to national defense needs both in the United States and Russia. The Department issued a Record of Decision (ROD) on the Storage and Disposition of Surplus Weapons-Usable Fissile Materials in January 1997. This decision calls for DOE to pursue a hybrid approach for plutonium disposition that allows for immobilization of surplus weapons plutonium in ceramic form and irradiating some of the surplus plutonium as mixed oxide fuel (MOX) in existing domestic reactors. The immobilization process that the Department plans to use is the can-in-canister approach in which cans of plutonium immobilized with ceramic material would be arrayed within large canisters into which intensely radioactive high-level waste would be poured. The resulting large, heavy, radioactive waste canisters increase the proliferation resistance of the immobilized plutonium. The waste canisters containing the immobilized weapons plutonium would ultimately be disposed of in a geologic repository.

The Immobilization and Associated Processing Facility will contain all the systems required for: (1) Plutonium Conversion: receiving stabilized non-pit plutonium and converting the material to an acceptable oxide feed form; (2) Initial Immobilization: blending the plutonium oxide feed with precursor materials and solidifying the resultant product into ceramic forms, and placing the ceramic forms into small cans; and (3) High Level Waste (HLW) Immobilization: placement of the small cans into larger canisters which are filled with borosilicate glass containing HLW and sealed. In the Programmatic Environmental Impact Statement (PEIS), DOE narrowed the field of candidate disposition sites for the facility to Savannah River and Hanford where both sites have an existing or planned HLW immobilization infrastructure as well as general support infrastructure in place such as a fire department, security protection forces, and water and sewage treatment plants. In a Notice of Intent to prepare the site specific EIS, DOE identified the Savannah River Site as the preferred site for the Immobilization and Associated Processing Facility. A final decision to locate the facility at the Savannah River Site was made in January 2000 in the ROD following the issuance of an Environmental Impact Statement.

The Immobilization and Associated Processing Facility is a complex consisting of a hardened building which will contain the plutonium processes in a safe and secure manner and conventional buildings and structures which will house support personnel, systems and equipment. The seismically hardened new construction will require approximately 150,000 square feet, and house the following key systems: oxide fuel feed preparation; metal fuel feed preparation; grinding; material unpacking and sorting; metal conversion to oxide; impure oxide feed preparation; materials characterization; materials control and accountability; in-process storage; feed batching; ceramic feed preparation; pellet characterization; sintering; recycle; can loading; can characterization; can storage; canister loading and assembly; and the canister transport system. In addition, conventional building space requiring approximately 50,000 square feet to house office space, change rooms, and utilities will be constructed. The existing site infrastructure containing the analytical laboratory (20,000 square feet) and the planned Actinide Packaging and Storage Facility (originally planned for completion before construction of the Immobilization facility) of

approximately 10,000 square feet was planned to be used for sample analysis and receipt and storage of select incoming materials. [a]

The Department plans on immobilizing 17 mt of non-pit surplus plutonium which is not suitable for use in mixed oxide fuel without extensive purification, of which approximately 8 mt is not weapons grade and therefore not subject to the U.S.-Russian bilateral agreement. Because of the time required to prepare some materials for immobilization, ten years is the estimated time to immobilize these materials after which the facility will be decontaminated and decommissioned over a three- to four-year period. The facility will be operational beginning in FY 2008.

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Title I preliminary design will begin in late FY 2001 and will determine the final construction baseline which will be updated in the FY 2004 budget cycle and used to measure performance. Current construction estimates are based on a conceptual design for DOE's can-in-canister approach utilizing the existing HLW and the Defense Waste Processing Facility (DWPF) with existing general support infrastructure in accordance with the conceptual design report. Current design and construction estimates do not include necessary receipt and storage functions required for the immobilization facility that are part of the APSF which is under reevaluation. Should the APSF not be constructed, the design baseline will be adjusted in the FY 2002 budget cycle to accommodate necessary design changes.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs, (Design, Drawings, and Specifications)	45,795	46,327
Design management costs @ 22% of above costs	9,909	3,996
Total, design phase	55,704	50,323
Contingencies at approximately 25% of above costs		
Design phase	13,981	17,613
Total Agency Requirement (Design Only)	69,685	67,936

5. Method of Performance

[a]EM Project 97-D-450, Actinide Packaging and Storage Facility (APSF), will be reevaluated and may not be constructed and therefore may not be available to provide necessary receipt and storage functions required for the immobilization facility. The preliminary estimates for the immobilization facility do not include 40,000 sq. ft required for these functions if attached to the Immobilization and Associated Processing Facility should APSF not be constructed. The space required increases due to our inability to leverage off the APSF.

