

**Report on the Effect the Low Enriched Uranium
Delivered Under the HEU Agreement Between the
Government of the United States and the Government
of the Russian Federation has on the
Domestic Uranium Mining, Conversion, and
Enrichment Industries and the Operation of the
Gaseous Diffusion Plant**

2005



Information Date: December 31, 2005

Introduction

The *Agreement Between the Government of the United States and the Government of the Russian Federation Concerning the Disposition of Highly Enriched Uranium Extracted from Nuclear Weapons* (HEU Agreement) was signed on February 18, 1993.

The HEU Agreement provides for the purchase over 20 years (1993–2013) of 500 metric tons (MT) of weapons-origin highly enriched uranium (HEU) converted to commercial-grade low enriched uranium (LEU) from the Russian Federation (Russia). The Russian LEU is sold in the United States (U.S.) nuclear fuel market to commercial nuclear power plants through the U.S. Enrichment Corporation (USEC), the U.S. Executive Agent. The LEU, in the form of uranium hexafluoride (UF₆), contains the equivalent of almost 400 million pounds of natural uranium concentrates (U₃O₈), 150 million kilograms of uranium (kgU) conversion services, and approximately 92 million separative work units (SWU) of uranium enrichment services. This is enough fuel to satisfy about eight years of domestic demand for uranium concentrates, conversion services, and enrichment services.

The HEU Agreement is a key element of U.S. nonproliferation policy serving mutual U.S. and Russian interests. The HEU Agreement provides incentives for Russia to use HEU from its nuclear warheads for blending down into LEU for use and sale as fuel in commercial nuclear power plants. The revenue stream from the HEU Agreement provides the ongoing financial incentive for Russia to reduce its HEU inventory derived from surplus nuclear weapons. It also provides a structured mechanism to permit the sale of Russian enrichment services and uranium into an otherwise restricted U.S. market.

During a September 16, 2005 visit by Russia's President Vladimir Putin, President George W. Bush stated: "This year we reached a milestone in nonproliferation cooperation by completing the conversion of 10,000 Russian nuclear warheads into peaceful fuel for U.S. power reactors." In furtherance of this statement, the U.S. Departments of State (DOS) and Energy (DOE), and the Russian Federation Ministry of Foreign Affairs, and the Federal Atomic Energy Agency (RosAtom) issued a joint statement (see Appendix A) on September 30, 2005, marking the successful midpoint of the implementation of the HEU Agreement. Two hundred fifty metric tons of HEU, equivalent to 10,000 nuclear warheads, have been converted to LEU.

Purpose

The 1996 USEC Privatization Act (Privatization Act), Public Law 104-134 (42 U.S.C. 2297h) was enacted requiring the President to "report to the Congress not later than December 31 of each year on the effect the low-enriched uranium delivered under the HEU Agreement is having on the domestic uranium mining, conversion, and enrichment industries, and the operation of the gaseous diffusion plants."

Report Layout

This report includes a review of the (i) implementation and status of the HEU Agreement deliveries, (ii) events impacting the HEU Agreement, and (iii) the effect of the HEU Agreement on domestic nuclear fuel markets. The report also provides a description of government actions taken to prevent or mitigate any adverse impact on such companies or any loss of employment at the gaseous diffusion plants as a result of the HEU Agreement. Previous reports prepared by the (DOE) are available on the Office of Nuclear Energy, Science and Technology internet site (<http://nuclear.gov/>) under in the "Reports" section of "Public Information."

Implementation of the HEU Agreement

A contract implementing the terms of the HEU Agreement was signed on January 14, 1994, with USEC, acting as the executive agent on behalf of the U.S. Government, and Techsnabexport (Tenex) as the executive agent for the Russian Federation. The terms provide for the sale of the enrichment component of the LEU resulting from the blended down HEU to USEC's customers. The contract also provides for the Russian Government to receive revenues from USEC based on an average of market indices for enrichment services.

