

# **FINDING OF NO SIGNIFICANT IMPACT**

## **Pit Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities**

**DOE/EA-1207**

**August 14, 1998**

**U.S. Department of Energy  
Office of Fissile Materials Disposition  
Washington, DC**

## U.S. DEPARTMENT OF ENERGY

Pit Disassembly and Conversion Demonstration Environmental Assessment and Research and Development Activities

**AGENCY:** U.S. Department of Energy

**ACTION:** Finding of No Significant Impact

**SUMMARY:** An environmental assessment (EA) has been prepared to assess potential environmental impacts associated with a U.S. Department of Energy (DOE) proposed action to test an integrated pit disassembly and conversion process on a relatively small sample of pits and plutonium metal at the Los Alamos National Laboratory (LANL) in New Mexico. The proposed action would involve performing work in a series of interconnected gloveboxes using remote handling, automation, and computerized control systems to minimize operator exposure where possible, increase safety, and minimize the amount of waste generated by the process. Based on the analysis in the EA and considering comments received, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA). Therefore, the preparation of an environmental impact statement (EIS) is not required. The EA also discusses other on-going research and development activities, which have already been reviewed pursuant to NEPA, and which concern pit disassembly and conversion, potential mixed oxide (MOX) fuel fabrication, and immobilization of surplus plutonium.

**ADDRESSES AND FURTHER INFORMATION:** Single copies of the EA and further information concerning the proposed action are available from: Mr. G. Bert Stevenson, NEPA Compliance Officer, Office of Fissile Materials Disposition (MD-4), U.S. Department of Energy, P.O. Box 23786, Washington, DC 20026-3786, (202) 586-5368.

For further information regarding the DOE NEPA Process, contact: Ms. Carol Borgstrom, Director, Office of NEPA Policy and Assistance, Office of Environment, Safety and Health, U.S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585, (202) 586-4600 or (800) 472-2756.

## SUPPLEMENTARY INFORMATION

**PURPOSE AND NEED:** DOE needs to develop the capability to disassemble surplus plutonium pits which are sealed in metallic shells. (A pit is a nuclear weapons component.) In order to develop this capability in a timely manner, safety and operational design information must be obtained from the actual disassembly of up to 250 representative pits and the conversion of the recovered plutonium to plutonium metal ingots and plutonium dioxide. The resulting experience would be used to supplement information developed to support the design of a full-scale disassembly and conversion facility should DOE decide to construct such a facility in the *Surplus Plutonium Disposition Environmental Impact Statement* (SPD EIS) Record of Decision (ROD).

**BACKGROUND:** DOE is implementing a long-term program to provide safe and secure storage of weapons-usable fissile materials, and to allow for the timely disposition of weapons-usable plutonium declared surplus to national security needs. The program's goal is to ensure that there is a high standard of security and accounting of these materials while in storage, and that the surplus plutonium is never used again in nuclear weapons.

In January 1997, DOE issued the ROD for the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (Storage and Disposition Final PEIS)*. In the PEIS ROD, DOE announced a decision to pursue a strategy to dispose of surplus United States plutonium that allows for two separate approaches: 1) immobilization of some (and potentially all) of the surplus plutonium; and 2) using some of the surplus plutonium as MOX fuel in existing commercial reactors. In that decision, DOE explained that the timing and extent to which either or both of the disposition approaches are ultimately deployed would depend in part on the follow-on SPD EIS, as well as technology development and research.

**PROPOSED ACTION:** In order to meet the purpose and need for this action, DOE proposes that an integrated Pit Disassembly and Conversion Demonstration take place at LANL's Plutonium Facility-4 in Technical Area-55. No new facilities are needed to support this demonstration; however, minor internal modifications would be made to existing facilities. These minor modifications, relating to the installation of new gloveboxes, would not involve worker exposure.

Implementation of this demonstration requires direct demonstration activities, such as pit bisection, and general support activities, such as receipt and storage of plutonium, that are typical support activities at LANL. These direct and support activities include the following:

- shipment of pits and non-pit, clean plutonium metal from offsite to LANL;
- receipt, unpackaging, and placement into storage of offsite pit and non-pit, clean plutonium metal;
- interim storage of pit and non-pit, clean plutonium metal, awaiting use in the demonstration;
- removal of any external pit features;
- bisection and disassembly of pits;
- processing pit hemishells to separate the plutonium from other materials;
- recasting the plutonium to metal ingots or converting it to plutonium dioxide;
- thermally processing the plutonium to remove gallium and other impurities;
- sealing the plutonium in an appropriate container for storage;
- decontaminating the container;
- sealing the decontaminated container in a second container;
- performing nondestructive assay on all components for material accountability purposes; and
- storing the resulting plutonium metal and plutonium dioxide until an ultimate disposition decision is made.

