

Exhibit 20

Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement

Summary



Savannah River Site – South Carolina



Sequoyah Nuclear Plant – Tennessee



Browns Ferry Nuclear Plant – Alabama



Waste Isolation Pilot Plant – New Mexico



Los Alamos National Laboratory – New Mexico



NNSA
National Nuclear Security Administration

U.S. Department of Energy
Office of Fissile Materials Disposition
and
Office of Environmental Management
Washington, DC

COVER SHEET

Lead Agency: U.S. Department of Energy (DOE) / National Nuclear Security Administration (NNSA)

Cooperating Agency: Tennessee Valley Authority

Title: *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement (SPD Supplemental EIS) (DOE/EIS-0283-S2)*

Locations: South Carolina, New Mexico, Alabama, and Tennessee

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Abstract: On March 28, 2007, DOE published a Notice of Intent (NOI) in the *Federal Register* (72 FR 14543) to prepare the *SPD Supplemental EIS* to evaluate the potential environmental impacts at the Savannah River Site (SRS) in South Carolina of disposition pathways for surplus weapons-usable plutonium (referred to as “surplus plutonium”) originally planned for immobilization. The proposed actions and alternatives included construction and operation of a new vitrification capability in K-Area, processing in H-Canyon/HB-Line and the Defense Waste Processing Facility (DWPF), and fabricating mixed oxide (MOX) fuel in the MOX Fuel Fabrication Facility (MFFF) currently under construction in F-Area. Before the *Draft SPD Supplemental EIS* was issued, DOE decided to modify the scope of this *SPD Supplemental EIS* and evaluate additional alternatives. Therefore, on July 19, 2010 and again on January 12, 2012, DOE issued amended NOIs (75 FR 41850 and 77 FR 1920) announcing its intent to modify the scope of this *SPD Supplemental EIS* and to conduct additional public scoping.

The public scoping periods extended from March 28, 2007, through May 29, 2007; July 19, 2010 through September 17, 2010; and January 12, 2012 through March 12, 2012. Scoping meetings were conducted on April 17, 2007, in Aiken, South Carolina; April 19, 2007, in Columbia, South Carolina; August 3, 2010, in Tanner, Alabama; August 5, 2010, in Chattanooga, Tennessee; August 17, 2010, in North Augusta, South Carolina; August 24, 2010, in Carlsbad, New Mexico; August 26, 2010, in Santa Fe, New Mexico; and February 2, 2012, in Pojoaque, New Mexico. A summary of the comments received during the public scoping periods is provided in Chapter 1 of this *SPD Supplemental EIS* and available on the project website at <http://nnsa.energy.gov/nepa/spdsupplementaleis>.

DOE has revised the scope of this *SPD Supplemental EIS* to refine the quantity and types of surplus plutonium, evaluate additional alternatives (including additional pit disassembly and conversion options), no longer

consider in detail one of the alternatives identified in the 2007 NOI (ceramic can-in-canister immobilization), and revise DOE's preferred alternative. In this *SPD Supplemental EIS*, DOE describes the environmental impacts of alternatives for disposition of 13.1 metric tons (14.4 tons) of surplus plutonium for which DOE has not made a disposition decision, including 7.1 metric tons (7.8 tons) of plutonium from pits that were declared excess to national defense needs after publication of the 2007 NOI, and 6.0 metric tons (6.6 tons) of surplus non-pit plutonium. The analyses also encompass potential use of MOX fuel in reactors at the Sequoyah and Browns Ferry Nuclear Plants of the Tennessee Valley Authority (TVA).