The 1999 Commercial Feed Agreement provides revenue to Russia for the natural uranium and conversion components of the LEU delivered under the HEU Agreement. The Feed Agreement establishes an allocation of the natural uranium and conversion among Tenex and the Western Consortium (Cameco, Cogema, and RWE Nukem) based upon a provision in the USEC Privatization Act. Section 3112 of the Act sets an annual quota that restricts the total quantity of natural uranium imported into the United States for domestic end use. Natural UF₆ not purchased by Tenex or the Western Consortium is shipped to a monitored inventory in Russia. The Feed Agreement is important to the overall success of the HEU Agreement.

Status of Deliveries

Table 1 shows the estimated number of Russian warheads that have been dismantled; HEU and LEU quantities as well as the equivalent natural uranium, conversion services, and enrichment components that have been delivered to date; and projected totals for the remaining life of the HEU Agreement.

Table 1. Status of LEU Deliveries under the HEU Agreement

Contracted Year	Estimated Dismantled Warheads ^(a)	HEU (MT) ^(b)	LEU (MT)	Natural UF ₆ Uranium Concentrates Component (million lb. U ₃ O ₈ (e))	Natural UF ₆ Conversion Services Component (million kgU)	Uranium Enrichment Services Component (million SWU)
1995	244	6.1	186.0	4.8	1.9	1.1
1996	479	12.0	370.9	9.5	3.7	2.2
1997	534	13.4	358.5	10.2	3.9	2.4
1998	764	19.1	571.5	15.0	5.8	3.5
1999	970	24.3	718.7	19.0	7.3	4.5
2000	1,462	36.6	1,037.8	28.3	10.9	6.7
2001	1,201	30.0	904.3	23.7	9.1	5.5
2002	1,201	30.0	879.0	23.5	9.0	5.5
2003	1,203	30.1	906.0	23.7	9.1	5.5
2004	1,202	30.1	891.0	23.6	9.1	5.5
2005	1,206	30.1	846.0	23.3	9.0	5.5
Total Delivered Through 2005	10,466	261.8	7669.7	204.6	78.8	47.9
Total Expected over Life of Agreement	20,000	500	15,258.6	395.8	152.2	92.1

Notes:

(a) Based on IAEA's definition of significant quantities (1987 IAEA Safeguards Glossary).

(b) The HEU Agreement allowed for up to 30 MTU of HEU to be blended down to LEU for delivery in 1999. However, only 21.3 MTU (14.7 MTU in CY 1999 and 6.6 MTU in CY 2000) of the 1999 order was actually delivered. The remaining 8.7 MTU of HEU will be scheduled for delivery in future years.

As of December 31, 2005, 261.8 MTU of Russian HEU was converted to LEU and delivered to the United States. To reach the total goal of 500 MTU of HEU, 30 MTU of deliveries are scheduled annually between 2006 and 2012. These deliveries, together with the undelivered 8.7 MTU from 1999 and a delivery of 19.5 MTU in 2013, will meet the 500 MTU goal. A listing of milestones associated with the HEU Agreement is shown in the following table.

HEU Agreement Milestones

- February 18, 1993 – The HEU Agreement was signed.
- January 14, 1994 - Executive Agents for the United States and Russia (USEC and Tenex) executed the Implementing Contract to the HEU Agreement.
- June 1995 - The first delivery of LEU that was derived from HEU arrived in the United States.
- April 26, 1996 - The USEC Privatization Act, P.L. 102-486, was signed by President Clinton. This Act, in part, established the annual amount of natural uranium that can be imported for sale within the United States.
- October 21, 1998 - President Clinton signed P.L. 105-277 that, in part, provided for the United States to purchase, for up to \$325 million, the unsold natural uranium associated with the 1997 and 1998 deliveries of Russian LEU.
- March 24, 1999 - The Transfer of Source Material Agreement was signed by the United States and Russian Governments. In addition, the Western Consortium and Tenex signed a Commercial Feed Agreement. These agreements were instrumental in introducing the natural uranium component into the market in a nondisruptive manner.
- November 16, 2001 - The Western Consortium and Tenex signed an amendment to the Commercial Feed Agreement that exercised the Western Consortium’s options to purchase the natural uranium for the period 2002 through 2013.
- June 19, 2002 - The U.S. and Russian Governments approved the latest amendment to the contract between USEC and Tenex that implements the HEU Agreement. Under this new amendment, a market-based pricing structure for the SWU is used for the remaining term of the HEU Agreement.
- June 16, 2004 - The Western Consortium and Russia announced an amendment to the Commercial Feed Agreement that ensures there is sufficient natural uranium in Russia to blend down the HEU to commercially usable LEU through the remaining term of the Agreement.
- September 2004 – Deliveries of LEU reach the equivalent level of 9,000 nuclear warheads eliminated.
- August 2005 – LEU downblended from 250 MT of HEU was delivered to the United States. This represents one-half of the 500 MT of HEU and is equivalent to 10,000 nuclear warheads eliminated.
- September, 30, 2005 – The U.S. Departments of State and Energy, and the Russian Federation Ministry of Foreign Affairs, and the Federal Atomic Energy Agency issued a joint statement marking the successful midpoint of the implementation of the HEU Agreement.