These direct and support activities are analyzed in this EA to capture the cumulative impact of this demonstration.

Technical Area-55 has historically performed plutonium processing activities similar to those required in this demonstration, and currently disassembles pits in a series of individual gloveboxes. Most of the plutonium, in the form of pits or metal, to be used in the demonstration would be taken from storage at LANL. Additional surplus pits may be shipped from the Pantex Plant near Amarillo, Texas, or the Rocky Flats Environmental Technology Site (RFETS) near Golden, Colorado, if there is a need to test additional types of pits. Plutonium in the form of metal would be shipped, if needed, from the Idaho National Engineering and Environmental Laboratory (INEEL) near Idaho Falls, Idaho; the Savannah River Site (SRS) near Aiken, South Carolina; or the Lawrence Livermore National Laboratory (LLNL) in Livermore, California. Highly enriched uranium would be recovered from some of the pits during the disassembly process and shipped to DOE's Oak Ridge Reservation (ORR) for storage in accordance with DOE's Y-12 Plant EA and the *Storage and Disposition Final PEIS*.

**ALTERNATIVES CONSIDERED:** In addition to the No Action Alternative, the EA also discusses the consideration of DOE sites other than LANL for this proposed action.

No Action: Under the No Action Alternative, an integrated pit disassembly and conversion line would not be demonstrated at LANL. Research related to these activities would continue to be performed in a series of individual gloveboxes. Information that would be generated as a result of the proposed Pit Disassembly and Conversion Demonstration (e.g., specifications for the main operating line and information needed to optimize the layout in terms of shielding, residence time in the gloveboxes, and distance between gloveboxes) would not be available under the No Action Alternative.

Consideration of Other DOE Sites: Other DOE sites were considered for this proposed action. The only other site, however, that was a potential alternative was LLNL because it is the only other DOE national laboratory with extensive, operating plutonium facilities that could be used to conduct the demonstration. LLNL was eliminated from further consideration because, among other things, LLNL's plutonium administrative limits are significantly lower and would restrict the proposed demonstration. Furthermore, because much of the plutonium that would be used in the demonstration is already located at LANL, it would need to be transported to LLNL. In addition, the capabilities at LANL were readily available during the timeframe in which DOE needed the demonstration to be conducted. Also, the majority of the gloveboxes that would be used in the demonstration are already at LANL. Consequently, there would be no need to decontaminate LANL gloveboxes for the express purpose of sending them to LLNL for use in the demonstration.

DOE also considered other potential disassembly and conversion options as alternatives to the proposed demonstration. However, none of the potential options are reasonable alternatives and, therefore, are not analyzed in detail in the EA. As one potential option, DOE considered a demonstration that would involve disassembling a fewer number of pits. However, this option would not encompass all of the types of surplus pits that would be involved in surplus plutonium disposition (immobilization or MOX fuel) or continued safe storage. As such, this option would not meet the purpose and need for the proposed demonstration and would not generate complete information. For conversion, DOE considered the potential alternative of converting only plutonium from pits, but not non-pit plutonium metal, to plutonium dioxide. Since this option would exclude plutonium metal, this option would not test and demonstrate conversion of all types of surplus plutonium material that may be subject to disposition under the MOX or immobilization approaches, would not generate complete information, and would not fully meet the purpose and need for the proposed demonstration. In addition, DOE considered converting plutonium to a metal form only. This option would not test and demonstrate conversion of pit plutonium to the oxide form most suitable for either immobilization or MOX fuel. Thus, this option would not generate complete information, and would not fully meet the purpose and need for the proposed action.

**ENVIRONMENTAL IMPACTS:** The environmental consequences of the proposed action are not expected to result in any appreciable risks to members of the public, workers, or the environment. The results of evaluations in key impact areas are summarized, as follows:

Water Quality Impacts - A small amount of process water would be used as part of the decontamination module. This process water, less than 100 liters (26 gallons) per year, would be handled in accordance with LANL's procedures for the treatment and disposal of liquid low-level waste. No increased release of radionuclides is expected by liquid pathways as a result of the proposed action.

Air Quality Impacts - As a part of this demonstration, it is estimated that small amounts of plutonium and americium would be released into the atmosphere. The maximally exposed individual (MEI) is estimated to receive an effective dose equivalent of 0.043 mrem per year from the demonstration and a total dose from all site operations of 4.3 mrem per year. There is not expected to be any airborne release of beryllium as a result of the demonstration. Any hazardous compounds released would be very small quantities related to routine cleaning operations connected with the demonstration.