| It is expected that a cost-plus-fixed-fee contract will be the most appropriate and cost-beneficial for the design work. It is anticipated that the construction procurement will be a fixed-price contract awarded on the basis of competitive bidding.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Design Cost						
Design	0	0	0	3,000	66,685	69,685
Plant Engineering & Design (PE&D)	0	0	0	0	0	0
Operating expense funded equipment	0	0	0	0	0	0
Total Design Costs (Federal and Non-Federal)	0	0	0	3,000	66,685	69,685
Other Project Costs						
R&D necessary to complete project	0	0	0	0	0	0
Conceptual design costs	0	0	0	0	0	0
Decontamination and Decommissioning (D&D)	0	0	0	0	0	0
NEPA documentation costs	0	0	0	0	0	0
Other project-related costs	0	0	0	0	0	0
Total Other Project Costs	0	0	0	0	0	0
Total Agency Requirement (Design only)	0	0	0	3,000	66,685	69,685

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	[a]	N/A

[a]Related annual costs will be defined during the Title I design effort and reflected in the FY 2004 budget request.

99-D-143, Mixed Oxide Fuel Fabrication Facility - Title I & II Design, Savannah River Site, Aiken, South Carolina

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The design cost increased from $50,375,000 to $65,375,000 due to the addition of an aqueous processing step prior to fabricating mixed-oxide fuel. The aqueous polishing step is necessary to ensure removal of impurities that exist in the weapons grade plutonium which could affect the fuel performance during irradiation.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(A-E and technical design only)*	2Q 1999	4Q 2001	1Q 2002	4Q 2005		
FY 2001 Budget Request *(Preliminary Estimate)*	2Q 1999	3Q 2002	4Q 2002 [a]	1Q 2006	[b]	[a]

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Design			
1999	28,000	28,000	10,000
2000	12,375	12,375	24,000
2001	15,000	15,000	21,000
2002	10,000	10,000	10,375

[a]Site preparation will begin in 4Q 2002.

[b]Preliminary cost estimates for the Mixed Oxide Fuel Fabrication Facility are based upon contract proposal estimates. The preliminary estimates are: Total Estimated Cost (TEC) -- approximately $398,000,000 and Total Project Cost (TPC) – approximately $590,000,000. These estimates are used for the purpose of requesting design funding only. Future construction funding will be based upon Title I cost estimates. The Administration will not construct new facilities for disposition of U.S. plutonium unless there is significant progress on plans for plutonium disposition in Russia

3. Project Description, Justification and Scope

In the aftermath of the Cold War, significant quantities of weapons-usable plutonium have become surplus to national defense needs both in the United States and Russia. The Department issued a Record of Decision (ROD) on the Storage and Disposition of Surplus Weapons-Usable Fissile Materials in January 1997. This decision calls for DOE to pursue a hybrid approach for plutonium disposition that allows for immobilization of surplus weapons plutonium in ceramic form and irradiating some of the surplus plutonium as mixed oxide fuel (MOX) in existing domestic reactors. A Mixed Oxide (MOX) Fuel Fabrication Facility will provide the U.S. with the capability to convert specification plutonium dioxide derived from surplus weapons grade plutonium stocks to MOX fuel suitable for use as a fuel source in U.S. commercial nuclear reactors, with subsequent disposal of the spent fuel to be carried out in accordance with the Nuclear Waste Policy Act.

The MOX Fuel Fabrication Facility will contain all the systems required for: receiving plutonium oxide from the Pit Disassembly and Conversion Facility; processing and blending of fuels materials (including aqueous polishing) fabrication of fuel pellets; loading pellets into rods; assembly of completed fuel bundles and shipment to commercial reactors for irradiation. The facility will meet current commercial standards for nuclear fuel manufacturing utilizing the extensive experience base of European fabrication of MOX fuel. The facility will be licensed by the Nuclear Regulatory Commission and operated by a private sector consortium for the Department. Four sites (Hanford, Idaho National Engineering and Environmental Laboratory, Pantex, and Savannah River) were considered for the MOX Fuel Fabrication Facility. Several of these sites have general support infrastructure in place such as a fire department, security protection forces, waste management services, and water and sewage treatment plants. In June 1998, the DOE announced the Savannah River Site as the preferred location to build the MOX Fuel Fabrication Facility. A final decision to locate the facility at the Savannah River Site was made in January 2000 in the ROD following the issuance of an Environmental Impact Statement.