Tenex announced¹ a shipment of LEU sent to the U.S. Port of Baltimore in August marks a milestone for the HEU Agreement. From the first shipment of LEU in 1995 though this shipment in August 2005, Russia has delivered to the United States approximately 7,350 MTU of LEU down blended from 250 MTU of HEU. This is one-half of the 500 MTU of HEU to be down blended into LEU and is

¹ Tenex press release “The “Megatons to Megawatts” Program has crossed the “quantitative equator”, August 16, 2005

equivalent to the elimination of 10,000 nuclear warheads. Russia announced that it has earned more than \$5.3 billion for the delivered material.

Events Impacting the HEU Agreement During 2005

In reviewing activities in the nuclear fuel market during 2005, the Tenex 2003 decision to sever its ties to Globe Nuclear Supply Services (GNSS) is noted below:

Tenex Decision to Sever Its Ties to GNSS

On October 31, 2003, Tenex decided that further uranium sales to GNSS within the framework of the implementing HEU-LEU Agreement are inexpedient. Effective January 1, 2004, Tenex terminated sales to GNSS of natural uranium resulting from the HEU Agreement. Tenex cited “the terms of the contract with GNSS are contrary to the interests of the Russian Federation.” On November 20, 2003, GNSS filed an arbitration request with the Arbitration Institute of the Stockholm (AIS) Chamber of Commerce.

In addition, on November 21, 2003, GNSS asked the U.S. District Court for the District of Maryland for an injunction. However, after the court dismissed the request for an injunction in December 2003, GNSS appealed the decision to the 4th U.S. Circuit Court of Appeals. On July 22, 2004, the 4th U.S. Circuit Court of Appeals remanded the case back to the district for further proceedings.

In August 2004, the Government of the Russian Federation announced it has approved Tenex contracts with several U.S. utilities. These utilities appear to be the same companies at risk of not receiving deliveries of natural uranium from GNSS. Tenex will deliver the natural uranium feed component to these utilities. As the Tenex natural uranium deliveries replace the GNSS deliveries, no disruption is expected to take place in the uranium supply to domestic customers.

Although an evidentiary hearing with AIS was originally set for April 25 to May 4, 2005, the hearing was rescheduled and is expected to take place in 2006.

Effect of the HEU Agreement on Domestic Industries

The following sections discuss the supply and demand for the domestic uranium mining, conversion and enrichment markets as well as pricing². In characterizing the nuclear fuel markets in 2005, it is important to recognize that the uranium, conversion and enrichment markets continue to experience a fundamental shift in supply sources. The shift comes as a result of a reduction of supply from government and commercial inventories (commonly called secondary supplies) available to the market, and has resulted in higher prices (primarily in the uranium and conversion markets). Without secondary supplies, the spot market was relatively quiet as buyers focused more on long-term contracts. As a result of the price increases, U.S. producers and suppliers are moving to expand capacity in all three markets, in order to meet future demand. During 2005, the trade press continued to report new exploration plans for uranium resources in a number of countries including the United States. The conversion suppliers are also contemplating expanded capacity. Two companies are in the process of obtaining a Nuclear Regulatory Commission (NRC) license to build new enrichment capacity in the United States. Because forecasted demand is now encouraging new supply to enter the market, prices may begin to reflect the actual cost of production as opposed to an inventory sale price.

