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Department of Energy
National Nuclear Security Administration
Office of the General Counsel
P.O. Box 5400
Albuquerque, NM 87185-5400

April 21, 2021

SENT VIA EMAIL

This letter is the final response to your October 5, 2020 Freedom of Information Act (FOIA) request. You requested "a copy of the most recent Fissile Materials Disposition Strategic Plan."

Your request was received in this office on October 6, 2020. We contacted the National Nuclear Security Administration's (NNSA) Office of Defense Nuclear Nonproliferation (NA-20), about your request. NA-20 searched and located one (1) document entitled "Strategic Plan 0600," which is fully releasable and provided in its entirety.

For assistance, you may contact me, NNSA's FOIA Public Liaison, Office of the General Counsel, at 1-866-747-5994, or by mail at Department of Energy, National Nuclear Security Administration, Office of the General Counsel, PO Box 5400, Albuquerque, NM 87185, for further assistance and to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, e-mail at ogis@nara.gov; telephone at 202-741-5770; toll free at 1-877-684-6448; or facsimile at 202-741-5769.

There are no fees chargeable to you for processing this request. If you have questions regarding this response, please contact Delilah Perez by email at Delilah.Perez@nnsa.doe.gov or write to the address above. Please reference Control Number FOIA 21-00003-M.

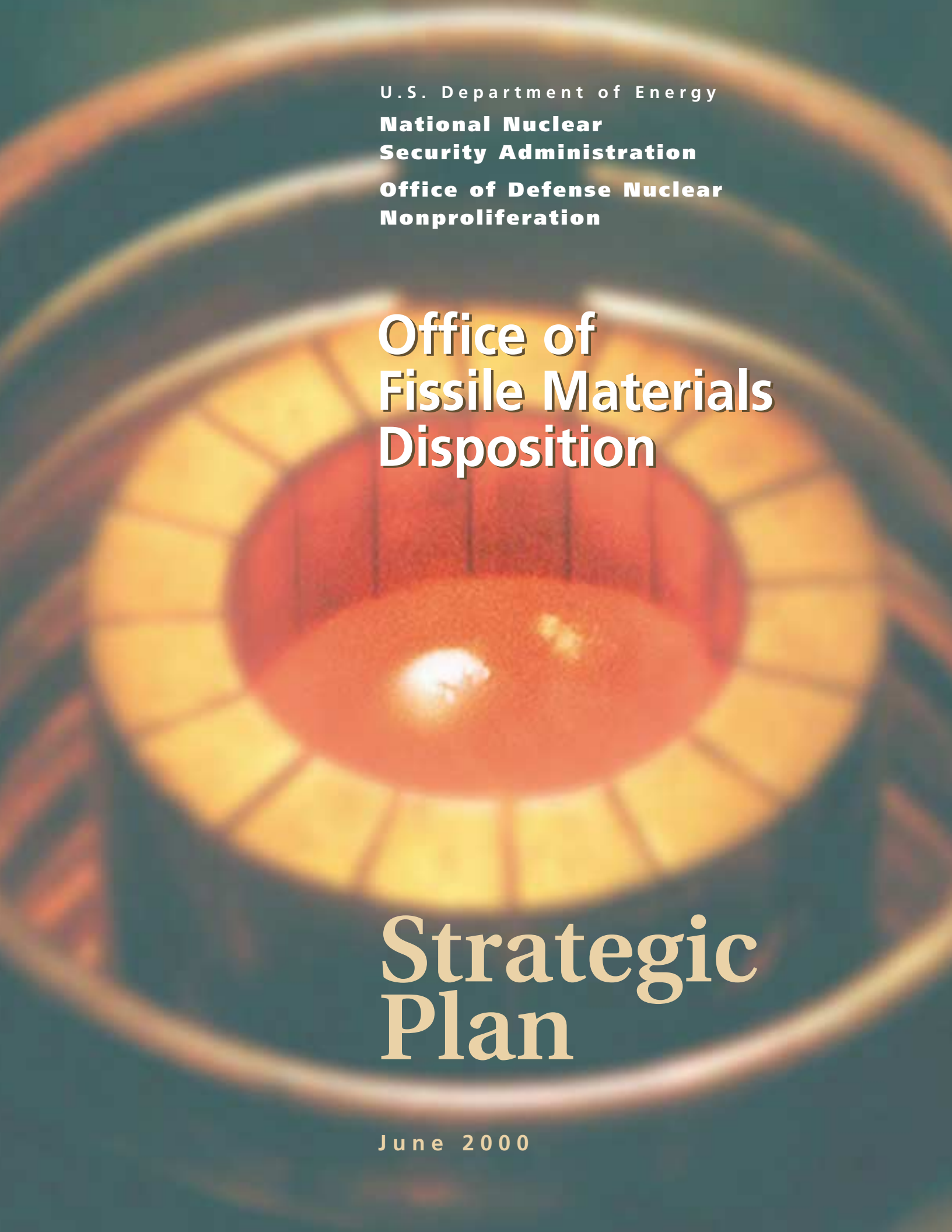
Sincerely,

Christina H. Hamblen

Digitally signed by Christina H. Hamblen
Date: 2021.04.21 07:19:54 -06'00'

Christina H. Hamblen
FOIA Officer

Enclosure



U.S. Department of Energy

National Nuclear Security Administration

Office of Defense Nuclear Nonproliferation

Office of Fissile Materials Disposition

Strategic Plan

June 2000

Within 20 years...

Eliminate *174 tons of surplus U.S. highly enriched uranium.*

Eliminate *50 tons of surplus U.S. plutonium.*

Work *with Russia to* **eliminate** *similar amounts of surplus plutonium.*

The Office of Defense Nuclear Nonproliferation (NN) in the Department of Energy is at the forefront of efforts to address proliferation dangers in partnership with governments and organizations worldwide. Whether it is securing nuclear weapon usable materials and expertise in the former Soviet Union or developing the verification technologies for arms control and nonproliferation, NN is engaged globally to meet the proliferation threats of today and tomorrow. The Office of Fissile Materials Disposition plays a central role in NN's broader mission. For more information on NN, visit our website <www.nn.doe.gov>.

Cover: Molten plutonium in a crucible (photo courtesy of Los Alamos National Laboratory)

Introduction

The Office of Fissile Materials Disposition has come a long way in developing a path forward for disposing of surplus fissile materials, both in this country and in Russia. We are already disposing of surplus U.S. highly enriched uranium and are completing the groundwork for disposing of surplus U.S. plutonium. With the signature by the United States and Russia of a bilateral agreement on plutonium disposition, we will move ahead promptly to begin constructing the facilities and begin disposing of surplus U.S. and Russian plutonium.

This important nonproliferation mission has received significant support from the United States Congress and from other nations. Our objectives, strategies, and goals reflect the collective input of a diverse group of interested parties. Congress, Federal, state, and local governments, Tribal officials, non-government organizations, and the public have all contributed to shaping this program through more than 90 public meetings and thousands of comments received by mail, phone, fax, and our web site, as well as through frequent meetings, conferences, and other public events.

The Department of Energy's fissile materials disposition program is expected to play a critical role in meeting national and international security initiatives. The program also plays a leading role in the Office of Defense Nuclear Nonproliferation's broader mandate to demilitarize and develop verification measures for U.S. and Russian surplus fissile materials. After you read our plan, I am sure you will share our view of the importance of this effort in reducing the global danger from proliferation of weapons of mass destruction.

Laura S. H. Holgate
Assistant Deputy Administrator
Office of Fissile Materials Disposition

History

Since the end of the Cold War, significant quantities of plutonium and highly enriched uranium have become surplus to defense needs, both in the United States and Russia. Continued implementation of arms reduction agreements is expected to result in further weapons dismantlements and increases in stockpiles of these surplus, weapons-usable fissile materials.

