**Recycling Nuclear Warheads** 

into Electricity

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The Megatons to Megawatts<sup>™</sup> Program is a unique, commercially financed governmentindustry partnership in which bomb-grade uranium from dismantled Russian nuclear warheads is being recycled into low enriched uranium (LEU) used to produce fuel for American nuclear power plants. USEC, as executive agent for the U.S. government, and Techsnabexport (TENEX), acting for the Russian government, implement this 20-year, \$8 billion program at no cost to

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# **Program Status**

taxpayers.

**412** metric tons of bomb-grade HEU have been recycled into **11,905** metric tons of LEU, equivalent to **16,494** nuclear warheads eliminated.

#### Overview

Through a multi-step process in Russia, the bombgrade uranium material is converted into a different

chemical form and then diluted into LEU suitable for use in fabricating commercial nuclear power reactor fuel. USEC then purchases the LEU to market to its utility customers.

Since 1994, the Megatons to Megawatts program has significantly enhanced world security by steadily reducing stockpiles of nuclear bomb-grade materials, while creating a clean, valuable resource—uranium for use in nuclear fuel.

Virtually the entire U.S. nuclear reactor fleet has participated in this program by using fuel fabricated with LEU from the Megatons to Megawatts program.

On average, one in 10 American homes, businesses, schools and hospitals receive electricity generated by fuel fabricated using LEU from the Megatons to Megawatts program—and this ratio is much higher in certain areas of the country.

By 2013, when the program is completed, 500 metric tons (MT) of Russian highly enriched uranium (HEU), the equivalent of 20,000 warheads will have been recycled into LEU— enough material to produce fuel to power the entire United States for about two years.

#### The Agreement

USEC Inc.'s subsidiary, United States Enrichment Corporation, is the U.S. government's executive agent responsible for implementing the historic 1993 government-to-government agreement between the United States and Russia.

The agreement calls for Russia to convert 500 MT of HEU from dismantled nuclear warheads into LEU to be fabricated into fuel for nuclear reactors to generate electricity. This is the equivalent of about 20,000 nuclear warheads.

To implement the agreement, USEC's government-owned predecessor entered into a 20year commercial contract with Techsnabexport (TENEX), executive agent for the Russian Federal Atomic Energy Agency (Rosatom), in 1994.

## The Process

The conversion and dilution of HEU takes place in Russia. The resulting LEU is then shipped to USEC facilities in Paducah, Kentucky. For an overview of this process, see HEU to LEU: Step-by-Step.

The first shipment of warhead-derived LEU from Russia arrived in the United States in June 1995.

# **Uranium/Enrichment Components**

Under terms of the contract, as amended in 1996, United States Enrichment Corporation (i) purchases the enrichment portion of the blended-down material and sells it to its electric utility customers for use in fabricating fuel for their commercial nuclear power plants, and (ii) transfers to TENEX a quantity of natural uranium equal to the natural uranium component of the LEU. In 1999, Russia entered into a sales agreement with three Western companies for that natural uranium.

USEC expects the total purchase price of the enrichment portion of the material to be about \$8 billion. Including the natural uranium delivered by USEC to TENEX, the program's total value is approximately \$12 billion.

## **Contract Amendments**

In November 1996, USEC's government-owned predecessor and TENEX amended the contract to include a five-year commitment in order to smooth and accelerate the timetable. The amendment established specific quantities and prices through 2001, eliminating the need to resolve such issues on an annual basis.

In May 2000, USEC and TENEX reached an agreement in principle to further amend the HEU contract and adopt market-based pricing terms starting in calendar year 2002. Subsequent negotiations led to a revision of these terms and a contract amendment was agreed in February 2002, and referred to the U.S. and Russian governments for approval.

In June 2002, the U.S. and Russian governments approved implementation of the contract amendment for the remaining 12 years of the program. The new pricing terms went into effect in January 2003. (See USEC's June 19, 2002, press release.) These pricing terms were modified in 2009 for the years 2010 through 2013 in order to enhance the stability of future pricing for both parties.

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