[6450-01-P]

DEPARTMENT OF ENERGY

Surplus Plutonium Disposition Program

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

ACTION: Amended Record of Decision

SUMMARY: The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) is amending its January 11, 2000 Record of Decision (ROD) (65 FR 1608) to allow for the fabrication of mixed oxide (MOX) fuel lead assemblies in France on a one-time basis. The January 2000 ROD stated that DOE would fabricate a limited number of lead assemblies at Los Alamos National Laboratory (LANL). However, because of cost and schedule impacts and programmatic considerations, lead assembly fabrication at LANL is no longer feasible.

The environmental impacts of fabricating lead assemblies in Europe were first evaluated in the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (*Storage and Disposition PEIS*) (DOE/EIS-0229, December 1996). In accordance with DOE National Environmental Policy Act (NEPA) Implementing Procedures at Title 10, Section 1021.314(c), DOE/NNSA has prepared a Supplement Analysis (SA) for the *Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe* (DOE/EIS-0229-SA3). This SA updates the environmental impacts of fabricating lead assemblies in France using

plutonium oxide from LANL. The SA concludes that the proposed fabrication of lead assemblies in France would not result in impacts significantly different from or significantly greater than those described in previous DOE NEPA documents. Therefore, DOE/NNSA will now pursue the fabrication of up to four lead assemblies in France at the existing Cadarache and MELOX facilities, using surplus plutonium from LANL. The lead assemblies will be returned to the United States for irradiation at Catawba Nuclear Station (Catawba)[1] in South Carolina.

FOR FURTHER INFORMATION CONTACT: For further information concerning the fabrication of lead assemblies in France, the Supplement Analysis entitled *Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe*, or this amended ROD, contact Hitesh Nigam, NEPA Compliance Officer, Office of Fissile Materials Disposition, National Nuclear Security Administration, 1000 Independence Avenue, S.W., Washington DC, 20585; or leave a message at 800-820-5134.

For further information concerning DOE's NEPA process, contact Ms. Carol Borgstrom, Director, Office of NEPA Policy and Compliance (EH-42), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585, telephone 202-586-4600, or leave a message at 800-472-2756. Additional information regarding the DOE NEPA process and activities is also available on the Internet through the NEPA home page at http://tis.eh.doe.gov/nepa.

[1] Because the plants' refueling schedules determine the availability for lead assembly use, Duke Power Company has submitted a license amendment request to the NRC to allow irradiation of MOX lead assemblies at Catawba. The SA also analyzes the use of the McGuire Nuclear Station (McGuire) in North Carolina, which could be used in lieu of Catawba, if a license amendment request were submitted and approved.

SUPPLEMENTARY INFORMATION:

I. Background

The *Storage and Disposition PEIS* evaluated the potential environmental consequences of alternative strategies for the long-term storage of weapons-usable plutonium and highly enriched uranium and the disposition of weapons-usable plutonium that has been or may be declared surplus to national security needs. As part of this evaluation, the *Storage and Disposition PEIS* analyzed the environmental impacts of fabricating lead assemblies (and some initial MOX batch assemblies) in existing facilities in Europe in the event that it would be necessary to begin production more quickly than could be accomplished in the United States. The fabrication of lead assemblies (small quantities of nuclear fuel used by a commercial nuclear power plant to confirm that a new fuel design will perform safely and predictably) involves the same basic process as full-scale fabrication of MOX fuel and is required to support Nuclear Regulatory Commission (NRC) licensing activities and fuel qualification efforts. The *Storage and Disposition PEIS* evaluated transport of plutonium oxide from a storage facility at an existing DOE site to a U.S. port (Sunny Point, NC); port handling at the U.S. port; ocean transport to the European ports of Barrows, United Kingdom, and Cherbourg, France; ocean transport of MOX fuel back to the United States; and safe, secure trailer (SST) transport of MOX fuel from the U.S. port to either an existing commercial reactor site or a storage site in the United States. The shipping schedule projected two shipments of plutonium oxide per year and a maximum of four shipments of fresh (unirradiated) MOX fuel assemblies per year. The

Storage and Disposition PEIS also discussed the potential effect of ocean transport on the global commons.

