

**6450-01-P**

**DEPARTMENT OF ENERGY**

**National Nuclear Security Administration**

**Amended Record of Decision: Disposition of Surplus Highly Enriched  
Uranium Environmental Impact Statement**

**AGENCY:** National Nuclear Security Administration, U.S. Department of Energy.

**ACTION:** Amended Record of Decision.

**SUMMARY:** The National Nuclear Security Administration (NNSA), a semi-autonomous agency within the U.S. Department of Energy (DOE), is amending the August 5, 1996, Record of Decision (the 1996 ROD) (61 FR 40619) for the Disposition of Surplus Highly Enriched Uranium Environmental Impact Statement (HEU EIS) (DOE/EIS-0240). The 1996 ROD included DOE's decision to implement a program to render a nominal 200 metric tons of surplus highly-enriched uranium (HEU) non-weapons-usable by blending it down to low-enriched uranium (LEU) and selling as much of the resulting LEU as possible (up to 85 percent) for use as reactor fuel. In 2007, NNSA prepared a Supplement Analysis (DOE/EIS-0240-SA1) to the HEU EIS but did not make a decision at that time. The Supplement Analysis analyzed the potential environmental impacts associated with ongoing HEU disposition activities and potential changes to those activities: supplying LEU to reactors in foreign countries through U.S. persons under certain circumstances; establishing new pathways for disposing of HEU materials that would not be converted to LEU for reactor fuel; and down-blending additional quantities of HEU for use as

reactor fuel. NNSA now is amending the 1996 ROD to make decisions regarding each of these proposals.

**FOR FURTHER INFORMATION CONTACT:** For further information about the Surplus HEU Disposition Program and the American Assured Fuel Supply, contact: Robert M. George, HEU Disposition Program Manager, Office of Fissile Materials Disposition, National Nuclear Security Administration, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585; (202) 586-1530.

For general information concerning the DOE National Environmental Policy Act (NEPA) process, contact: Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (GC-54), U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585; (202) 586-4600; leave a message at (800) 472-2756; or send an e-mail to [askNEPA@hq.energy.gov](mailto:askNEPA@hq.energy.gov). Additional information regarding DOE NEPA activities and access to many DOE NEPA documents are available on the Internet through the DOE NEPA Website at <http://nepa.energy.gov>. Some of these documents, including the HEU EIS referenced in this Amended ROD, are available upon request as described at [http://nepa.energy.gov/nepa\\_request.cfm](http://nepa.energy.gov/nepa_request.cfm).

#### **SUPPLEMENTARY INFORMATION:**

##### **Background**

Following the end of the Cold War, the United States identified a surplus of weapons-usable HEU. HEU has a concentration of 20 percent or more of uranium-235, which is a fissile material that can be used to make nuclear weapons. In 1994, the United States declared 174 metric tons of HEU to be surplus to defense needs. In the HEU EIS, DOE analyzed alternatives to disposition a nominal 200 metric tons of surplus HEU in order to reduce the threat of nuclear weapons proliferation in an environmentally safe manner by reducing stockpiles of weapons-usable fissile materials, setting a nonproliferation example for other nations, and allowing peaceful beneficial re-use of the material.

Alternatives analyzed in the HEU EIS involved the continued storage of HEU or mixing the surplus HEU with other uranium materials (LEU, natural uranium, or depleted uranium) to lower the concentration of uranium-235 so that it is not weapons-usable, a process called “down-blending.” DOE analyzed a range of scenarios regarding how much HEU would be down-blended (to approximately four percent uranium-235) for use in commercial reactors as opposed to blending to approximately 0.9 percent uranium-235 for disposal as low-level radioactive waste (LLW).

The HEU EIS evaluated the potential environmental impacts of down-blending at up to four existing U.S. facilities: DOE’s Y-12 National Security Site in Oak Ridge, Tennessee; DOE’s Savannah River Site (SRS) in Aiken, South Carolina; The Babcock & Wilcox Company (now B&W Nuclear Operations Group, Inc. [B&W NOG]) in Lynchburg, Virginia; and Nuclear Fuel Services, Inc., (NFS) in Erwin, Tennessee. These sites were considered because they have technically viable HEU conversion and blending capabilities and could down-blend surplus HEU to LEU for use in commercial fuel or for disposal as waste. B&W NOG and NFS, which is now

owned by B&W NOG, are both licensed by the U.S. Nuclear Regulatory Commission (NRC) to process HEU.