"...these materials pose a clear and present danger to national and international security."

National Academy of Sciences

If acquired by terrorists or rogue nations, these surplus materials could be made into crude nuclear weapons for use against the citizens of the United States, Russia, or other nations. The National Academy of Sciences has characterized this threat as a "clear and present danger" to national and international security.

This threat led President Clinton to announce a framework for United States efforts to prevent the proliferation of weapons of mass destruction. A key element of this framework committed the United States to undertake a comprehensive approach to seek to eliminate, where possible, the accumulation of stockpiles of 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.

In support of this strategy, the Department of Energy and the Department of Defense reviewed estimates of the fissile materials required to support U.S. security needs. As a result, 38 metric tons of weapon-grade plutonium and 174 metric tons of highly enriched uranium were determined excess to U.S. national defense needs. Based on this review, President Clinton ordered that 200 tons of fissile materials—enough for thousands of nuclear warheads—be permanently withdrawn from the U.S. nuclear stockpile and never again be used to build nuclear warheads. In addition, the Department of Energy considers another 14 metric tons of non-weapon-grade plutonium as surplus.

Left: Tearing down the Berlin wall [courtesy of German Information Center].

Above: "Management and Disposition of Excess Weapons Plutonium," National Academy of Sciences, 1994

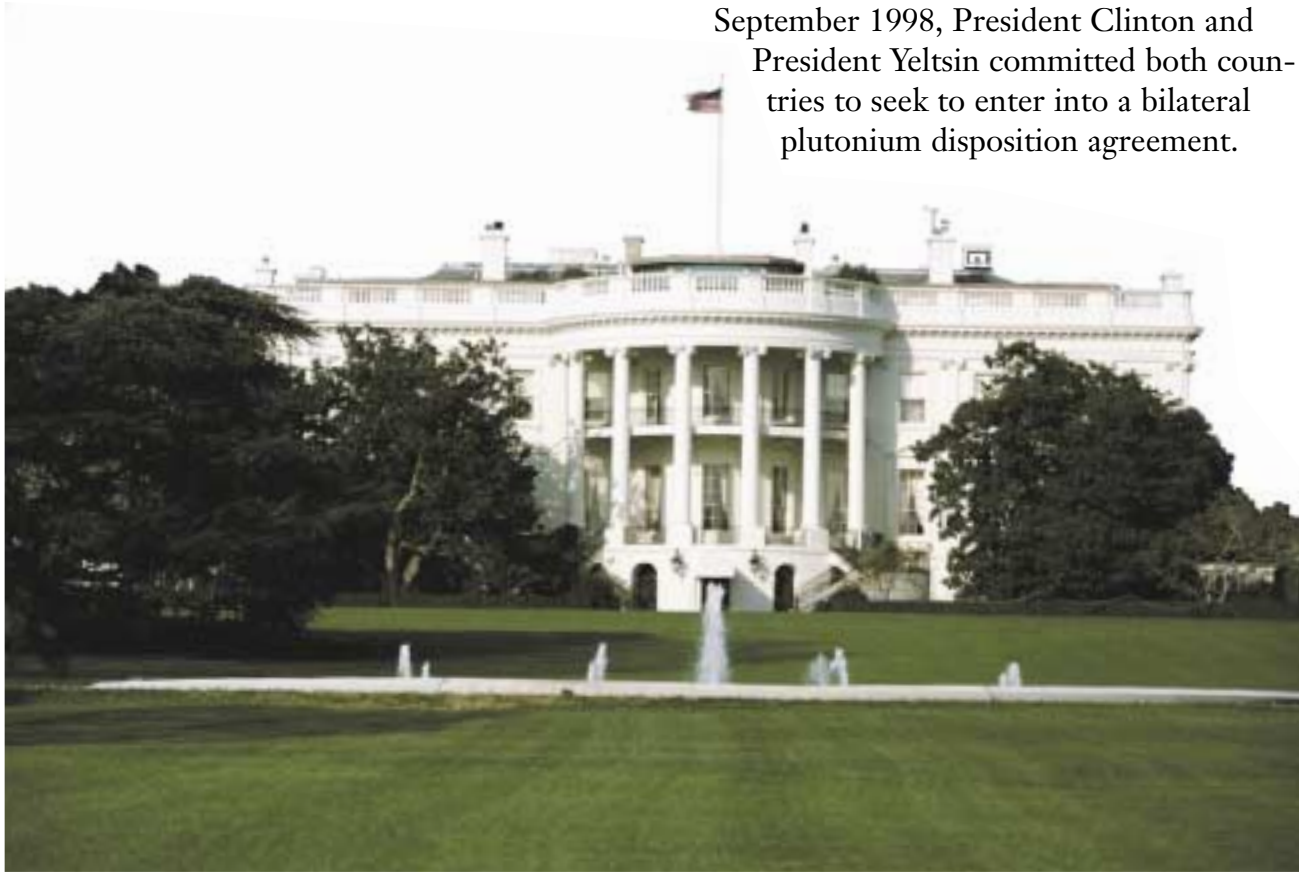
As part of President Clinton's nonproliferation strategy, the United States initiated a dialog with Russia to address the problem of excess fissile materials. At the January 1994 Moscow Summit, President Clinton and President Yeltsin agreed to cooperate on measures to prevent the accumulations of excess stocks of weapons-usable fissile materials. In April 1996, at the Moscow Nuclear Safety and Security Summit, the G-7 nations and Russia agreed that irradiating mixed oxide (MOX) fuel in commercial reactors and immobilization represented appropriate strategies for disposing of surplus plutonium. Both approaches would convert plutonium to spent fuel or some other form equally as difficult to recover and use in nuclear weapons.

Top right: Helsinki Summit, 1997

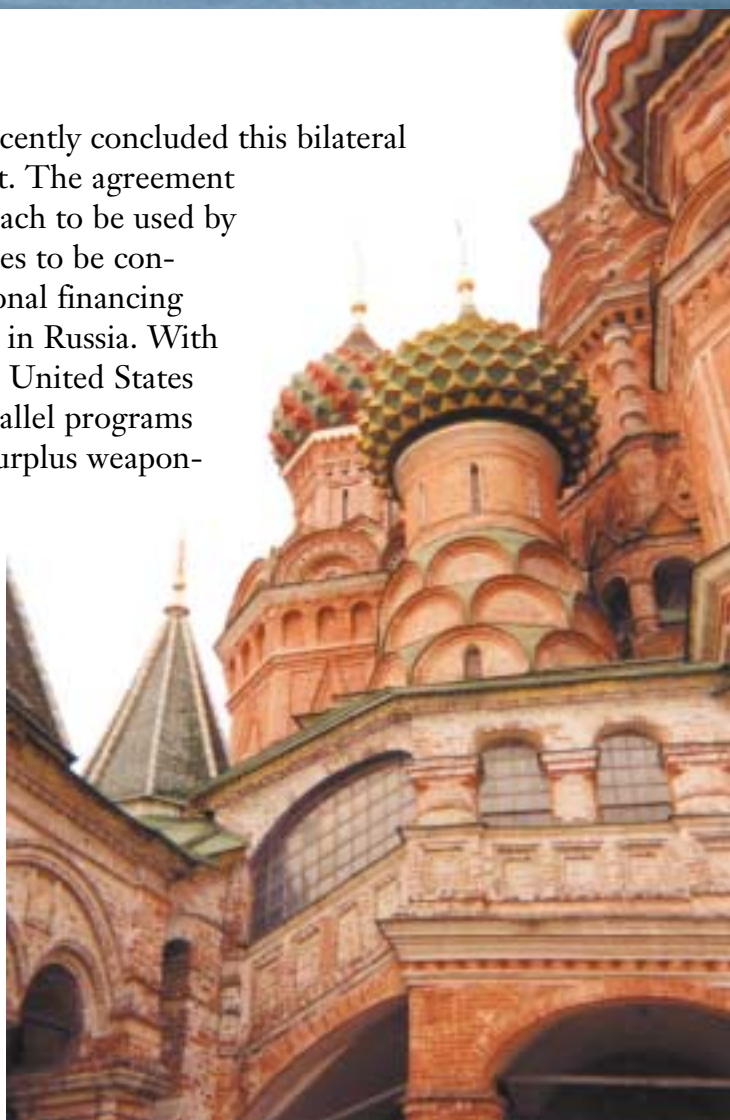
Bottom right: St. Basil's Church, Moscow