Although the *Storage and Disposition PEIS* indicated that fabrication in Europe, if it occurred at all, would only be an interim measure, the PEIS analysis included not only the annual transportation impacts of shipments to and from Europe, but also the overall transportation impacts of performing all fuel fabrication work for the entire 50-metric-ton surplus plutonium inventory in Europe. These analyses indicate that total transportation fatalities resulting from both radiological and nonradiological risk to the public and workers for both routine and accident conditions associated with European MOX fuel fabrication for the entire inventory would range from 1.69 to 4.62 fatalities, depending on the hypothetical one-way distance to be traveled (i.e., 1,000 km to 4,000 km). Port handling impacts were also analyzed in the PEIS. The analysis determined that annual accident risks from exporting two shipments of plutonium oxide and importing four shipments of MOX fuel would not result in any latent cancer fatalities (LCFs) among workers or the general public. The analysis also indicates that the probability that these shipments would be involved in a maritime accident of sufficient severity to cause release of radioactive materials resulting in catastrophic consequences would be extremely small (on the order of 1.0×10^{-7}/yr to 1.0×10^{-8}/yr).

The ROD for the *Storage and Disposition PEIS*, issued on January 21, 1997 (62 FR 3014), outlined DOE's decision to pursue a hybrid disposition strategy. This strategy allowed for both the immobilization of some (and potentially all) of the surplus plutonium and the fabrication of some of the surplus plutonium into MOX fuel to be

irradiated in existing domestic, commercial reactors. The ROD made no decisions concerning lead assembly fabrication.

The environmental impacts of domestic fabrication of lead assemblies were evaluated in detail as part of the MOX fuel fabrication alternatives in the *Surplus Plutonium Disposition EIS* (SPD EIS) (DOE/EIS-0283, November 1999), which tiered from the *Storage and Disposition PEIS*. Specific facilities at five DOE sites were considered for this effort, based on site capabilities existing at that time: the Hanford Site in Washington, Idaho National Engineering and Environmental Laboratory Argonne National Laboratory West (ANL–W) facilities in Idaho, the Savannah River Site (SRS) in South Carolina, LANL in New Mexico, and Lawrence Livermore National Laboratory in California. The SPD EIS evaluated the environmental impacts of fabricating 10 fuel assemblies, irradiating up to 8 of them at existing commercial reactors (Catawba or McGuire), and performing post-irradiation examination at the Oak Ridge National Laboratory (ORNL) or ANL–W. This analysis included evaluation of transportation impacts.

The SPD EIS analyses indicate that environmental impacts from modification and routine operation of lead assembly fabrication facilities would be small; no LCFs would be expected in the general population from the postulated bounding design basis accident; nor would there be any traffic fatalities or LCFs expected from the associated transportation.

Among other decisions made in the ROD for the SPD EIS issued on January 11, 2000, DOE selected LANL as the site for lead assembly fabrication, to be followed by irradiation in U.S. commercial reactors and post-irradiation examination of selected fuel rods at ORNL.

II. Lead Assembly Fabrication in Europe

In May 2000, DOE determined that cost and schedule impacts and other programmatic considerations precluded lead assembly fabrication at LANL, and DOE discontinued related activities at LANL. DOE/NNSA is now proposing to use U.S. surplus plutonium from LANL to fabricate up to four lead assemblies in the existing Cadarache and MELOX facilities in France, and return those lead assemblies to the United States for irradiation. Consistent with decisions in the January 2000 ROD for the SPD EIS, the lead assemblies would be irradiated at Catawba, after which selected rods from lead assemblies would be transported to ORNL for post-irradiation examination.