As described in the 1996 ROD (61 FR 40619; August 5, 1996), DOE planned to down-blend as much surplus HEU as possible (then assumed to be up to 85 percent of the 200 metric tons, i.e., approximately 170 metric tons) into LEU for use as commercial reactor fuel. The remainder (approximately 30 metric tons) would be down-blended and then disposed of as low-level waste (LLW). DOE planned to use a combination of the four sites and estimated that the blend-down program would be completed in about 15–20 years. This alternative was identified in the 1996 ROD as the environmentally preferable alternative. To date, almost 15 years after the ROD was issued, DOE has down-blended approximately 120 metric tons of surplus HEU to LEU and provided all the LEU for use in commercial or research reactors.

In the fall of 2005, up to an additional 200 metric tons of HEU were declared surplus to nuclear weapon program needs. Of this, up to 160 metric tons were designated for the U.S. Naval Reactors Program for use as reactor fuel. However, based on historical data, DOE anticipated that up to approximately 32 metric tons of this HEU might be unsuitable for use as naval reactor fuel, and proposed to down-blend rejected material to LEU. Another 20 metric tons of the 200 metric ton declaration were designated for down-blending. Down-blending this HEU began in 2009, consistent with the 1996 ROD.

#### **American Assured Fuel Supply Initiative**

In 2005, the Secretary of Energy announced that DOE would set aside a stockpile of LEU derived from 17.4 metric tons of surplus HEU to be held in reserve to address potential disruptions in the nuclear fuel supply of eligible foreign recipients that meet certain nonproliferation criteria. In the Explanatory Statement accompanying the House Appropriations Committee Print for the Consolidated Appropriations Act, 2008 (Pub. L. 110-161), which was given the same effect as a joint explanatory statement, Congress recommended that DOE also make the LEU available to domestic reactors in the event of a supply disruption. This effort to establish and manage an LEU reserve was originally referred to as the Reliable Fuel Supply Initiative, but now is called the American Assured Fuel Supply (AFS).

### **Proposed Action and Program Changes**

NNSA proposes to implement the AFS initiative and modify certain elements of the existing surplus HEU disposition program:

(1) American Assured Fuel Supply. Under the AFS, a portion of LEU derived from down-blending surplus HEU would be held in reserve to respond, through U.S. intermediaries, to disruptions in the foreign or domestic supply of nuclear fuel. In the 2007 Supplement Analysis, this initiative was referred to as the Reliable Fuel Supply Initiative and was limited in scope to ensuring that foreign countries with good nonproliferation credentials have access to the nuclear fuel market and the benefits of nuclear power. Under the current proposal, the AFS would supply LEU in the event of a supply disruption both to recipients in foreign countries through a U.S. person or recipients in the United States. This would further nuclear nonproliferation objectives by supporting civilian nuclear energy development while minimizing proliferation risks.

Down-blending the 17.4 metric tons of surplus HEU commenced in 2007 and is scheduled to be completed by 2012.<sup>1</sup> These operations are the same as analyzed in the HEU EIS and are consistent with the existing ROD. The down-blending will result in approximately 290 metric tons of LEU, of which approximately 230 metric tons will form the AFS. The remainder of the LEU will be used to pay for the down-blending and processing costs. Forty metric tons of LEU will be stored in existing facilities at the Westinghouse fuel fabrication facility in Columbia, South Carolina, and the rest of the DOE-owned LEU will be available for the facility's working inventory subject to contract conditions for providing LEU upon request by DOE.

The sale of LEU from the AFS will be conducted consistent with the policies and guidance in the "Secretary of Energy's 2008 Policy Statement on Management of Department of Energy's Excess Uranium Inventory" (March 11, 2008) and the DOE Excess Uranium Inventory Management Plan.<sup>2</sup> In all cases, the U.S. persons purchasing the LEU must meet all applicable licensing requirements and other authorizations for the possession, use, and transportation of nuclear materials. If the AFS is used to supply a foreign recipient, the U.S. persons exporting the LEU will obtain a license from the NRC. DOE will establish the price of the LEU at the time of delivery using commercially acceptable market indices, to the extent practical, and ensure that reasonable value is obtained. All proceeds from the sale will be deposited in the U.S. Treasury.

The U.S. persons purchasing LEU from the AFS will be solely responsible for transportation, insurance, safety, and liability issues once title is transferred. The LEU will be in the form of

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<sup>1</sup> NNSA awarded the contract for down-blending to a team consisting of WesDyne International (a subsidiary of Westinghouse Electric Company) and NFS. NFS is down-blending the surplus HEU to LEU at its facility in Erwin, Tennessee.