² The reference for price and secondary market data provided in this section is the Ux Consulting Company, LLC. The reference for uranium production and demand information is Energy Resources International, Inc.

In order to better reflect this situation in commercial nuclear fuel markets, this report includes long-term market prices as well as spot prices.

Utilities are also expected to optimize their purchase of uranium, conversion and enrichment services by taking into account the higher price of uranium relative to the price of enrichment services. Many utilities have flexibility in their enrichment services contract to vary the tails assay under which they purchase enrichment services. This flexibility permits a utility to lower the tails assay (within a contracted range) when the price of uranium increases. At a lower tails assay, a utility delivers less uranium feed to an enrichment supplier and will purchase additional enrichment services. The quantity of LEU delivered remains the same, while the utility's overall cost for the LEU is reduced. The net effect will be an increase in enrichment demand and a decrease of uranium demand. Should enrichment prices begin to increase, the opposite effect would occur as the industry finds its most economical cost level. In any event, the global growth in nuclear power generation stemming from new plants, plant upgrades, and license renewal is expected to further increase future demand in all three markets.

Uranium Mining

World uranium demand during 2005 is estimated to be about 167 million pounds U_3O_8 . To meet this demand, world uranium production is estimated to be 112 million pounds U_3O_8 during 2005, an increase of 9 million pounds U_3O_8 from the 2004 level of about 103 million pounds U_3O_8 . Current worldwide production supplies about two-thirds of demand. Additional supply from secondary market sources such as government and commercial inventories, re-enriched uranium tails, and reprocessed uranium, as well as the HEU Agreement natural uranium component, are needed to meet the balance of uranium requirements. As noted previously, demand may be affected by utilities exercising their tail assay flexibility option. This would decrease uranium demand.

Uranium demand in the United States for 2005 is estimated to be 52 million pounds U_3O_8 . Domestic uranium production in 2005 is estimated to increase from 2.3 million pounds U_3O_8 reported in 2004 to 2.7 million pounds U_3O_8 . This is equivalent to about five percent of the annual demand for uranium used in U.S. commercial nuclear power plants. The increase in domestic production over the past several years also reflects an increase in uranium exploration and development drilling. Employment in the U.S. uranium production industry also increased 31 percent between 2003 and 2004.³

Spot market uranium prices began the year at \$20.70 per pound U_3O_8 but increased to a high of \$36.25 per pound U_3O_8 by the end of the year. The long-term contract price for uranium also increased at the end of 2005 to \$36.25 per pound U_3O_8 . With global uranium supply and demand in closer balance and the reduced level of availability of secondary market supply, uranium production levels and supplier costs, as well as demand may determine both future spot market and long-term contract prices.

Since the initial implementation of the 1999 Commercial Feed Agreement, the measured sale of the uranium to the Western Consortium and Tenex has limited the effects of the HEU Agreement deliveries on the commercial markets. In fact, the HEU Agreement deliveries have now become an increasingly important source of supply to meet U.S. utility uranium requirements. Because of declining supply availability from secondary sources, HEU Agreement deliveries have helped ensure adequate supply at competitive prices.

³ The Energy Information Administration (EIA) reports a 31 percent increase in employment for the U.S. uranium production industry from 2003 to 2004. (EIA Domestic Uranium Production Report, August 5, 2005)

Uranium Conversion Services

World demand for UF₆ conversion during 2005 is estimated to be 61 million kgU as UF₆. Conversion services demand for 2005 in the United States is estimated to be 22 million kgU as UF₆. In 2005, world conversion production is estimated to be 45.5 million kgU as UF₆, which is an increase of about 7.4 million kgU over the 2004 level. Conversion services primary production in the United States increased from 7 million to an estimated 11.5 million kgU as UF₆. The gap between production and demand during 2005 was made up from a combination of the conversion services equivalent contained in the feed component of the uranium under the HEU Agreement and other commercial sources of UF₆.