Below: The White House, Washington, DC

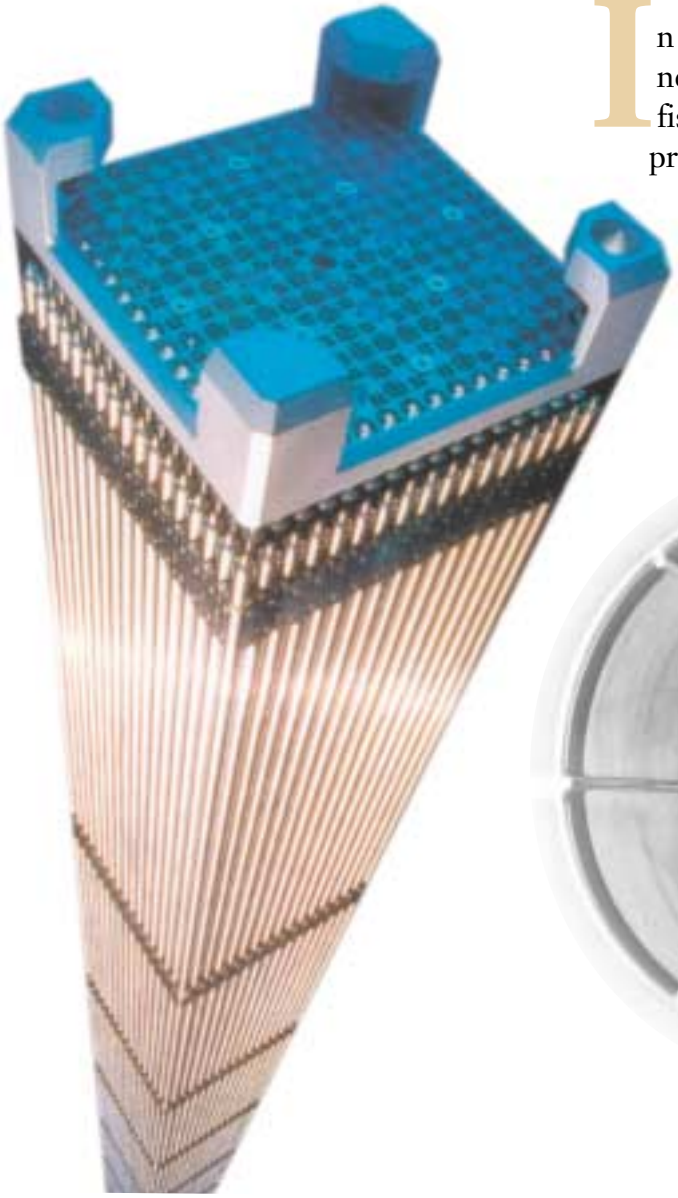
Then, in September 1997, Russian President Yeltsin made the first official declaration of excess Russian fissile materials, stating that up to 50 metric tons of weapons plutonium and up to 500 metric tons of highly enriched uranium were excess to Russian defense needs. In July 1998, the United States and Russia signed a Scientific and Technical Cooperation Agreement to conduct tests and demonstrations of proposed plutonium disposition technologies. Shortly thereafter, in September 1998, President Clinton and President Yeltsin committed both countries to seek to enter into a bilateral plutonium disposition agreement.



The United States and Russia recently concluded this bilateral plutonium disposition agreement. The agreement specifies the technological approach to be used by each country, the types of facilities to be constructed in Russia, and international financing commitments for these activities in Russia. With the agreement in place, both the United States and Russia will proceed with parallel programs to dispose of 68 metric tons of surplus weapon-grade plutonium.



Approach



In order to reduce costs and to minimize the time needed to complete the disposition mission, the U.S. fissile materials disposition program will rely, where practical, on existing technologies and facilities available in the public and private sectors. For example, we are transferring highly enriched uranium to USEC, Inc. for down-blending to low enriched uranium, using available commercial technology. For plutonium disposition, the mixed oxide (MOX) fuel fabrication facility will be based on an existing European plant design, and the resulting MOX fuel will be irradiated in existing, domestic reactors.

"...partnership with private sector companies sets the stage for Russia and the United States to work together to eliminate tons of excess plutonium."

Bill Richardson,
Secretary of Energy
March 1999

The fissile materials disposition program also relies on technologies and capabilities of other elements of the Department. For example, the immobilization approach will use high-level vitrified radioactive waste from the Savannah River Site's ongoing waste tank cleanup operations to provide the radiation barrier necessary for proliferation resistance. Both spent MOX fuel and the immobilized waste form will ultimately be entombed in a geologic repository under development by the Department's Civilian Radioactive Waste Management Program.

Opposite page
Left: MOX fuel assembly, MELOX plant, France (photo courtesy of COGEMA)

Center: Conceptual can-in-canister array for immobilization

Right: McGuire Nuclear Station, North Carolina (photo courtesy of Duke Power)

This page
Above: Defense Waste Processing Facility at Savannah River Site

Left: Potential geologic repository

Goals

To effectively reduce inventories of surplus weapons-usable fissile materials, the Office of Fissile Materials Disposition has three performance goals: 1) eliminate surplus U.S. highly enriched uranium; 2) eliminate surplus U.S. weapon-grade plutonium, and 3) implement a bilateral agreement with Russia to eliminate similar quantities of Russian surplus plutonium. It is expected that these efforts will take about 20 years to complete.

As this effort matures, changes in policy as well as budget limitations may dictate modification to the strategies and performance metrics for the program. The Department's Annual Performance Plans and Annual Operating Plans will communicate the necessary changes to the fissile materials disposition program.

Above: Molten glass test pour for immobilization

Right: Test fuel pellets for MOX

Within 20 years...

1.

Eliminate surplus U.S. highly enriched uranium (HEU) primarily by down-blending the material to low enriched uranium (LEU) for peaceful use as fuel for commercial reactors.

2.

Eliminate surplus U.S. plutonium by irradiating mixed oxide (MOX) fuel and converting some of the material to an immobilized waste form.

3.

Implement a bilateral agreement with Russia to eliminate similar quantities of surplus Russian plutonium.