Radiological Impacts - Total radiological releases would be significantly lower than either the U.S. Environmental Protection Agency (EPA) limit or past annual releases from LANL. The resulting maximum concentrations for radionuclides measured at the location of the MEI for the demonstration is estimated to be less than two percent of the EPA limit. Radiological impacts associated with the proposed action could increase LANL total site impacts by a small percentage (1.0 percent for the MEI, 1.3 percent for the surrounding population, and 1.3 percent for the average individual).

Under the proposed action, the estimated annual average dose to pit disassembly workers would be 750 mrem. The annual dose received by the plutonium workers who would perform these activities would increase by 35 person-rem to 90 person-rem. Doses to individual workers would be kept to minimal levels by current administrative policies, exposure monitoring, and the as low as reasonably achievable program.

Accident Impacts - The spectrum of plausible accidents and abnormal events associated with the proposed action was evaluated to identify those with the highest radiological impacts. The consequences of the hydride-oxidation (HYDOX) process accidents are more severe and therefore envelope process accident consequences. The hydrogen deflagration in the reactor vessel was identified as having the highest potential consequences to the public. A mitigated accident, where credit is taken for the building's ventilation system including high-efficiency particulate air filters and other features, would result in a source term of  $1.4 \times 10^{-8}$  grams of plutonium and a MEI dose at the site boundary, near the Royal Crest Trailer Court, of  $2.8 \times 10^{-8}$  rem. The likelihood of this accident occurring was categorized as "unlikely." Workers in the room at the time of the deflagration may be injured by flying glass and other missiles depending on their proximity to the deflagration.

Waste Management Impacts - The proposed action would generate transuranic waste, low-level waste, mixed low-level waste, and hazardous waste, but the volume generated is expected to be small. Therefore, the projected increase in the total waste volume for each category would have little or no impact on current LANL waste management processes and procedures.

Transportation Impacts - Under the proposed action, plutonium in the form of pits, might be shipped to LANL from RFETS or the Pantex Plant and in the form of metal from INEEL, SRS, or LLNL. Highly enriched uranium recovered from these pits would be shipped to ORR. The greatest risk to the public from these proposed shipments would be from a traffic accident involving the safe secure trailer (SST) or the escort vehicles and not from radiological exposure. If the demonstration is implemented, it is estimated that this proposed action would result in a risk to the public (either as a latent cancer or a traffic accident) of less than 5 chances in 1,000 of a fatality.

Socioeconomic Impacts - The proposed action would not affect employment at LANL because no additional personnel are anticipated to be required to support the demonstration. It is standard practice for workers at LANL to move from one project to another without any impact on the overall employment level. No significant socioeconomic effects, therefore, would be expected to result from the proposed action.

Environmental Justice Impacts - Implementation of the proposed action would pose no significant risk

to the general population including minority and low-income populations. No disproportionately high and adverse impacts on minority and low-income populations would result from implementation of the proposed action.

Other Environmental Impacts - The demonstration would be located within an existing building, Plutonium Facility-4. Therefore, there would not be any new construction that could affect floodplains, wetlands, biological resources, or cultural resources.

Cumulative Impacts - The *Draft Site-Wide Environmental Impact Statement on the Continued Operation of the Los Alamos National Laboratory (Draft LANL Site-Wide EIS)*, which is incorporated by reference in the EA, discusses the cumulative impacts of the proposed demonstration, ongoing LANL operations, potential expanded LANL operations, and other activities in the LANL region. As explained in the *Draft LANL Site-Wide EIS*, expanded operations at LANL, including the proposed demonstration and other activities, would result in an additional latent cancer fatality risk of about .0002 over the lifetime of the MEI.

No Action Alternative Impacts - Under the No Action Alternative, an integrated pit disassembly and conversion line would not be demonstrated at LANL. There would, therefore, be no change in the current environmental or health effects associated with work done in Plutonium Facility-4 and Technical Area-55, and these facilities would continue to operate as they do currently.

Transportation Risks Associated with the No Action Alternative - Under the No Action Alternative, pits or plutonium metal would not be shipped to LANL from INEEL, LLNL, RFETS, SRS or Pantex, and there would not be any highly enriched uranium recovered from these pits, so there would be no shipments of highly enriched uranium to ORR. However, DOE has committed to consolidate its inventory of weapons-grade plutonium, so the pits at RFETS would continue to be shipped to Pantex, where they would be stored pending a decision on their ultimate disposition in accordance with the ROD that would be issued after the SPD Final EIS is completed. The greatest risk to the public from this alternative would continue to be from a traffic accident involving the SST or its escort vehicles and not from radiological exposure.

**DETERMINATION:** Based on the analysis in the EA, and after considering the preapproval review comments, I conclude that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an EIS for the proposed action is not required.

Issued in Washington, D.C., this 14<sup>th</sup> day of August 1998.

(Signed)  
Andre I. Cygelman, Acting Director  
Office of Fissile Materials Disposition  
U.S. Department of Energy