In this *SPD Supplemental EIS*, DOE evaluates the No Action Alternative and four action alternatives for disposition of 13.1 metric tons (14.4 tons) of surplus plutonium: (1) Immobilization to DWPF Alternative – glass can-in-canister immobilization of both surplus non-pit and disassembled and converted pit plutonium and subsequent filling of the canister with high-level radioactive waste (HLW) at DWPF at SRS; (2) MOX Fuel Alternative – fabrication of the disassembled and converted pit plutonium and much of the non-pit plutonium into MOX fuel at MFFF, for use in domestic commercial nuclear power reactors to generate electricity, and disposition of the surplus non-pit plutonium that is not suitable for MFFF as transuranic waste at the existing Waste Isolation Pilot Plant (WIPP), a deep geologic repository in southeastern New Mexico; (3) H-Canyon/HB-Line to DWPF Alternative – processing the surplus non-pit plutonium in the existing H-Canyon/HB-Line at SRS with subsequent disposal as HLW (i.e., vitrification in the existing DWPF), and fabrication of the pit plutonium into MOX fuel at MFFF; and (4) WIPP Alternative – processing the surplus non-pit plutonium in the existing H-Canyon/HB-Line for disposal as transuranic waste at WIPP, and fabrication of the pit plutonium into MOX fuel at MFFF. Under all alternatives, DOE would also disposition as MOX fuel, 34 metric tons (37.5 tons) of surplus plutonium in accordance with previous decisions. The 34 metric tons (37.5 tons) of plutonium would be fabricated into MOX fuel at MFFF, for use at domestic commercial nuclear power reactors. Within each action alternative, DOE also evaluates options for pit disassembly and conversion to, among other things, disassemble nuclear weapons pits and convert the plutonium metal to an oxide form for disposition. Under three of the options, DOE would not build a stand-alone Pit Disassembly and Conversion Facility in F-Area at SRS, which DOE had previously decided to construct (65 FR 1608).

Preferred Alternative: The MOX Fuel Alternative is DOE's Preferred Alternative for surplus plutonium disposition. DOE's preferred option for pit disassembly and the conversion of surplus plutonium metal, regardless of its origins, to feed for MFFF is to use some combination of facilities at Technical Area 55 at Los Alamos National Laboratory and K-Area, H-Canyon/HB-Line, and MFFF at SRS, rather than to construct a new stand-alone facility. This would likely require the installation of additional equipment and other modifications to some of these facilities. DOE's preferred alternative for disposition of surplus plutonium that is not suitable for MOX fuel fabrication is disposal at WIPP. The TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose.

Public Involvement: Comments on this *Draft SPD Supplemental EIS* should be submitted within 60 days of the publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register* to ensure consideration in preparation of the *Final SPD Supplemental EIS*. DOE will consider comments received after the 60-day comment period to the extent practicable. Written comments may be submitted to Sachiko McAlhany via postal mail to the address provided above, via email to spdsupplementaleis@saic.com, or by toll-free fax to 1-877-865-0277. Public hearings on this *Draft SPD Supplemental EIS* will be held during the comment period. The dates, times, and locations of these hearings will be published in a DOE *Federal Register* notice and will also be announced by other means, including the project website, newspaper advertisements, and notification to persons on the mailing list. Information on this *SPD Supplemental EIS* can be found on the project website at <http://nnsa.energy.gov/nepa/spdsupplementaleis>.

SUMMARY

S.1 Introduction

In keeping with U.S. nonproliferation policies and commitments¹ to reduce the availability of material that is readily usable in nuclear weapons, the U.S. Department of Energy (DOE), including the semiautonomous National Nuclear Security Administration (NNSA), is engaged in a program to disposition U.S. surplus weapons-usable plutonium (referred to in this supplemental environmental impact statement as “surplus plutonium”). Surplus plutonium includes pit² and non-pit³ plutonium that is no longer needed for U.S. national security or programmatic purposes. DOE has previously analyzed and made decisions on disposition paths for most of the plutonium the United States has declared as surplus.

On March 28, 2007, DOE published a Notice of Intent (NOI) in the *Federal Register* (72 FR 14543) to prepare this *Surplus Plutonium Disposition Supplemental Environmental Impact Statement (SPD Supplemental EIS)*⁴ to evaluate the potential environmental impacts at the Savannah River Site (SRS) of alternative disposition pathways for surplus plutonium originally planned for immobilization in the Record of Decision (ROD) (65 FR 1508) for the *Surplus Plutonium Disposition Environmental Impact Statement (SPD EIS)* (DOE 1999). The proposed actions and alternatives included construction and operation of a new vitrification capability in K-Area, processing in H-Canyon/HB-Line and the Defense Waste Processing Facility (DWPF), and fabricating mixed oxide (MOX) fuel in the MOX Fuel Fabrication Facility (MFFF) currently under construction in F-Area at SRS.

Weapons-usable plutonium is plutonium in forms that can be readily converted for use in nuclear weapons. Weapons-grade, fuel-grade, and power-reactor-grade plutonium are all weapons-usable plutonium.