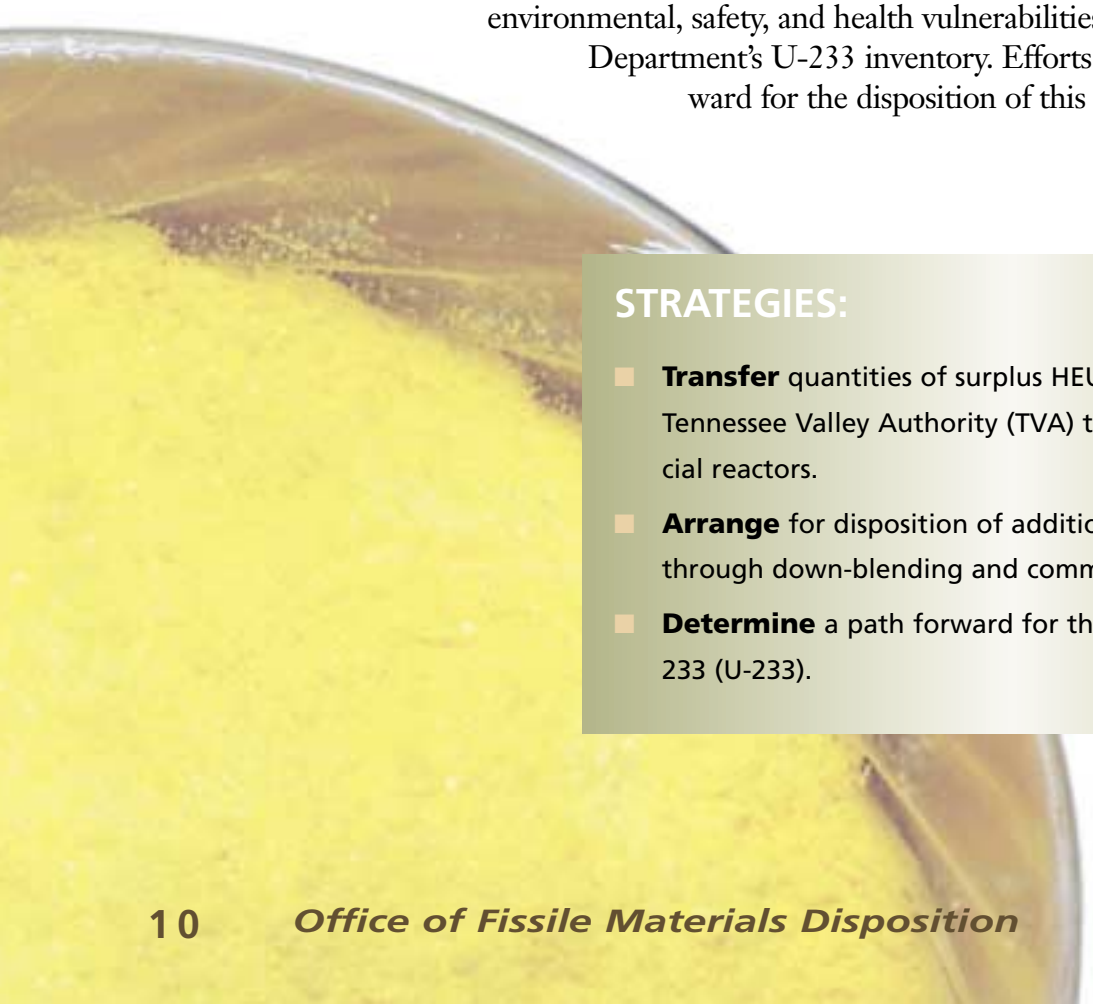
Eliminate Surplus U.S.

The technology to make highly enriched uranium unsuitable for use in nuclear weapons is well understood. Highly enriched uranium can be mixed with other forms of uranium, such as depleted or natural uranium, to produce low enriched uranium. In a low enriched form, the material is unsuitable for nuclear weapons use.

U.S. Actions

A July 1996 decision by the Department of Energy calls for eliminating the proliferation threat of stockpiles of surplus highly enriched uranium, where practical, by down-blending the material for sale as low enriched uranium and using it, over time, as commercial nuclear reactor fuel to recover its economic value. Material that cannot be economically recovered would be disposed of as waste.

Current plans would continue the transfer of 63 metric tons of surplus highly enriched uranium to USEC, Inc. through 2005. This material will be down-blended to low enriched uranium fuel for eventual sale to commercial utilities. An additional 38 metric tons of off-specification highly enriched uranium will be transferred to the Tennessee Valley Authority between 2002 and 2007 for down-blending and use in its reactors. Planning for the disposition of additional quantities of surplus highly enriched uranium is continuing. In addition to disposition plans for highly enriched uranium, there are environmental, safety, and health vulnerabilities associated with the Department's U-233 inventory. Efforts to determine a path forward for the disposition of this material are underway.



STRATEGIES:

- **Transfer** quantities of surplus HEU to USEC, Inc. and the Tennessee Valley Authority (TVA) to make LEU for commercial reactors.
- **Arrange** for disposition of additional lots of surplus HEU through down-blending and commercial use.
- **Determine** a path forward for the disposition of Uranium 233 (U-233).

Highly Enriched Uranium

The Department will continue to store surplus highly enriched uranium at the Y-12 Plant in Tennessee. When ready for down-blending to low enriched uranium, the surplus material will be shipped to existing private sector facilities in Erwin, Tennessee and Lynchburg, Virginia. All shipments of surplus highly enriched uranium will continue to be moved by the Department's Transportation Safeguards Division using the Safe Secure Trailer system.

Opposite page: Low enriched uranium (photo courtesy of BWX Technologies)

This page
Above left: Disassembly of HEU weapon components at the Y-12 Plant

Center (2 photos): Recast cylinder and chips from HEU weapon components

Above right: Furnace used to convert HEU metal chips to HEU oxide

Russian Actions

In 1993, Russia agreed to sell to the United States, over a twenty-year period, low enriched uranium fabricated from up to 500 metric tons of highly enriched uranium from dismantled Soviet nuclear weapons. USEC, Inc. is the executive agent for the purchase of that material from Russia.

METRICS:

- **Complete** the shipment of 50 metric tons (MT) of surplus HEU to USEC, Inc. in 2005 for down-blend to LEU and subsequent use as commercial reactor fuel; transfer title and complete the shipment of 38 MT of off-specification HEU to TVA in 2007 for down-blend and use in TVA reactors.
- **Receive** financial returns for the Treasury from the sale of LEU that has been down-blended from additional lots of surplus HEU beginning in 2006.
- **Issue** an Environmental Impact Statement for disposition of surplus U-233 by 2003.

Eliminate Surplus U.S.

Unlike uranium, nearly all isotopes of plutonium can be used to make a nuclear weapon. As a result, the disposition of plutonium requires the application of more complicated technologies than for the disposition of highly enriched uranium, and there is less public agreement on a path forward. The Department's strategy for disposition is to convert surplus U.S. plutonium to the "spent fuel standard" where the material is converted to forms as inaccessible and unattractive for retrieval and weapons use as the residual plutonium in spent fuel from commercial reactors. In a "spent fuel standard" form, the surplus plutonium cannot be used in nuclear weapons without significant processing.

STRATEGIES:

- **Implement** the U.S. hybrid strategy for plutonium disposition in rough parallel with plutonium disposition in Russia.
- **Complete** the design and construct three key U.S. plutonium disposition facilities for pit disassembly and conversion, immobilization, and MOX fuel fabrication.
- **Operate** a pit disassembly and conversion facility to convert surplus weapons plutonium to an unclassified oxide form suitable for disposition and international inspection.
- **Operate** a MOX fuel fabrication facility to convert oxide materials into a MOX fuel; and irradiate the MOX fuel in existing domestic commercial reactors.
- **Operate** an immobilization facility using the can-in-canister approach to immobilize surplus "non-pit" plutonium in a ceramic material that is then surrounded with vitrified high-level radioactive waste.

U.S. Actions

In January 1997, the Department of Energy announced that it would pursue a hybrid disposition strategy for surplus U.S. plutonium. The strategy relies on two technology approaches: irradiation, in which the surplus plutonium is converted to a mixed oxide (MOX) fuel and irradiated in existing,

Plutonium

"I believe that the dual-track approach for eliminating excess weapons plutonium stockpiles best serves our arms reduction and nonproliferation goals."