One-half of the global increase in production between 2004 and 2005 is the result of the restart of ConverDyn's conversion facility after being shutdown for an extended period of time. The ConverDyn conversion facility at Metropolis, Illinois was shutdown in December 2003 due to an accidental release of UF₆ gas off site. The NRC investigated and determined that the release had minimal impact on worker or public health and safety. However, restart of the facility was not permitted until early April 2004, which caused significant production shortfalls in 2004. ConverDyn is expected to produce about 11 million kgU in 2005, however, contractual commitments exceed this target. ConverDyn has informed its customers and enrichment delivery locations about its situation and is working with all parties to meet its contract commitments.

The balance of the increase in 2005 is due to an increase in production by Cameco at its conversion facility at Port Hope, Ontario. Port Hope's UF₆ production was reduced in 2004 due to a lengthy strike and other reasons. In 2005, Cameco also negotiated a 10-year agreement with British Nuclear Fuels plc (BNFL) to annually convert a base quantity of 5 million kgU as UO₃ to UF₆ for Cameco.

The plant shutdown also had an effect on the Commercial Feed Agreement implementation due to ConverDyn's inability to deliver UF₆. Under the Tripartite Agreement (signed in 2001) between USEC, Tenex and ConverDyn, the Agreement facilitated the delivery of the natural uranium component of the HEU Agreement material back to Russia from the ConverDyn facility. Consequently, USEC made arrangements with Cameco to supply the UF₆ for return to Russia in 2004. This strategy, however, was not successful due to an unanticipated strike at Cameco's Port Hope conversion facility, which lasted from July 25 to September 17, 2004. The 2004 shipment of UF₆ to Russia was delayed to early 2005.

From a market perspective, the conversion component of the HEU Agreement is equivalent to almost nine million kgU per year of production capacity, which is comparable in size to any of the existing conversion production facilities. Since the USEC Privatization Act does not restrict the sale of Russian conversion services entering the United States, the unfettered introduction of the nine million kgU of conversion from HEU Agreement deliveries into the market initially impacted the conversion services market. However, with the already existing shortfall in production, the HEU Agreement has become an essential source of conversion supply.

During 2005, the spot market price of conversion services increased from \$10.00 to \$11.50 per kgU as UF₆, which is an increase of over 15 percent. The spot market price of conversion services has increased over 500 percent since it bottomed out at \$2.25 per kgU as UF₆ in July 2000. The price rise is a result of the continued tightness in the conversion market attributable in large part to the shutdown and reduced production of the ConverDyn plant.

Uranium Enrichment Services

World demand for enrichment services during 2005 is estimated to be 43 million SWU, which is a slight increase from the 2004 level of 40 million SWU. As noted previously, demand may be affected by utilities exercising their tail assay flexibility option. This would tend to increase enrichment demand slightly. However, overall the world supply and demand for enrichment services, including the LEU resulting from the HEU Agreement, are in close balance.

Demand for the United States during 2005 is estimated to be about 13 million SWU a slight increase above the 12 million SWU report in 2004. The USEC Paducah Gaseous Diffusion Plant (GDP) is the single source of enrichment services production in the United States. Its estimated production is about 5.5 million SWU per year or about 42 percent of domestic demand. The enrichment services component of the HEU Agreement provides the equivalent of 5.5 million SWU per year. Most of the SWU from the HEU Agreement purchased by USEC are used to meet U.S. demand. In this respect, the HEU Agreement is likely to remain an essential source of supply through the remaining years of the Agreement.

Spot market prices for enrichment services have increased slightly in 2005. The spot price began the year at \$110 per SWU and increased slightly to \$114 per SWU.

Plans for new technology deployment are proceeding. Louisiana Energy Services (LES) continues to pursue its commercial license with NRC to build a new three million SWU per year uranium enrichment plant, the National Enrichment Facility, in Eunice, New Mexico. The plant will use Urenco's gas centrifuge technology. LES expects to bring the new plant into operation beginning in 2008 and to achieve full capacity by 2013. LES filed its commercial plant license application with the NRC in December 2003.

USEC is pursuing its plan to deploy a new 3.5 million SWU per year gas centrifuge uranium enrichment plant by the end of 2010. On August 23, 2004, USEC submitted a license application to the NRC to build and operate its American Centrifuge Plant in Piketon, Ohio. This plant will use an updated version of DOE's centrifuge machine developed in the 1980's.

