Department of Energy
Washington, DC 20585

JUN 0 1 2005

The Honorable A. J. Eggenberger
Acting Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, D.C. 20004-2901

Dear Dr. Eggenberger:

This is in response to the November 7, 2003, letter from the Defense Nuclear Facilities Safety Board (Board) regarding the retrieval, storage, and disposal of the Hanford waste drums containing Pu-238. The initial response from the Department of Energy on February 3, 2004, provided historical data, challenges faced, and activities being done to provide a plan to safely retrieve and disposition the Pu-238 drums. A follow-up letter was sent on May 25, 2004, with a description of the processing paths and remaining actions and a commitment to continue to update the Board.

The plan for the Hanford Pu-238 drums is outlined in the enclosure. This plan provides a path that will minimize radiation exposure to workers, uses already existing processes with personnel already experienced in handling Pu-238, and requires little to no changes to existing regulatory documents.

If you have any further questions, please call me at (202) 586-7709 or Ms. Patrice M. Bubar, Deputy Assistant Secretary for Integrated Safety Management and Operations Oversight, at (202) 586-5151.

Sincerely,

Charles E. Anderson
Principal Deputy Assistant Secretary
for Environmental Management

Enclosure

Hanford ^{238}Pu Drum Disposition Plan

Background

Twelve drums of ^{238}Pu, produced in the old HB-Line at the Savannah River Site (SRS), were transferred to Hanford in 1966 for critical mass experiments. The critical mass experiments were never performed as a sufficient amount of material could not be made available and the material remained untouched in storage until 1980 when the 12 drums were placed in retrievable storage at the 218-W-4C burial ground. Each of the 12 drums contains between 225 and 525 grams of plutonium in an oxide form and generates up to 50 watts of decay heat. The plutonium oxide consists of a mixture of ^{239}Pu (65 wt %) and ^{238}Pu (18 wt %) with trace amounts of other plutonium isotopes including ^{241}Pu, with the wt % given as the as-measured-values in 1966. ^{241}Am has continued to buildup over the years of storage and could pose a radiation hazard to workers. The material has a plutonium content exceeding 85 weight per cent plutonium. Additionally, the condition of the package and any pressurization are unknown and may present other hazards to workers during retrieval and subsequent handling.

Alternative Evaluation Summary

The May 25, 2004 letter from Inés Triay to John T. Conway identified possible processing paths for the ^{238}Pu drums. One path provides for shipment of the drums to SRS to either dissolve and process the ^{238}Pu solution through the H-Canyon or to repackage and prepare the contents of the drums for shipment to Waste Isolation Pilot Plant (WIPP). The other path involves repackaging and preparing the ^{238}Pu at Hanford's Plutonium Finishing Plant for shipment to the WIPP. A possibility of using this material in the Los Alamos National Laboratories (LANL) weapon aging program was declined by LANL due to having an excess amount of better suited material.

Both alternatives to repackage and prepare the material for shipment to WIPP at either SRS or Hanford have been eliminated for the following reasons. Repackaging would require additional handling of the material, compared to dissolution, and would result in increased radiation exposure to personnel. The disposal of this material at WIPP requires compliance with section 310 of Public Law 108-137 (Energy and Water Appropriation Act). The law prohibits disposal at WIPP of waste containing greater than 20 percent by weight for the aggregate of any material category. The ^{238}Pu material contains greater than 85 percent by weight plutonium and a suitable material to aggregate it with to meet the law has not been identified. The alternative to repackage and prepare the material at either SRS or Hanford for shipment to WIPP was more costly (> $10M) than dissolving and processing through the H-Canyon. Additionally, the alternative to repackage and prepare the material at Hanford for WIPP shipment would have required additional regulatory documents (i.e., environmental permits, authorization basis modifications, and National Environmental Policy Act analysis), facility and equipment upgrades, extensive training of operators, and could potentially impact site closure.

The alternative to dissolve and process the material through the H-Canyon was selected as the path forward. This alternative as compared to the SRS WIPP alternative will result in the least radiation exposure to workers, is cost effective and an efficient use of SRS resources, uses existing processes, will be performed by personnel familiar with handling ^{238}Pu, requires little

to no changes to existing regulatory documentation, and has the fewest and most manageable uncertainties.

Path Forward

The path forward involves shipping the ^{238}Pu material to SRS for dissolving and processing through H-Canyon. One or two drums of material would be retrieved at the same time and loaded into the Radioisotope Thermoelectric Generator (RTG) Transportation System. The RTG Transportation System would be sent to SRS and unloaded. After unloading is complete, the RTG transportation system would be returned to Hanford for the next shipment. The unloaded 55-gallon drum would be placed inside a contamination control containment structure for unpackaging. The contents would be introduced into Phase 1 Scrap Recovery, further unpackaged, and the ^{238}Pu oxide dissolved using an established Pu oxide flowsheet.

Supporting Activities

The following activities are being done in support of the ^{238}Pu disposition path:

1. A National Environmental Policy Act (NEPA) analysis was performed on the disposition path and identified that a Transportation Categorical Exclusion would be required to ship the ^{238}Pu to SRS. The Transportation Categorical Exclusion is complete and has been issued. All required NEPA documents are in place to support this disposition path.
2. An initial in-field inspection will be performed prior to retrieval. This activity will verify the integrity of the packages or identify additional controls that may be required during retrieval. Radiological dose surveys, radiological contamination surveys, visual inspections, thermal scans, and other activities such as radiography, as warranted, will be performed.
3. The use of the RTG Transportation System, support personnel for loading and unloading, and security escorts will be required. Procedure revisions and dry runs for the loading and unloading of the ^{238}Pu material using the RTG Transportation System will be required and will be performed by the Idaho National Laboratory (INL). Coordination and prioritization with the Office of Nuclear Energy and the Office of Secure Transport will determine when the material is retrieved and shipped to SRS. All of the shipments are being planned to occur in 2006, but are subject to change based on other national priorities. Impacts from a new SRS contract will have to be assessed and incorporated into the planning documents if shipments and processing are delayed beyond 2006.
4. Both Hanford and SRS should communicate the disposition path with appropriate stakeholders.
5. The RTG Transportation System Certificate of Compliance and Safety Analysis will require modification to allow transportation of 55-gallon drums and material in its current form. A small modification will be required to secure the drum within the RTG cask. The modification will be performed by INL.
6. As required, changes to SRS and Hanford procedures and documents, training, equipment upgrades/security preparations will be performed to assure safe retrieval and processing of the material. Additionally, a material shipper/receiver agreement to support shipment will be issued.