President Bill Clinton

Opposite page
Left: **©1996, The Washington Post Reprinted with permission.**

Right: Secretary of Energy Bill Richardson dedicates prototype pit disassembly and conversion facility at Los Alamos National Laboratory in New Mexico, 1998

This page: The pit disassembly (shown at left), and conversion process will convert surplus plutonium "pits" to oxide powder (shown in inset), for disposition and international inspection

domestic reactors; and immobilization, in which surplus plutonium is mixed with ceramic and then surrounded by vitrified high-level radioactive waste. Both approaches will effectively convert the surplus plutonium to the "spent fuel standard" recommended by the National Academy of Sciences. In effect, the plutonium becomes as difficult, unattractive, and costly to retrieve, reprocess, and reuse as the plutonium already residing in spent fuel from commercial nuclear reactors. Pursuing both approaches in parallel is important because it provides insurance against possible difficulties with the implementation of either technology by itself and helps ensure an early start to plutonium disposition.

METRICS:

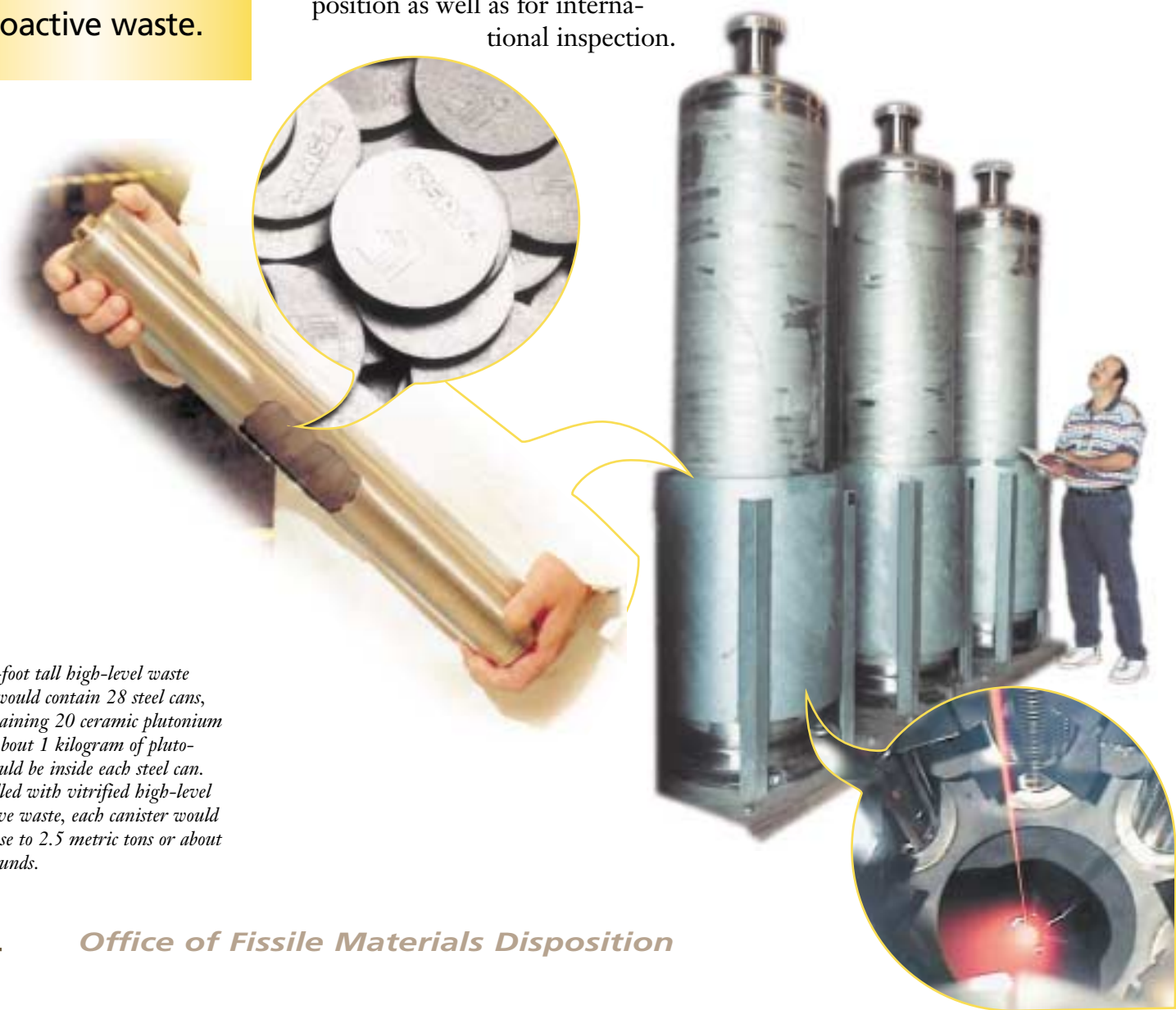
- **Issue** a Record of Decision (ROD) in 2000 for siting plutonium disposition facilities. Completed January 2000.
- **Complete** the designs of a plutonium pit disassembly and conversion facility and a MOX fuel fabrication facility in 2002 and an immobilization facility in 2004. Begin construction of the pit disassembly and conversion facility in 2002, the MOX fuel fabrication facility in 2003, and the immobilization facility in 2004.
- **Begin** full-scale operation of a pit disassembly and conversion facility and produce plutonium oxide in 2006.
- **Submit** Nuclear Regulatory Commission (NRC) operating license application in 2002, and subsequent to NRC approval, begin full-scale operation of a MOX fuel fabrication facility in 2007.
- **Begin** full-scale operation of an immobilization facility in 2008 and produce high-level waste canisters containing cans of plutonium immobilized in ceramic.

U.S. Hybrid Strategy

Immobilization

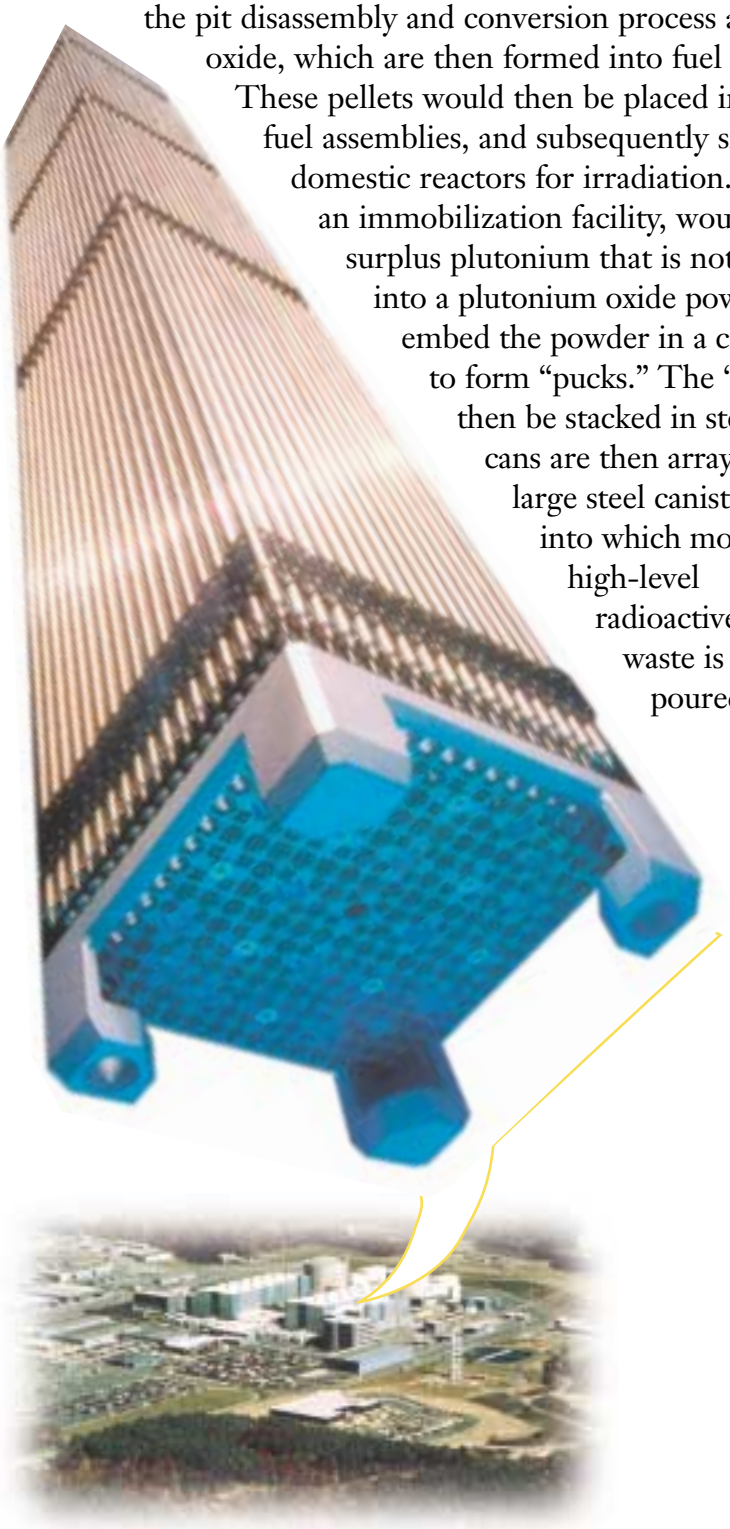
Immobilize surplus plutonium in ceramic form surrounded by vitrified high level radioactive waste.