In addition, Eurodif has announced plans to replace its existing uranium enrichment plant with a new 7.5 million SWU per year plant that will also use Urenco's gas centrifuge technology. The new plant is expected to begin operation in 2007 and achieve full production by 2016. The site of the new plant will be at the existing enrichment plant located in Tricastin, France.

Overall, the uranium enrichment market in 2005 remained stable with supply and demand in equilibrium and prices at about \$113 per SWU. The HEU Agreement deliveries remain important to the U.S. enrichment market as it accounts for approximately 42 percent of U.S. demand.

Actions Taken to Avoid Potential Impacts to the Nuclear Fuel Industry

Recognizing the vital importance of the nuclear fuel cycle to U.S. energy and national security, Congress, the Department, and industry have worked diligently to help avoid the impacts of the HEU Agreement deliveries upon commercial nuclear fuel markets. Historically actions taken include:

- Congress provided, under the USEC Privatization Act, a graduated level of quotas that allowed the natural uranium component of the HEU Agreement to enter into the U.S. market in a measured and stable manner.

- The USEC Privatization Act also provided for the purchase and transfer of the 1995 and 1996 natural uranium component of the HEU Agreement deliveries to the Department. The Department has responsibly managed the uranium to avoid an adverse material impact to the market.
- Congress provided the authority and funding for the Department to purchase and hold until March 24, 2009, the 1997 and 1998 natural uranium component of the HEU Agreement deliveries to avoid oversupplying the uranium and conversion markets.
- Russia and the Western Consortium have successfully implemented the Commercial Feed Agreement to ensure the reliable and stable supply of uranium and conversion into the market.
- USEC has ensured the successful introduction of the enrichment services component of the HEU into the U.S. market under existing contracts to avoid adverse market impacts.
- The U.S. and Russian Governments have actively monitored the progress of the HEU Agreement and the Commercial Feed Agreements as well as proposed amendments to help ensure avoidance of market impacts.

Conclusion

The successful implementation of the HEU Agreement remains a high priority of the U.S. Government and is a key element of U.S. nonproliferation policy, as well as serving U.S. and Russian commercial interests. This year's report continues to show that the HEU Agreement deliveries are an increasingly important source of supply in meeting U.S. utility uranium, conversion and enrichment requirements. With higher market prices and declining supply from secondary markets, the HEU Agreement deliveries helped ensure adequate supply at reasonable prices. In addition, U.S. producers and suppliers are moving to expand capacity in all three markets, in order to meet future demand.

While the initial HEU Agreement deliveries had a limited effect on the commercial nuclear fuel markets, mitigating actions taken by DOE and Congress to avoid an adverse material impact from the HEU Agreement deliveries have worked. Successful implementation of the HEU Agreement to date is also a tribute to the efforts of the U.S. and Russian Executive Agents and the industry. Recognizing the vital importance of the nuclear fuel cycle to U.S. energy and national security; the Department will continue to work with Congress and industry to ensure the HEU Agreement's continued success.

As President George W. Bush has stated, "This year we reached a milestone in nonproliferation cooperation by completing the conversion of 10,000 Russian nuclear warheads into peaceful fuel for U.S. power reactors." The U.S. Departments of State and Energy, and the Russian Federation's Ministry of Foreign Affairs and the Federal Atomic Energy Agency issued a joint statement (see Appendix A) on September 30, 2005, that echoed the successful midpoint of the implementation of the HEU Agreement. By the end of 2005, 261.8 metric tons of HEU, equivalent to 10,466 nuclear warheads, was converted to LEU and will be used as fuel for nuclear power reactors in the United States.