Surplus plutonium has no identified programmatic use and does not fall into one of the categories of national security reserves.

Then on July 19, 2010, DOE issued an amended NOI (75 FR 41850) announcing its intent to modify the scope of this *SPD Supplemental EIS* and to conduct additional public scoping. Under the revised scope, DOE would refine the quantity and types of surplus plutonium, evaluate additional alternatives, and no longer consider in detail one of the alternatives identified in the 2007 NOI (i.e., ceramic can-in-canister immobilization). In addition, DOE had identified in the 2007 NOI a glass can-in-canister immobilization approach as its Preferred Alternative for the non-pit plutonium then under consideration; the 2010 amended NOI explained that DOE would evaluate a glass can-in-canister immobilization alternative in this *SPD Supplemental EIS*, but that DOE did not have a preferred alternative.

On January 12, 2012, DOE issued a second amended NOI (77 FR 1920) announcing its intent to further modify the scope of this *SPD Supplemental EIS* to evaluate additional options for pit disassembly and conversion of plutonium metal to oxide including potential use of the Plutonium Facility (PF-4) at the Los Alamos National Laboratory (LANL), and to conduct additional public scoping. In addition, DOE identified the MOX Fuel Alternative as DOE’s Preferred Alternative.

¹ On September 1, 2000, the Agreement Between the Government of the United States and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes and Related Cooperation (referred to as “the PMDA”) (USA and Russia 2000) was signed. The PMDA (and its 2010 Protocol) calls for each country to dispose of at least 34 metric tons (37.5 tons) of excess weapons-grade plutonium by fabrication into MOX fuel and irradiation in reactors in each country.

² The plutonium was made by the United States in nuclear reactors for use in nuclear weapons. A pit is the central core of a primary assembly in a nuclear weapon and is typically composed of plutonium-239 metal, enriched uranium, or both, and other materials.

³ Non-pit plutonium may exist in metal or oxide form, and may be combined with other materials that were used in the process of manufacturing plutonium for use in nuclear weapon or related research and development activities.

⁴ In the NOI (72 FR 14543), the title was given as the Supplemental Environmental Impact Statement for Surplus Plutonium Disposition at the Savannah River Site.

This *SPD Supplemental EIS* updates the previous DOE National Environmental Policy Act (NEPA) analyses (described in Appendix A, Section A.1, of this *SPD Supplemental EIS*) to consider options for pit disassembly and conversion of plutonium metal to oxide. It also analyzes the use of fuel fabricated from surplus plutonium in Tennessee Valley Authority (TVA) reactors and other domestic commercial nuclear power reactors to generate electricity. This *SPD Supplemental EIS* also evaluates alternatives for the disposition of 13.1 metric tons (14.4 tons) of surplus plutonium for which DOE has not yet made a disposition decision.

S.2 Purpose and Need for Agency Action

DOE's purpose and need for action remains, as stated in the *SPD EIS* (DOE 1999:1-3), to reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally sound manner, ensuring that it can never again be readily used in nuclear weapons.

TVA is a cooperating agency on this *SPD Supplemental EIS* because it is considering the use of MOX fuel, produced as part of DOE's Surplus Plutonium Disposition Program, in its nuclear power reactors. TVA provides electrical power to the people of the Tennessee Valley region, including almost all of Tennessee and parts of Alabama, Mississippi, Kentucky, Virginia, North Carolina, and Georgia. TVA's Sequoyah and Browns Ferry Nuclear Plants, located near Soddy-Daisy, Tennessee, and Athens, Alabama, respectively, currently are, and will continue to be, major assets among TVA's energy generation resources in meeting the demand for power in the region. Consistent with DOE's purpose and need, TVA's purpose for considering use of MOX fuel derived from DOE's Surplus Plutonium Disposition Program is the possible procurement of MOX fuel for use in these reactors.

A cooperating agency participates in the preparation of an EIS because of its jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) (40 CFR 1501.6, 1508.5).

S.3 Proposed Action

DOE proposes to disposition an additional 13.1 metric tons (14.4 tons) of surplus plutonium for which it has not previously made a disposition decision; to provide the appropriate capability to disassemble surplus pits and convert surplus plutonium to a form suitable for disposition; and to provide for the use of MOX fuel in TVA's and other domestic commercial nuclear power reactors.

