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Highly Enriched Uranium Transparency Program

History

In February 1993, the U.S. and the Russian Federation signed a bilateral agreement—the 1993 highly enriched uranium (HEU) Purchase Agreement—for the safe and prompt disposition of 500 metric tons of HEU extracted from surplus Russian nuclear weapons. This agreement advances U.S. nonproliferation goals by eliminating an unprecedented amount of weapons-grade fissile material. In response to this agreement, which ends in 2013, the Department of Energy's (DOE) National Nuclear Security Administration (NNSA) began the HEU Transparency Program. Through the efforts of this program, in which Sandia National Laboratories (SNL) is an active participant, approximately 393 metric tons (866,000 lbs) of HEU, the equivalent of over 14,000 nuclear weapons, has been eliminated from Russia's stockpile and is being used to generate 10% of the electricity in the U.S.

Transparency Measures

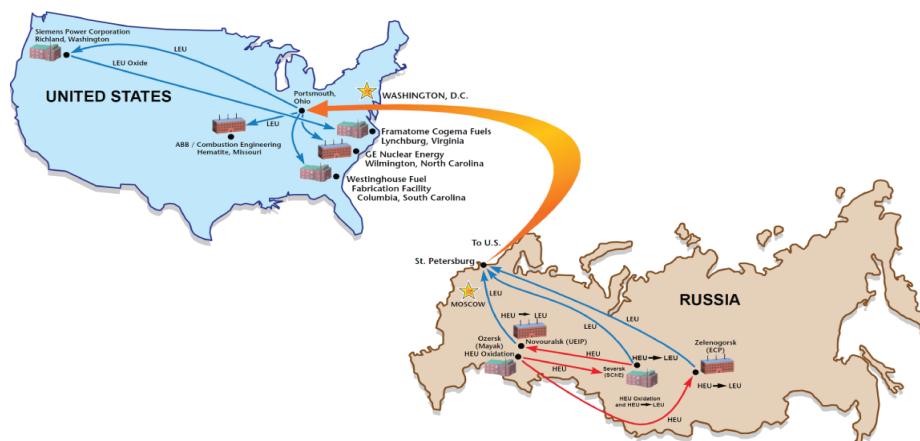
DOE/NNSA's Office of Nuclear Verification is responsible for developing, participating in negotiations on, and implementing transparency

measures. These transparency measures ensure that the nonproliferation objectives of the HEU agreement are being met. Under the 20-year agreement, Russia will irreversibly eliminate 500 metric tons of excess HEU from dismantled nuclear weapons by converting it into low-enriched uranium (LEU) fuel for U.S. commercial power reactors.



HEU metal is burned and converted into oxide

The U.S.-Russian cooperative effort provides security and economic benefits to both nations. First, it helps Russia reduce its nuclear stockpiles and eliminate excess weapons-usable material that would otherwise remain at risk for potential theft or diversion. Second, the partnership between our two nations demonstrates mutual commitment to nuclear arms reductions and progress toward nuclear disarmament under the Nuclear Nonproliferation Treaty. Third, material derived from dismantled Russian weapons is fabricated into nuclear fuel in the U.S., where it generates nearly half of all U.S. nuclear energy.



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE AC04-94AL85000.



Nondestructive assay measurement on a container

Under the HEU Purchase Agreement's transparency measures, U.S. monitoring personnel can visit each of the four Russian facilities involved in the agreement up to six times per year over the life of the agreement: the Mayak Production Association (MPA), Siberian Chemical Enterprises (SChE), the ElectroChemical Plant (ECP), and the Ural Electrochemical Integrated Enterprise (UEIE). SNL has provided monitors for the Transparency Monitoring Office and Special Monitoring Visits.

The U.S. has also established a Transparency Monitoring Office at UEIE, which allows for longer-term monitoring. In addition, the U.S. has installed blend-down monitoring systems (BDMSs) at the three Russian blending facilities participating in the agreement. These systems provide information on HEU down blending even when U.S. monitors are not present. SNL designed tamper-indicating enclosures for the BDMS and procures radioactive sources for the system. There is also a BDMS expert on staff at SNL.



U.S. monitors observing fluorination process

U.S. personnel, principally from U.S. national laboratories, conduct the following activities during transparency visits to Russian facilities:

- conduct material inventories
- monitor process operations

- perform nondestructive assay measurements on material to determine HEU enrichment
- receive, review, and analyze process and material-accounting documentation

Russian experts conduct monitoring visits to the U.S. to ensure that the LEU is used for peaceful purposes. The Russians also have the right to visit the fuel fabricators where this LEU is processed into fuel assemblies. In addition, the Russians have the right to review all the relevant documents used to track this LEU through the U.S. to its eventual destination at a commercial nuclear power plant.

This year, and each year until the agreement is completed in 2013, U.S. experts will monitor the elimination of another 30 metric tons (over 66,000 lbs) of Russian HEU converted to LEU, thus improving the situation with respect to the security of its remaining nuclear materials. Overall, the HEU Transparency Program is helping to destroy the equivalent of 1,200 nuclear weapons annually—reducing the availability of HEU materials to potential proliferant nations and terrorists. By the agreement's completion in 2013, the equivalent of about 20,000 nuclear weapons will have been destroyed and recycled into electricity-generating nuclear reactor fuel. This benefit has led to the program being called Megatons to Megawatts.

Other SNL Contributions

In addition to providing monitors for Special Monitoring Visits and actively contributing to BDMS, SNL also contributes in the area of tamper-indicating devices. SNL provides all tags and seals and related documentation for the program, trains program monitors on proper use and documentation of tags and seals, tracks usage, performs forensic analysis, and develops and distributes program documentation.



Inventorying weapon component containers

For more information, please contact:
Phil Bennett, Manager, International Safeguards & Nuclear Monitoring S&T, pcbenne@sandia.gov, 505-845-8777
Henry Abeyta, Director, Global Security Programs, hjabeyt@sandia.gov, 505-844-8280