Appendix A

United States Department of State

Press Statement

Sean McCormack, Spokesman

Washington, DC

September 30, 2005

Midpoint Of The Successful Implementation Of The Highly Enriched Uranium Agreement Between The United States And Russia

The following is a joint statement of the Departments of State and Energy of the United States of America and of the Ministry of Foreign Affairs and the Federal Atomic Energy Agency of the Russian Federation marking the successful midpoint of implementation of the HEU agreement:

September 2005 marks a significant milestone in the implementation of the HEU Agreement. Formally known as the Agreement between the Government of the United States of America and the Government of the Russian Federation Concerning the Disposition of Highly Enriched Uranium from Nuclear Weapons, dated 18 February 1993, the HEU Agreement is one of the most important instruments for cooperation between our two governments. Two hundred fifty metric tons of highly enriched uranium (HEU), equivalent to 10,000 nuclear warheads, has been converted to low enriched uranium (LEU). This accomplishment marks the halfway point towards the goal of eliminating 500 metric tons of HEU by 2013, when the Agreement is set to be fully implemented.

Under the HEU Agreement, the Russian Federation has agreed to process HEU extracted from dismantled nuclear warheads into LEU, which is used in the United States for the peaceful purpose of generation of electricity in commercial power reactors. To implement the HEU Agreement, the United States and the Russian Federation have entered into a number of additional agreements, including a package of agreements concluded on March 24, 1999, which established a mechanism for the disposition of the natural uranium component of the LEU. These agreements have been implemented, in part, through contracts between commercial companies, whose activities in implementation of these agreements are carefully managed and overseen, as appropriate, by the U.S. and Russian Governments.

Pursuant to the HEU Agreement and the implementing contracts, 30 metric tons of Russian HEU are converted each year into LEU for use as fuel in U.S. nuclear power plants, generating approximately 10% of U.S. electricity. A unique feature of the HEU Agreement is that it is designed to realize its nuclear threat reduction goals without cost to the taxpayers of the United States or Russia. The appropriate payments and the return of the natural uranium feed component received by the Russian Federation ensure the Russian Federation's continued conversion of HEU into LEU under the Agreement and the construction and operation of facilities for this conversion, as well as a variety of other valuable activities, such as nuclear safety upgrades, conversion of military facilities to peaceful uses, and environmental clean-up.

Moreover, as noted by delegates of the United States and the Russian Federation at the Seventh Nuclear Nonproliferation Treaty (NPT) Review Conference held in New York in May of 2005, the HEU Agreement has played a valuable role in fulfilling the Article VI obligations of the United States and Russia under the NPT to pursue negotiations on nuclear disarmament.

The United States and the Russian Federation continue to support the HEU Agreement and its goals and recognize it as one of the most significant bilateral initiatives between our governments in the area of nuclear weapons dismantlement while attaining valuable energy and environmental benefits.

Consistent with the mutual policy of our governments to strengthen cooperation in this field, and considering the crucial role played by the HEU Agreement, the United States and the Russian Federation intend to ensure that the HEU Agreement is implemented successfully and without any hindrances to achieving this goal.

2005/905

Released on September 30, 2005

Glossary

Blending or down blend – The term used to describe the process whereby HEU is mixed with depleted, natural, or low enriched uranium to create LEU.

Cameco – A Canadian company that is the world's largest supplier of uranium and one of the largest suppliers of uranium conversion services. Cameco is one of the three members of the Western Consortium under the 1999 Commercial Feed Agreement.

COGEMA – An AREVA subsidiary that is active in all phases of the nuclear fuel cycle including uranium, conversion and enrichment services. Cogema is one of the members of the Western Consortium under the 1999 Commercial Feed Agreement.

Commercial Feed Agreement – An agreement between members of the Western Consortium and Russia whereby the natural uranium feed component associated with the Russian LEU delivered under the HEU Agreement after 1998 is purchased for resale in the commercial uranium market. Sales of this natural uranium in the United States are subject to quotas set forth in the USEC Privatization Act.

Conversion – The process whereby natural uranium in the form of an oxide is converted to UF₆.

Depleted uranium – Uranium containing less than the 0.71 percent ²³⁵U. Found in natural uranium.

Enriched uranium – Uranium that is greater than the 0.71 percent ²³⁵U. (See uranium, natural uranium, and highly enriched uranium.)

Executive Agent – Under the HEU Agreement, these are the commercial companies responsible for implementing the HEU Agreement on behalf of the governments of the United States (USEC) and Russia (Tenex).