The hybrid strategy will require the Department to construct and operate three key plutonium disposition facilities at the Savannah River Site in South Carolina. The first, a pit disassembly and conversion facility, would disassemble classified nuclear weapons components (pits) and convert the resulting plutonium metal into an unclassified plutonium oxide powder, suitable for disposition as well as for international inspection.



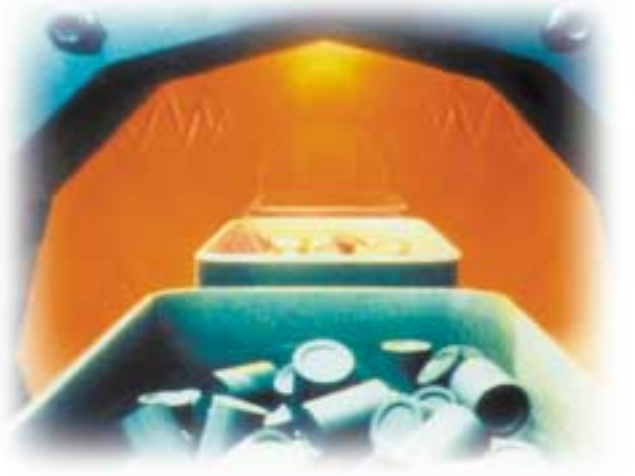
Each 10-foot tall high-level waste canister would contain 28 steel cans, each containing 20 ceramic plutonium pucks. About 1 kilogram of plutonium would be inside each steel can. When filled with vitrified high-level radioactive waste, each canister would weigh close to 2.5 metric tons or about 5,500 pounds.

The second, a MOX fuel fabrication facility, would produce MOX fuel assemblies for irradiation in existing, commercial reactors. The MOX process involves mixing plutonium from the pit disassembly and conversion process and uranium oxide, which are then formed into fuel pellets. These pellets would then be placed into MOX fuel assemblies, and subsequently shipped to domestic reactors for irradiation. The third, an immobilization facility, would convert surplus plutonium that is not in "pit" form into a plutonium oxide powder and embed the powder in a ceramic matrix to form "pucks." The "pucks" would then be stacked in steel cans. The cans are then arrayed inside a large steel canister, into which molten high-level radioactive waste is poured.



MOX/Reactors

Irradiate surplus plutonium as mixed oxide (MOX) fuel in existing, domestic, commercial reactors.



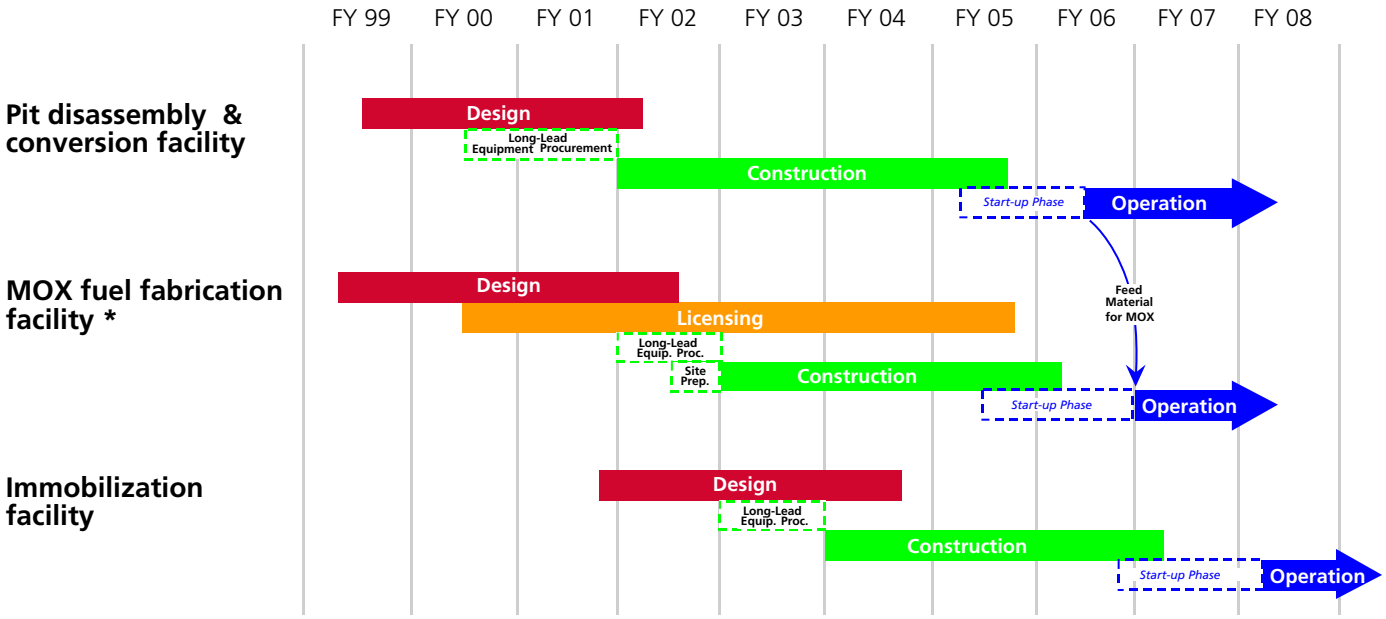
Each MOX fuel assembly would be approximately 8 inches square and just over 13 feet long and would contain 264 fuel pins that are approximately one quarter inch in diameter. Each complete MOX fuel assembly would contain about 20 kilograms of surplus weapons-grade plutonium, and weigh a total of 0.5 metric tons or about 1,100 pounds. Each domestic reactor would hold up to 40 complete MOX fuel assemblies during an irradiation cycle.