As part of this proposed action, up to 140 kg of plutonium oxide from LANL would be transported by truck (one shipment consisting of three SST/Safeguards Transport [SGTs])[2] to a U.S. military port. The plutonium oxide would then be transferred to

[2] The SST/SGT is a specially designed component of an 18-wheel tractor-trailer vehicle. Although the details of the vehicle enhancements are classified, key characteristics are not, and include: enhanced structural supports and a highly reliable tie-down system to protect cargo from impact; heightened thermal resistance to protect the cargo in case of a fire; deterrents to protect unauthorized removal of cargo; couriers who are armed Federal officers that receive rigorous training and are closely monitored through DOE's Personnel Assurance Program; an armored tractor to protect the crew from attack, equipped with advanced communications equipment; specially designed escort vehicles containing advanced communications and additional couriers; 24-hour-a-day real-time monitoring of the location and status of the vehicle; and stringent maintenance standards.

Pacific Nuclear Transport Limited (PNTL) ships[3] at the port and transported across the Atlantic Ocean to Cherbourg, France (one shipment consisting of a two-ship convoy). The plutonium oxide would then be transferred to existing fabrication facilities in France (Cadarache and MELOX). After fabrication, PNTL ships would transport the lead assemblies and remaining archive and scrap material across the Atlantic Ocean back to the same U.S. military port. The lead assemblies would be transferred from the PNTL ships to SST/SGTs, and transported from the port to Catawba (one shipment consisting of four SST/SGTs). Archive (MOX pellets meeting fuel specifications) and scrap (out-of-specification MOX fuel pellets and remains from the pellet-grinding process) material would be transported from the port to LANL for storage (one shipment consisting of two SST/SGTs). Once the MOX facility becomes operational, these archive and scrap materials would be used as feed material during pellet production for MOX fuel that would be irradiated in existing U.S. commercial nuclear reactors.

DOE would obtain an export license from the NRC to transport plutonium oxide from the United States to France and would require a Certificate of Competent Authority from the Department of Transportation (based on the NRC review) for the two shipping containers (FS47 and FS65) required for this project. DOE submitted the export license application to the NRC in October 2003, which is currently under review. The application for certification of the FS47 was submitted on August 2003 and the FS65 is scheduled to be filed in December 2003.

[3] The PNTL ships are vessels specially designed to carry radioactive materials. Special safety features include: double hulls to withstand damage from a severe collision and remain afloat; enhanced buoyancy to ensure the ship stays afloat and maintains a stable attitude even in the most extreme circumstances; duplicate navigation, communications, electrical and cooling systems; dual propulsion systems; specialized fire fighting equipment; satellite navigation and tracking; and highly experienced crew members.

III. NEPA Process for Amending ROD

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 when it is unclear whether a supplement to an EIS is required, an SA be prepared to assist in making that determination. DOE/NNSA has recently prepared the *Supplement Analysis for the Fabrication of Mixed Oxide Fuel Lead Assemblies in Europe* (DOE/EIS-0229-SA3) in accordance with these CEQ and DOE Procedures. The conclusions of the SA are summarized in Section IV of this amended ROD.

IV. Summary of Impacts

The SA focuses on the potential impacts (from both routine operations and postulated accidents) of transportation of materials, including cargo-handling activities at three alternative U.S. military ports, and the effects on the global commons of ocean transport. This is because the domestic activities proposed, other than those associated with transportation, remain essentially unchanged compared to the manner in which they were analyzed in the *Storage and Disposition PEIS* and the SPD EIS.[4] The ports evaluated in

[4] The only additional action needed for lead assembly fabrication in France, beyond those evaluated in previous NEPA documents, is the transport of archive and scrap materials to LANL for storage.

the SA are Charleston Naval Weapons Station in South Carolina, and Yorktown Naval Weapons Station and Norfolk Naval Station in Virginia.

Based on the analyses in the SA, the proposed fabrication of lead assemblies in France, specifically, overland transportation of plutonium oxide from LANL to any of the three ports, ocean transport to France, the return shipment of fresh MOX fuel lead assemblies to the United States, and subsequent transport of the lead assemblies to Catawba and archive and scrap materials to LANL, would not result in impacts significantly different from or greater than those described in either the *Storage and Disposition PEIS* or the SPD EIS. Where there are differences in impacts, they are small changes to impacts that are themselves small. Therefore, the activities evaluated do not represent substantial changes in any proposed actions or result in any new circumstances relevant to environmental concerns.