Figure S-1 shows the major Surplus Plutonium Disposition Program activities. Facilities at E-, F-, H-, K-, and S-Areas at SRS in South Carolina; at Technical Area 55 (TA-55) at LANL in New Mexico; at the Waste Isolation Pilot Plant (WIPP) in New Mexico; and at the Browns Ferry and Sequoyah Nuclear Plants and other domestic commercial nuclear power reactors that could irradiate MOX fuel. Figures S-2 and S-3 show the locations of SRS and LANL and the applicable operations areas at these sites. Figures S-4, S-5, and S-6 show the locations of WIPP, Browns Ferry Nuclear Plant, and Sequoyah Nuclear Plant, respectively.

S.4 Disposition Paths Identified for Surplus Plutonium

To date, the United States has declared as excess to U.S. defense needs a total of 61.5 metric tons (67.8 tons) of plutonium. This quantity includes both pit and non-pit plutonium. Based on a series of NEPA reviews described in Appendix A, Section A.1, of this *SPD Supplemental EIS*, DOE has determined disposition paths for most of this surplus plutonium.

Plutonium with Identified Disposition Paths

Figure S-7 summarizes the various plutonium disposition paths decided to date for 45.3 metric tons (50.0 tons) of surplus plutonium.

public comments in preparing the materials to be disseminated during the public hearings on this *Draft SPD Supplemental EIS*.

Comment Summary: Commentors were interested in the background and structure of DOE and its ability to execute whichever alternative is selected in the ROD.

Response: On August 4, 1977, President Carter signed the Department of Energy Organization Act, creating DOE from the Federal Energy Administration and the Energy Research and Development Administration. DOE's mission is to ensure the United States' security and prosperity by addressing the country's energy, environmental, and nuclear challenges through transformative science and technology solutions. NNSA was established by Congress in 2000 as a separately organized, semiautonomous agency within DOE, responsible for the management and security of the Nation's nuclear weapons, nuclear nonproliferation, and naval reactor programs. DOE/NNSA has been working toward dispositioning surplus plutonium for many years. As described in Appendix A, Section A.1, of this *SPD Supplemental EIS*, accomplishments to date include disposal of plutonium as TRU waste at WIPP; consolidation of surplus non-pit plutonium at SRS; and the ongoing construction of MFFF and the Waste Solidification Building (WSB). Surplus plutonium disposition activities are subject to the availability of funds appropriated by Congress.

Comment Summary: Commentors expressed concern over the MOX fuel fabrication program, including the lack of interest in MOX fuel of commercial nuclear power plant operators; cost and schedule; and tying U.S. disposition activities to the Russian government's nuclear activities.

Response: MOX fuel use in commercial reactors is a demonstrated technology that has been used worldwide for over 40 years. DOE continues to pursue potential domestic commercial nuclear power customers. MFFF will start up using existing surplus plutonium oxide supplies and will be built and operated as described in Appendix B, Section B.1.1.2, and Chapter 5, Section 5.3.2, of this *SPD Supplemental EIS*. The United States remains committed to the Agreement Between the Government of the United States of America and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated As No Longer Required for Defense Purposes and Related Cooperation (PMDA), under which both the United States and the Russian Federation have each agreed to dispose of at least 34 metric tons (37.5 tons) of excess weapons-grade plutonium in nuclear reactors to produce electricity. It is important that MFFF begin operations to demonstrate progress to the Russian government, meet U.S. legislative requirements, and reduce the quantity of surplus plutonium and the concomitant cost of secure storage.

Comment Summary: Commentors expressed concern about processing more plutonium through DWPF.

Response: As described in Appendix B, Section B.1.4.1, and analyzed in Appendix G of this *SPD Supplemental EIS*, DOE has analyzed the potential environmental impacts of increasing the plutonium loading in DWPF canisters.

Comment Summary: Commentors expressed concern about lead assembly testing at Duke Energy's Catawba Nuclear Station and the need to conduct lead assembly testing in the TVA reactors. A commentor stated that NRC regulations require reactor testing to the burn-up level being sought for licensing. MOX lead assemblies were only tested for two cycles at the Catawba Nuclear Station.