Above and left: MOX fuel pellets shown being sintered in furnace. MOX fuel assemblies will be shipped to domestic reactors for irradiation. (Photos courtesy of COGEMA and Duke Power)

The Path Forward

The current schedule calls for surplus nuclear weapons pits to be disassembled and the plutonium converted into plutonium oxide powder beginning in 2006; MOX fuel would be fabricated beginning in 2007; and immobilization activities would begin in 2008. Depending on schedules specified in the bilateral agreement on plutonium disposition, current inventories of surplus U.S. weapons plutonium could be disposed of as early as 2020.

U.S. Plutonium Disposition Schedule



* The MOX fuel fabrication facility will be shut down at the completion of the plutonium disposition mission

Prior to disposition, surplus plutonium "pits" are being stored at the Pantex Plant in Texas and surplus "non-pit" plutonium is being stored at the Savannah River Site in South Carolina. Transportation planning is underway for shipping the surplus plutonium "pits" to the Savannah River Site for disposition and for shipping fresh MOX fuel assemblies from the MOX fuel fabrication facility at the Savannah River Site to commercial nuclear reactor sites in North Carolina and South Carolina. All shipments of surplus plutonium, including fresh MOX fuel assemblies, will use the Safe Secure Trailer system, operated by the Department's Transportation Safeguards Division.

Top: Heavily secured bunkers at the Pantex Plant in Texas are used to store surplus plutonium "pits"

Center: Plutonium shipments will use the Department's Safe Secure Trailer system.

Bottom: When completed, the K-Area Materials Storage at Savannah River Site in South Carolina will store surplus non-pit plutonium.

Cooperating with Russia

Sites Currently Involved in Plutonium Disposition Activities

Russian Agency Oversight:

- Ministry of Atomic Energy (MINATOM)
- GOSTATOMNADZOR (GAN)
- Rosenergoatom (REA)

Plutonium Metal to Oxide Conversion

Conversion & Non-Destructive Assay

1. Bochvar Institute (VNIINM)
2. Research Institute for Atomic Reactors (RIAR)
3. All Russian State Design Institute (GSPI)
4. Mayak Production Association
5. Scientific and Engineering Center (SNIIP)

MOX Fuel Fabrication and Reactor Analysis/Modification

VVER-1000 MOX Fuel Development & Reactor Analysis

1. Bochvar Institute (VNIINM)
2. Research Institute for Atomic Reactors (RIAR)
6. Novosibirsk Chemical Concentrates Plant
7. St. Petersburg Atomenergoproekt (SPAEP)
8. Kurchatov Institute (KI)
15. Balakovo Nuclear Power Plant
17. All Russia Research Institute for Nuclear Power Plant Operation (VNIIAES)

BN-600 MOX Fuel Development & Reactor Conversion

3. Research Institute for Atomic Reactors (RIAR)
4. Mayak Production Association
9. Institute of Physics & Power Engineering (IPPE)
10. Experimental Machine Building Bureau (OKBM)
16. Beloyarsk Nuclear Power Plant

CANDU/Parallex

1. Bochvar Institute (VNIINM)

High Temperature Gas Reactor R&D

1. Bochvar Institute (VNIINM)
8. Kurchatov Institute (KI)
10. Experimental Machine Building Bureau (OKBM)
11. Scientific Production Association (LUTCH)
12. Siberian Chemical Combine (SCC)
14. All Russian Scientific Research and Design Institute of Engineering Technology (VNIPIET)

Immobilization

R&D and Engineering Projects

1. Bochvar Institute (VNIINM)
3. All Russian Design Institute (GSPI)
4. Mayak
13. Krasnoyarsk-26
14. All Russian Scientific Research and Design Institute of Engineering Technology (VNIPIET)
18. All Russian Scientific Research and Exploratory Planning Institute of Industrial Technology (VNIPIPT)
19. Khlopin Radium Institute (KRI)

Russian Actions

While the United States considers surplus plutonium to be a proliferation risk, Russia views its excess plutonium as an important energy source. For this reason, Russia's preferred approach for plutonium disposition supports their plans for nuclear reactors and power generation. Russia intends to dispose of almost all of their surplus plutonium in reactors following conversion of their plutonium metal to an oxide form and subsequent manufacture into mixed oxide fuel. They may immobilize small amounts that are unsuitable for use in reactors.

Opposite page: Secretary Bill Richardson, Acting Deputy Administrator for Defense Nuclear Nonproliferation Rose Gottemoeller, and Assistant Deputy Administrator Laura Holgate meet with Dr. Alexei Grachev and other Russian officials at the All-Russian Research Institute of Atomic Reactors (RIAR) in Dmitrovgrad, Russia

This page:
Above: Secretary Richardson reviews prototype technology for plutonium conversion at RIAR

Left: VVER-1000 reactors at Balakovo, Russia

Eliminate Surplus Russian

Above: Dr. Ernest Moniz, Under Secretary of Energy, and Dr. Valentin Ivanov, First Deputy Minister, Ministry of the Russian Federation for Atomic Energy (MINATOM), agree on "roadmap" for Russian plutonium disposition, October 1999

Opposite page: MOX fuel pellets for the U.S.-Canadian Parallex project are produced at the Bochvar Institute in Moscow

The United States and Russia have developed a plutonium disposition roadmap, or logic flow, and an associated nominal schedule for the Russian plutonium disposition program. The early parts of this roadmap focus on technology development in the areas of plutonium conversion and nondestructive assay, irradiating MOX fuel in reactors, and immobilization. Key elements of this work include:

- Assisting Russia to design and build a demonstration facility for converting weapons-origin plutonium metal to an oxide form suitable for use in MOX fuel and for international inspection.
- Developing a MOX fuel fabrication process that would be compatible with surplus weapons-grade plutonium, testing the resulting fuel, and qualifying it for use in VVER-1000 reactors and the BN-600 reactor.
- Assisting Russia to assess the feasibility of converting Russia's BN-600 reactor, a fast-neutron reactor, into a net burner of plutonium.
- Working with Russian institutes and private industry to develop gas turbine, modular helium reactor technology as an option to supplement Russia's existing reactor capacity to dispose of surplus plutonium.
- Examining the technical feasibility of burning a small quantity of MOX fuel made from surplus U.S. and Russian weapons plutonium in a Canadian test reactor. Irradiating MOX fuel in Canadian nuclear reactors is one of several options being examined to expand Russia's capacity to dispose of surplus weapons plutonium.

STRATEGIES:

- **Assist** in conducting tests and demonstrations of plutonium disposition technologies with Russia.
- **Participate** in U.S. efforts to implement the provisions of the Bilateral Agreement with Russia for the Disposition of Surplus Weapons Plutonium.
- **Assist** U.S. efforts to secure international financing to support plutonium disposition in Russia.
- **Develop** advanced reactor technology.
- **Accelerate** efforts under the Expanded Threat Reduction Initiative.
- **Initiate** and **assist** in the design of plutonium disposition facilities to be constructed in Russia.

Plutonium

"Working closely and carefully with other nations...is essential to limiting the spread of nuclear weapons technology and the means to deliver them. "

Bill Richardson,
Secretary of Energy

- Assisting Russia in developing glass and ceramic technologies suitable for immobilizing plutonium-containing materials at Russian sites.

Collectively, this cooperative work with Russia supports President Clinton's Expanded Threat Reduction Initiative to reduce the global danger from weapons of mass destruction. Along with other countries, we continue to conduct a number of demonstrations of key plutonium disposition technologies in Russia because we believe the development of this knowledge will enable the Russians to accelerate efforts to dispose of their surplus plutonium in accordance with the bilateral agreement on plutonium disposition.