Fissile material – Any material fissionable by thermal (slow) neutrons. The three primary fissile materials are ²³³U, ²³⁵U, and plutonium-239.

Gas centrifuge - A uranium enrichment process that uses centrifuges to spin UF₆ as a gas at high speeds to separate ²³⁵U isotopes from the ²³⁸U isotopes based on their difference in atomic weight.

Gaseous diffusion – A uranium enrichment process where UF₆ as a gas is compressed through a series of membranes to increase the concentration of ²³⁵U isotopes.

Highly enriched uranium (HEU) – Uranium having greater than 20 percent ²³⁵U. (See natural uranium component, enriched uranium, and depleted uranium.) The Russian HEU that is down blended under the HEU Agreement has an enrichment level of about 90 percent ²³⁵U.

Kilogram of uranium (kgU) – Equal to 2.6 pounds of U₃O₈.

Long-term price – In the context of this report, refers to the price paid for nuclear fuel materials and services that will be delivered more than one year after the contract is signed.

Low enriched uranium (LEU) – Uranium that is greater than 0.71 percent ²³⁵U but less than 20 percent. Most nuclear power reactor fuel contains LEU having three to five percent ²³⁵U.

Louisiana Energy Services (LES) - Limited and general partners consisting of Urenco, Exelon, Duke Power, Entergy, and Westinghouse. The partnership intends to build a three million SWU gas centrifuge uranium enrichment plant in Eunice, New Mexico, that will use Urenco's sixth generation gas centrifuge technology that is being used in Europe.

Metric ton of uranium (MTU) – Equal to 1,000 kilograms of uranium.

Natural uranium component – The feed material provided to a uranium enricher for producing enriched uranium and uranium tails. The natural uranium feed component consists of U_3O_8 from the mining industry and U_3O_8 to UF_6 conversion.

Nuclear Regulatory Commission (NRC) – The federal agency responsible for the licensing and regulation of nuclear safety, safeguards and security of commercial nuclear facilities.

Paducah Gaseous Diffusion Plant – The only operating uranium enrichment plant in the United States, located in Paducah, Kentucky.

Portsmouth Gaseous Diffusion Plant – A shutdown uranium enrichment plant located in Piketon, Ohio. The USEC American Centrifuge Plant is located at this site.

Privatization Act - On April 26, 1996, the USEC Privatization Act, Public Law 104-134 (42 U.S.C. 2297h) was enacted.

RWE Nukem – A company that provides uranium and services in the international nuclear fuel market. RWE Nukem is one of the members of the Western Consortium under the 1999 Commercial Feed Agreement.

Separative work units (SWU) – A unit of measurement used in the enrichment of ^{235}U .

Spot market price or spot price – In the context of this report, refers to the price paid for nuclear fuel materials and services delivered within 6 months of the purchase date.

Tails – UF_6 depleted in ^{235}U produced during the uranium enrichment process.

Techsnabexport (Tenex) – A company that is wholly owned by the Russian Government and controlled by the Federal Atomic Energy Agency, Russian Federation, that acts as Russia's executive agent on the HEU Agreement.

Uranium – A radioactive, metallic element with the atomic number 92; one of the heaviest naturally occurring elements. Uranium has 14 known isotopes, of which ^{238}U is the most abundant in nature. ^{235}U is commonly used as a fuel for nuclear fission. (See natural uranium, enriched uranium, highly enriched uranium, and depleted uranium.)

Uranium hexafluoride (UF_6) – Uranium oxide (U_3O_8) is converted to UF_6 which can then be fed through a uranium enrichment process, either diffusion or centrifuge.

United States Enrichment Corporation (USEC) – Currently the only domestic supplier of uranium enrichment services in the United States and operator of the Paducah Gaseous Diffusion Plant. USEC is also the U.S. executive agent on the HEU Agreement. USEC, a formerly wholly owned government corporation, was privatized as a result of the USEC Privatization Act of 1996.

Western Consortium – A group of three Western uranium suppliers (Cameco, COGEMA, RWE Nukem) that signed the 1999 Commercial Feed Agreement with Russia to buy and then market the natural uranium that remains in the United States under the HEU Agreement.