<sup>2</sup> These documents are available on the internet at:  
<http://www.ne.doe.gov/pdfFiles/Excess%20Uranium%20Inventory.pdf> and  
[http://www.ne.doe.gov/pdfFiles/inventory\\_plan\\_unclassified.pdf](http://www.ne.doe.gov/pdfFiles/inventory_plan_unclassified.pdf).

uranium hexafluoride (UF<sub>6</sub>) at a specific assay (generally 4.95% U-235); DOE assumes no responsibility beyond certification that the LEU meets ASTM International, formerly American Society for Testing Materials (ASTM), specifications and is of a certain quantity and assay.

For additional information on the policies and process for use of the AFS, please see “Notice of Availability: American Assured Fuel Supply,” also published in today’s Federal Register.

(2) New Disposition Pathways for HEU Discard Material. The HEU EIS analyzed the down-blending of low-equity<sup>3</sup> HEU materials to an enrichment level of 0.9 percent uranium-235, and disposing of the resulting LEU at a low-level radioactive waste facility. NNSA now proposes instead to directly dispose of these materials only if they meet acceptance criteria for disposal as LLW.<sup>4</sup> Most disposal would occur at DOE’s Nevada National Security Site (NNSS) (formerly the Nevada Test Site).

(3) Down-blending Additional HEU Over a Longer Period of Time. The quantity of surplus HEU available for disposition and the expected period of program implementation both have increased since the 1996 ROD. Additional quantities of surplus HEU primarily derive from two sources: new material declared excess to weapons needs in 2005, and HEU returned to DOE from foreign research reactor and domestic research reactor programs. NNSA proposes to down-blend these additional quantities of HEU to LEU for use in fabricating fuel for nuclear power plants, research reactors and isotope production facilities. The 1996 ROD foresaw HEU down-

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<sup>3</sup> Low-equity items include materials with varying enrichments that are no longer needed to meet programmatic needs, have no further defined use, and are commonly considered uneconomical for recovery due to low concentration of HEU or due to impurities.

<sup>4</sup> The Supplement Analysis also analyzes the potential environmental impacts of direct disposal in a geologic repository of 15 metric tons of spent nuclear fuel containing HEU. That fuel currently is in safe and secure storage along with a much larger quantity of spent nuclear fuel at Idaho National Laboratory, and DOE is not proposing any change at this time in the management of that material.

blending activities continuing for 15-20 years. NNSA now anticipates that down-blending may continue over an extended period, out to at least 2050, based on the pace of ongoing activities and because the material addressed by the 2005 declaration is coming from nuclear weapon dismantlement over the coming decades.

Down-blending of HEU from foreign or domestic research reactor spent nuclear fuel would occur only if DOE decides to chemically process, (reprocess) that fuel, which would separate the HEU from other components of the fuel. DOE currently plans to accept research reactor spent nuclear fuel through 2019, as announced in amended RODs (69 FR 69901; December 1, 2004 and 74 FR 4173; January 23, 2009) for the Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel (FRR SNF EIS) (DOE/EIS-0218).

Associated reprocessing operations are evaluated in the Savannah River Site Spent Nuclear Fuel Management Final Environmental Impact Statement (SRS SNF EIS) (DOE/EIS-0279 2000).

DOE has no plans to reprocess spent nuclear fuel solely for the purpose of extracting HEU. However, activities associated with managing the fuel for the purposes of stabilization, facility cleanup, treatment, waste management, safe disposal, or environment, safety, and health protection could result in the separation of HEU in weapons-usable form that could pose a proliferation threat. If HEU is recovered from spent fuel for one or more of these reasons, it would be available for down-blending consistent with the 1996 ROD for the HEU EIS.

### **Basis for Decision and Associated Environmental Impacts**

The Council on Environmental Quality (CEQ) regulations implementing NEPA at 40 CFR 1502.9(c) require Federal agencies to prepare a supplement to an EIS when an agency makes substantial changes in the proposed action that are relevant to environmental concerns or when there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE NEPA Implementing Procedures at 10 CFR 1021.314(c) direct that a supplement analysis be prepared to assist in making that determination when it is unclear whether a supplement to an EIS is required. NNSA prepared the Supplement Analysis for the Disposition of Surplus Highly Enriched Uranium (DOE/EIS-0240-SA1) in 2007 in accordance with these CEQ and DOE procedures.