METRICS:

- **Continue** to conduct small-scale tests and demonstrations of plutonium disposition technologies with Russia.
- **Complete** a bilateral agreement with Russia in 2000 for disposing of surplus weapons plutonium.
- **Secure** international financing in 2000 needed to support plutonium disposition in Russia.
- **Award** contracts in 2000 for preliminary design work on the Gas Turbine-Modular Helium Reactor in Russia.
- **Implement** plutonium disposition activities in Russia in accordance with the signature of the bilateral agreement with Russia.
- **Initiate** the design of plutonium disposition facilities in Russia in 2000. **Begin** full-scale operation of a plutonium conversion facility and a MOX fuel fabrication facility in Russia in the 2006–2008 time frame. **Begin** irradiating Russian MOX fuel in 2008.

This agreement is a key objective of U.S. nonproliferation efforts. Key provisions of the agreement include:

Material covered. The agreement commits each side to dispose of the first 34 metric tons of weapon-grade plutonium. Should additional material be declared excess in the future, the agreement allows the two sides to dispose of it in accordance with the terms of this agreement.

Disposition techniques. The agreement allows for disposition either by irradiating the plutonium as MOX fuel in nuclear reactors or by immobilizing the plutonium in glass or ceramic form surrounded by vitrified high-level radioactive waste.

Disposition rates. The two countries plan to begin operation of industrial-scale facilities not later than December 2007 in order to dispose of at least two metric tons per year of weapon-grade plutonium. Subsequently, a plan would be developed to seek to identify additional reactor capacity inside and/or outside Russia to permit at least a doubling of the disposition rates in both countries.

Financing. Russia has made clear that proceeding with plutonium disposition is dependent on assistance from the United States and other nations. The $200 million provided by the U.S. Congress in FY 1999 would assist Russia in jump-starting the effort needed for plutonium disposition. Preliminary estimates indicate construction of plutonium conversion and MOX fabrication facilities and modification of Russian nuclear reactors will cost between $1.7 and $2.5 billion dollars. Russia will need to contribute some resources, and the United States government is working with members of the international community to finance the remainder of this program.

Inspection, monitoring and nonproliferation conditions. The agreement includes provisions for monitoring and inspection activities to confirm that the facilities are being dedicated to the disposition of excess weapon-grade plutonium, that the disposition rates are being met, and that the disposed plutonium meets certain agreed standards. Both parties intend to work towards allowing certain bilateral inspection and monitoring rights to be satisfied by IAEA-equivalent verification measures, to the extent practicable.

Opposite page
Top: Russian and Canadian experts discuss the Parallex project in a laboratory at the Bochvar Institute, Moscow

Bottom: Red Square area, Moscow

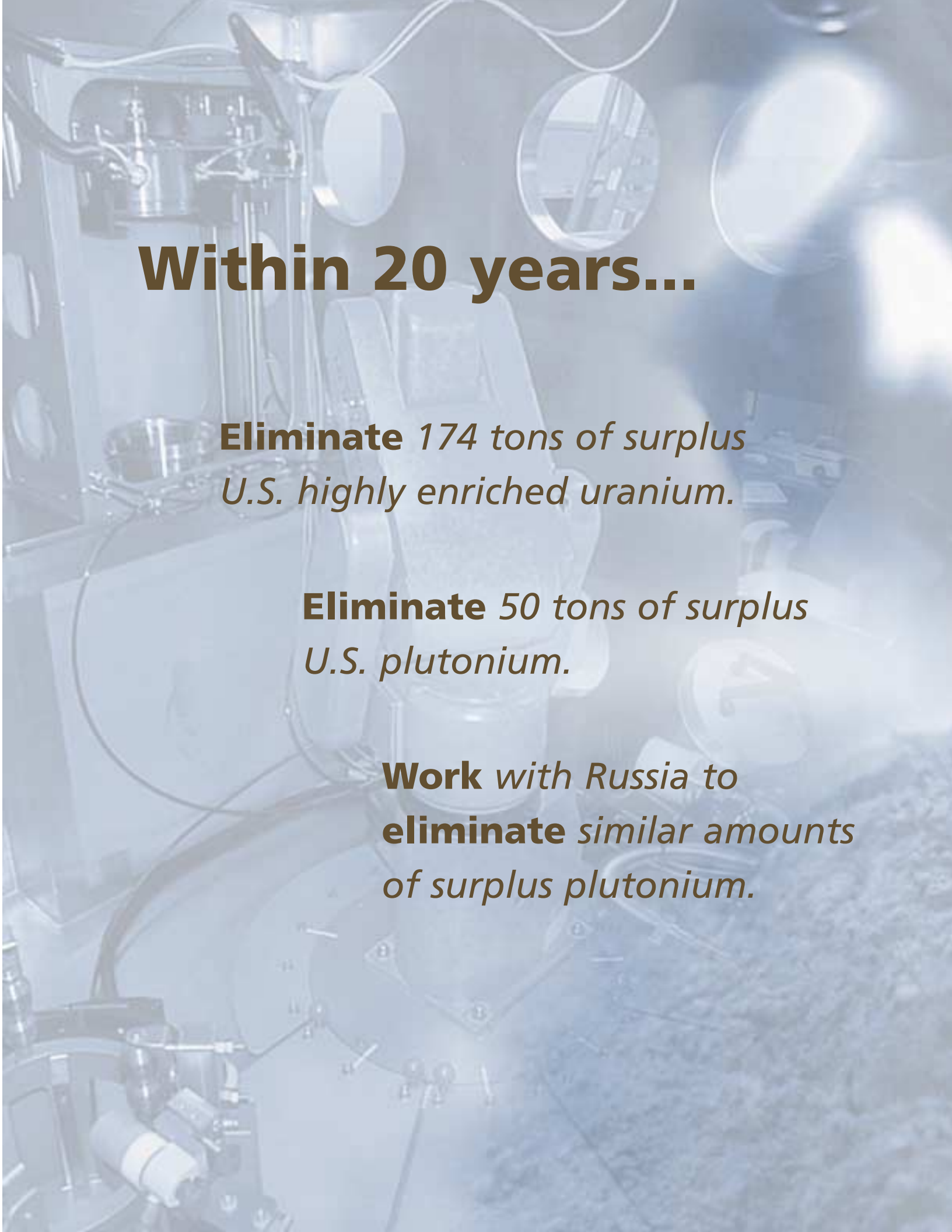
This page: Secretary Richardson, Acting Deputy Administrator Gottemoeller, and Assistant Deputy Administrator Holgate participate in discussions in Dmitrovgrad, Russia

Looking Ahead

Since the beginning of the fissile materials disposition program in 1994, we have tested and validated key disposition technologies, disposed of highly enriched uranium, disassembled nuclear weapon pits, signed design contracts for two of the three key disposition facilities, selected Savannah River as the site for U.S. plutonium disposition, and worked with Russia to define a parallel program to dispose of surplus Russian plutonium. In so doing, we have built a domestic and international consensus necessary to eliminate surplus highly enriched uranium and weapon-grade plutonium. Now, with the necessary Records of Decision issued for our domestic program and the bilateral agreement on plutonium disposition in place, our office will begin full implementation of the efforts to dispose of surplus U.S. and Russian weapon-grade plutonium.

We will move ahead to immobilize 17 metric tons of plutonium and use up to 33 metric tons of plutonium as mixed oxide fuel for irradiation in existing, domestic commercial reactors.

The U.S. commitment to this program sends a clear message to Russia and the rest of the world that we consider the disposition of surplus fissile materials to be one of our highest national priorities. We aim to finish this important job of reducing the global danger from the proliferation of weapons of mass destruction.



Within 20 years...

Eliminate *174 tons of surplus U.S. highly enriched uranium.*

Eliminate *50 tons of surplus U.S. plutonium.*

Work *with Russia to* **eliminate** *similar amounts of surplus plutonium.*

FOR FURTHER INFORMATION CONTACT:

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