Response: Significant worldwide experience with the use of MOX fuel, coupled with lead assembly testing programs including the one at the Catawba Nuclear Station, indicates MOX fuel performance. MOX fuel lead assemblies were successfully tested in the Catawba Nuclear Station Unit 1 reactor. The four MOX fuel lead assemblies performed safely; no safety limits were exceeded. The need for future lead test assemblies based on the reactor's planned use of MOX fuel (burn up levels) will be determined by NRC as part of the fuel qualification and licensing process.

Comment Summary: Commentors expressed concern about human health risks and increased risk of accidents using a partial MOX fuel nuclear reactor core instead of a full uranium fuel core. Commentors

and, therefore, an alternative that considers the disposal of entire surplus plutonium inventory using the MOX fuel approach was not evaluated.

S.9.3 Disposition of 13.1 Metric Tons (14.4 Tons) of Surplus Plutonium using H-Canyon/HB-Line and DWPF

Under the H-Canyon/HB-Line to DWPF Alternative, DOE is considering disposition of the 6 metric tons (6.6 tons) of surplus non-pit plutonium using H-Canyon/HB-Line and vitrification at DWPF. Disposition of the 7.1 metric tons (7.8 tons) of surplus plutonium pits using H-Canyon/HB-Line is not being considered. Based on planned rates, loading and schedule for treatment of waste at DWPF, there would be insufficient HLW having the characteristics needed to vitrify more than approximately 6 metric tons (6.6 tons) of surplus plutonium. In addition, concerns about criticality would limit the loading in the waste storage tanks and would not support vitrification of 13.1 metric tons (14.4 tons) of plutonium. Therefore, an alternative that evaluates the disposition of the entire 13.1 metric tons (14.4 tons) of surplus plutonium inventory using H-Canyon/HB-Line and DWPF was not evaluated.

S.9.4 Disposal of 13.1 Metric Tons (14.4 Tons) of Surplus Plutonium at the Waste Isolation Pilot Plant

Under the WIPP Alternative, DOE is considering disposal of the 6 metric tons (6.6 tons) of surplus non-pit plutonium at WIPP. Disposal of the 7.1 metric tons (7.8 tons) of surplus plutonium pits at WIPP is not being considered. Based on the proposed rates and schedules for disposal of waste at WIPP, disposal of an additional 7.1 metric tons (7.8 tons) of plutonium pits would significantly increase the volume of TRU waste generated and exceed the remaining WIPP capacity. Therefore, an alternative that evaluates the disposal of the entire 13.1 metric tons (14.4 tons) of surplus plutonium inventory at WIPP was not evaluated.

S.10 Preferred Alternative

The MOX Fuel Alternative is DOE's Preferred Alternative for surplus plutonium disposition. DOE's preferred option for pit disassembly and the conversion of surplus plutonium metal, regardless of its origins, to feed for MFFF is to use some combination of facilities at TA-55 at LANL and K-Area, H-Canyon/HB-Line, and MFFF at SRS, rather than to construct a new stand-alone facility. This would likely require the installation of additional equipment and other modifications to some of these facilities. DOE's preferred alternative for disposition of surplus non-pit plutonium that is not suitable for MOX fuel fabrication is disposal at WIPP.

TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose.

S.11 Summary of Environmental Consequences

This section summarizes the impact analyses for the alternatives evaluated in this *SPD Supplemental EIS*. Section S.11.1 summarizes the potential consequences of each alternative by resource area at SRS and LANL, as well as potential domestic commercial nuclear power reactor sites. Section S.11.2 is a summary of the cumulative impacts analysis that considers the consequences of the proposed alternatives in the context of other past, present, and reasonably foreseeable future actions. See Chapter 2, Section 2.6, of this *SPD Supplemental EIS*, for more information.

S.11.1 Comparison of Potential Consequences of Alternatives

Table S-3 summarizes the potential impacts of the alternatives evaluated in this *SPD Supplemental EIS* on activities at SRS and LANL. Impacts on key resource areas at these DOE sites (i.e., air quality, human health, socioeconomics, waste management, transportation, and environmental justice) are discussed in the following paragraphs. The remaining resource areas (i.e., land resources, geology and soils, water resources, noise, ecological resources, cultural resources, and infrastructure) are likely to experience minimal or no impacts regardless of the alternative being considered and, therefore, are analyzed in less detail.