Impacts additional to or different from those previously evaluated would result from transportation of materials to implement this activity, such as movement of archive and scrap materials from the port to LANL. Some of the origins and destinations, and hence the routes, would be different than previously evaluated, and the shipping containers, although also approved Type B packages, would be different. However, there would be fewer shipments of material than previously anticipated.

The risk to the maximally exposed individual from the postulated severe truck accident involving shipment of plutonium oxide powder is extremely low. The risk estimated in the SA, 1×10^{-8} latent cancer fatality, is less than the risk estimated in the SPD EIS,

3.5×10^{-8} latent cancer fatality. Although more plutonium oxide powder would be available for release from the accident in the SA in the extremely unlikely event of a transportation accident involving a breach of the Type B package, there are fewer shipments, so the frequency of occurrence, hence overall risk, is lower.

Implementation of the proposed action would involve a very small increase in the use of the port facilities, with no construction at or modification of these facilities. Only three trucks (SST/SGTs) would arrive at the port to deliver the plutonium oxide to the dock where two PNTL ships, traveling in a two-ship convoy, would receive the cargo. The lead assemblies, archive, and scrap material would be transported back to the United States, also in a two-ship convoy, and would leave the port in a total of six trucks. It is not expected that the minimal additional transportation and cargo handling activities would result in any impacts to the local environment.

The SA analyzes a severe accident that involves a collision between the PNTL ship and another ship with an ensuing fire, resulting in the release of plutonium oxide powder. The SA analyzed the identical accident scenario for each of the three proposed U.S. ports, which would result in a population accident risk of 1.2×10^{-7} LCF for Charleston NWS, 1.1×10^{-7} LCF for Naval Station Norfolk, and 3.5×10^{-8} LCF for Yorktown NWS. The resulting individual LCF risk to the maximally exposed individual is 3.5×10^{-11} for Charleston NWS, 4.3×10^{-11} for NS Norfolk, and 2.0×10^{-11} for Yorktown NWS. By way of comparison, the *Storage and Disposition PEIS* reported an earlier DOE study that estimated the likelihood of a maritime accident of sufficient severity to cause significant release of radioactive material to be in the range of 1.0×10^{-8} to 1.0×10^{-9} per port call.

The probability of an accident at sea involving the PNTL is very unlikely because of the limited number of shipments (one two-ship convoy each way) as well as the redundant modern navigation systems on the ship. The probability of a significant release is further reduced because of the ruggedness of the PNTL design and the Type B packages. If plutonium oxide were released to waters of the global commons, the *Storage and Disposition PEIS* reports that plutonium oxide would dissolve very slowly, and would combine with sediments rather than remaining dissolved in the ocean water.

Archive and scrap materials meeting the stabilization criteria of DOE Standard DOE-3013-2000 would be stored in two Type B shipping packages. There is very little risk of either an inadvertent criticality, or dispersion of plutonium in the event of an accident, because the plutonium would be incorporated in a non-dispersible ceramic material. The dose rate at 1 m from the packages would not exceed 0.1 mrem/hr, which would result in only minimal personnel exposure, and would not exceed the dose rate from storage of archive and scrap materials as anticipated in the SPD EIS, which is estimated to be 0.15 mrem/hr at 1m.

Both the *Storage & Disposition PEIS* (at Section G.1.2.6) and the SPD EIS (at Section L.6.5) acknowledged that a threat could be presented by sabotage or terrorism, and concluded that adequate safeguards are in place to meet such a threat. Although the likelihood of an attempted act of sabotage or terrorism occurring is not precisely knowable, the chance of success of any such attempt was judged to be very low, particularly in light of the transport methods to be employed by DOE in these shipments, which are designed specifically to afford security against sabotage or terrorism, as well as safety in the event of an accident. In preparing the SA, DOE

again considered sabotage or terrorism and determined that adequate safeguards remain in place to meet such threats.