The MOX Fuel Fabrication Facility will require approximately 160,000 square feet which will contain the following systems: plutonium oxide and oxide receiving and storage; aqueous polishing; MOX powder preparation; pelletizing; sintering; pellet grinding and inspection; fuel rod loading and rework; fuel rod inspection and storage, fuel bundle assembly; clean scrap recovery, processing and recycle; analytical laboratory, contaminated waste, and interim storage vaults. The facility also includes 55,000 square feet of conventional structures adjacent to the fuel fabrication structure to house offices, change rooms, operator training and process demonstration, mechanical shops, utility building, warehouse, and entry portals. Accountability systems essential for use by the IAEA will be in place for the purpose of international safeguards. This facility will be operational for ten years (at 3.5 mt per year maximum throughput capacity) beginning in FY 2007, after which the facility will be decontaminated and decommissioned over a three- to four-year period.

A contract was awarded to the Duke, Cogema Stone & Webster consortium on March 22, 1999. The contract requires the consortium to design a MOX Fuel Fabrication Facility that will be built at the

Savannah River Site and regulated by the Nuclear Regulatory Commission. The total design costs based on the contract proposal with the consortium is $65.4M which is a $15M increase from the conceptual design estimate. The increase is attributed primarily to the addition of an aqueous polishing step prior to fabricating mixed-oxide fuel. The aqueous polishing step is necessary to ensure removal of impurities that exist in the weapons grade plutonium which could affect the fuel performance during irradiation.

Title I preliminary design began in mid FY 1999 and will determine the final construction baseline. The construction baseline will be updated in the FY 2003 budget cycle and used to measure performance. Current construction estimates are based on a conceptual design for a new facility with an established general support infrastructure at the Savannah River Site. Current construction estimates do not include necessary aqueous polishing required to remove impurities to ensure optimal MOX fuel irradiation in commercial reactors. The design baseline has been adjusted in this budget to accommodate the addition of an aqueous polishing step. An updated design cost baseline is being developed as part of the overall consortium baseline planning activities following contract award and will be reflected in the FY 2002 budget cycle.

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs, (Design, Drawings, and Specifications)	49,043	37,803
Design management costs @ 9% of above costs	5,088	3,908
Total, design phase	54,131	41,711
Contingencies at approximately 21% of above costs		
. Design phase	11,244	8,664
Total Agency Requirement (Design Only) [a]	65,375	50,375

5. Method of Performance

The procurement strategy calls for a base contract with three options. The first step in the procurement strategy was completed on March 22, 1999 when a contract was awarded to a consortium to provide MOX fuel fabrication and irradiation services. This base contract covers the design and licensing of the MOX Fuel Fabrication Facility, fuel qualification activities, and reactor license modifications.

Sequential contract options cover construction (Option 1), operations (Option 2), and facility deactivation (Option 3). It is expected that an incentive contract with the consortium will be the most appropriate and cost beneficial for the construction work. The construction would be through fixed-price

[a]The increase over the previous estimate is due to incorporating aqueous processing in the facility design which is necessary to ensure removal of impurities that exist in the weapons grade plutonium which could affect the fuel performance during irradiation.

| subcontracts to the extent practical, with a cost-type contract for construction management services. The
| MOX Fuel Fabrication Facility will be Government-owned but operated by the contractor consortium.

| It is expected that during the operational phase of the consortium contract, facility operational costs will
| be offset by the value of the MOX fuel which will displace the low-enriched uranium (LEU) that the
| utilities would have otherwise purchased. The value of DOE's share of these fuel savings, less the facility
| operational costs, may provide a positive revenue stream to the government on a life-cycle cost basis.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Design Cost						
Design	0	28,000	12,375	15,000	10,000	65,375
Plant Engineering & Design (PE&D)	0	0	0	0	0	0
Operating expense funded equipment	0	0	0	0	0	0
Total Design Costs (Federal and Non-Federal)	0	28,000	12,375	15,000	10,000	65,375
Other Project Costs						
R&D necessary to complete project	0	0	0	0	0	0
Conceptual design costs	0	0	0	0	0	0
Decontamination and Decommissioning (D&D)	0	0	0	0	0	0
NEPA documentation costs	0	0	0	0	0	0
Other project related costs	0	0	0	0	0	0
Total Other Project Costs	0	0	0	0	0	0
Total Agency Requirement (Design only)	0	28,000	12,375	15,000	10,000	65,375

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	[a]	

[a]Related annual costs will be defined during the Title I design effort and reflected in the FY 2003 budget request.