In the HEU Supplement Analysis, NNSA analyzed the potential environmental impacts from the ongoing HEU disposition program, as well as potential impacts from port activities and transportation of LEU by ship across the global commons (ocean) to support the proposal to make LEU available to reactors in foreign countries. The Supplement Analysis did not identify an end date for implementation of the proposed activities because, as noted above, receipt of surplus HEU into the disposition program is ongoing.

The Supplement Analysis assumed the continued availability of the four facilities identified in the HEU EIS for continued blend down of HEU. Potential impacts were based on processing 10 metric tons of HEU per year at each facility.

The potential impacts would remain similar to those analyzed in the HEU EIS and Supplement Analysis. NNSA expects that there would be changes over time due to factors such as normal population fluctuations among work forces and in communities near the involved facilities.

These changes would not create any significant new circumstances or information related to the proposed actions. Activities would continue in existing, appropriately licensed or approved facilities. Potential environmental impacts would remain small and within applicable regulatory and other limits.

For AFS, which was not envisioned in the HEU EIS, potential impacts of the domestic program would be identical to those associated with the ongoing HEU disposition program. Prior to delivery to a reactor, one or more commercial nuclear fuel fabrication facilities would accommodate the LEU for the AFS reserve in its working inventory and existing storage capacity. This activity would be consistent with the facilities' existing NRC operating licenses and would not require additional construction. In addition, as analyzed in the Supplement Analysis, transportation activities to provide LEU to foreign reactors would add small potential impacts associated with transfer activities at the port of departure and overseas shipments through the global commons.

Disposal of certain HEU materials as LLW would result in potential impacts associated with transportation and disposal. Nevada National Security Site (NNSS) is the most likely disposal site for this LLW. The HEU EIS included an analysis of transporting 0.9 percent LEU to NNSS for disposal. Without down-blending, the low-enriched HEU materials would have a higher concentration of uranium-235, but with approved packaging and other required controls, the potential impacts would be similar to the transportation and disposal of 0.9 percent LEU at NNSS. DOE also has analyzed transportation of low-level radioactive wastes to NNSS in the Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (DOE/EIS-0243). That EIS also included analysis of waste disposal activities and

resulted in a ROD identifying the NNSS as available for the disposal of LLW if it meets the NNSS waste acceptance criteria (61 FR 65551, December 13, 1996). If NNSA were to use a different facility for disposal, the transportation impacts would be similar to those associated with use of NNSS (i.e., similar distances and population distributions would be involved), and disposal would occur in existing, licensed facilities so that impacts would be consistent with approved operations at the facility. Recognizing the potential for disposal at other sites, the HEU EIS identified the analysis of transportation impacts to NNSS as representative of other possible routes. In addition, DOE has analyzed the transportation and disposal of LLW in other NEPA analyses, including the Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS-0200, 1997).

### **Amended Decision**

Consistent with the decisions announced in the ROD issued pursuant to the HEU EIS (61 FR 40619; August 5, 1996), NNSA will continue ongoing surplus HEU disposition program activities. NNSA has decided to also make the following changes to the HEU disposition program:

- (1) Implement the AFS, including storage of LEU and, as needed, transportation of the LEU by ship across the ocean for use in foreign reactors.
- (2) Dispose of certain HEU materials as low-level radioactive waste without prior down-blending if the materials meet applicable waste acceptance criteria.

(3) Increase the quantity of HEU available for down-blending and continue down-blending operations beyond the 20 years anticipated in the 1996 HEU EIS.

NNSA will use all practicable means to avoid or minimize environmental harm when implementing the actions described in this Amended ROD. NNSA operates pursuant to a number of Federal laws including environmental laws, DOE Orders, and Federal, State, and local controls and agreements. Also, the commercial activities associated with the down-blending, transportation, and storage of HEU and LEU are regulated by the NRC and the Department of Transportation. Many of these requirements mandate actions that serve to mitigate potential adverse environmental impacts.

For transactions that trigger the requirements of section 3112(d) of the United States Enrichment Corporation Privatization Act, DOE will assess the impact of a release from the AFS on the domestic market, and will provide its recommendation to the Secretary to make the appropriate determination as to whether the transfer will have an adverse material impact on the domestic uranium enrichment, conversion, or mining industries.

Issued in Washington, DC, this 29th day of April, 2011.

Handwritten signature of Thomas P. D'Agostino in black ink.

Thomas P. D'Agostino  
Administrator  
National Nuclear Security Administration