Based on these analyses, DOE/NNSA has determined that the potential environmental impacts associated with lead assembly fabrication in France are within the impacts evaluated in the *Storage and Disposition PEIS* and the SPD EIS. Fabricating lead assemblies at existing MOX fuel fabrication facilities in France would not constitute significant new circumstances or information relevant to environmental concerns and bearing on the previously analyzed action or its impacts either in the United States or affecting the global commons. Therefore, pursuant to 10 CFR 1021.314(c), no additional NEPA analysis is required by DOE/NNSA in order to fabricate MOX fuel lead assemblies in France.

V. Response to Public Comments

DOE has received letters requesting that it prepare a supplemental EIS on the fabrication of lead assemblies in Europe. These requests convey concerns that public safety is put at risk by the proposal to fabricate MOX fuel lead assemblies in Europe. In particular, concerns have been expressed about the transportation of plutonium to and from Europe and the safety of the facilities in France. One letter received by DOE alleges that the proposal to fabricate lead assemblies in Europe has not been analyzed in an EIS, and therefore that an SA is not an appropriate document in which to analyze the proposal.

DOE disagrees with the last assertion. Fabrication of MOX fuel assemblies in Europe was specifically analyzed in the *Storage and Disposition PEIS.* In that evaluation, the transportation impacts of fabricating the entire 50 metric tons of surplus plutonium in Europe (as opposed to the current proposal to use up to 0.14 metric tons to fabricate four lead assemblies) was analyzed. The *Storage and Disposition PEIS* was issued for public review and comment in accordance with NEPA requirements. DOE/NNSA believes that this afforded the public ample opportunity to comment on fabrication of MOX fuel in Europe.

As the analysis presented in the SA makes clear, the potential environmental impacts associated with lead assembly fabrication in Europe are within the impacts evaluated in the *Storage and Disposition PEIS* and the SPD EIS. In this analysis, particular attention has been given to the impacts of transportation. As part of this analysis, the SA evaluates impacts of activities that affect the global commons outside the jurisdiction of any one nation. The SA does not address the impacts of the proposal in France, however, because DOE believes that it is neither required nor appropriate under NEPA to evaluate the safety or environmental impacts of an activity within and under the jurisdiction and control of another sovereign nation. Nevertheless, DOE wishes to emphasize that the transportation activities and facilities in France will be government-licensed and conducted and operated under strict standards. Accordingly, DOE/NNSA has concluded that preparation of a supplemental EIS is not needed.

VI. Amended Decision

DOE/NNSA will use U.S. surplus plutonium from LANL to fabricate up to four mixed oxide fuel lead assemblies in France on a one-time basis. The plutonium oxide will be transported overland from LANL to Charleston NWS, [5] and then shipped across the Atlantic Ocean to Cherbourg, France. The plutonium oxide will be fabricated at existing facilities in France (Cadarache and MELOX). After fabrication, lead assemblies and archive and scrap materials will be returned to the United States through Charleston NWS.

Consistent with decisions in the January 2000 ROD for the SPD EIS, these lead assemblies will be transported to Catawba[6] for irradiation, and selected rods from the irradiated lead assemblies will be transported to ORNL for post-irradiation examination. Archive and scrap materials will be stored at LANL. This decision will allow DOE to fabricate lead assemblies on a schedule compatible with DOE's MOX fuel fabrication schedule.

Issued in Washington, DC, this 7th day of Nov, 2003

C S Przybylek

Charles S. Przybylek
Chief Operating Officer
National Nuclear Security Administration

[5] However, if Charleston Naval Weapons Station is not available to support the schedule, either Yorktown Naval Weapons station or Naval Station Norfolk could be used for both the outbound and return shipments, after appropriate notifications and agreements have been made.

[6] The plants' refueling schedules determine availability for lead assembly use. Duke Power Company submitted a license amendment request to the NRC for Catawba. However, if needed, McGuire could also be used, provided a license amendment request was submitted and approved.