Interim Action Determination

Processing of Plutonium Materials in H-Canyon at the Savannah River Site

The Department of Energy (DOE) is preparing the Surplus Plutonium Disposition Supplemental Environmental Impact Statement (SPD SEIS, DOE/EIS-0283-S2). DOE is evaluating alternatives for disposition of non-pit plutonium that is surplus to the national security needs of the United States. Although the Deputy Secretary of Energy approved Critical Decision 1A, *Revised Preferred Alternative*, in 2008, the Department continues to evaluate alternative disposition paths for surplus plutonium materials and options for supplying feed material to the Mixed Oxide Fuel Fabrication Facility (MFFF) which will manufacture mixed oxide (plutonium and uranium) fuel for commercial nuclear power plants. Adoption of certain of these alternative disposition paths, such as preparing some of these materials for disposal as transuranic (TRU) waste, could significantly alter the scope of the SPD SEIS and result in substantial delays in issuing the Draft and Final SPD SEIS. At present, DOE anticipates that the earliest completion date for the SPD SEIS would be some time in Fiscal Year 2011.

In order to disposition certain materials that are not suitable for MFFF feed or disposal as TRU waste and conserve available storage space for plutonium materials, DOE has a need to process up to 420 kilograms of Plutonium-239 (Pu-239) material through H-Canyon[1]. DOE evaluated the environmental impacts of processing of plutonium and uranium materials in the Interim Management of Nuclear Materials EIS (DOE/EIS-0220, October 1995).

DOE regulations for implementing National Environmental Policy Act (NEPA) at Title 10 Code of Federal Regulations (CFR) Parts 1021.104 and 1021.211 describe requirements for allowable interim action concerning a proposal that is the subject of an ongoing project-specific EIS. No action concerning such a proposal may be taken if the action would: (1) have an adverse environmental impact, or (2) limit the choice of reasonable alternatives.

Processing of Plutonium Materials

DOE proposes to process up to 420 kilograms of plutonium materials in H-Canyon for vitrification in DWPF. These materials consist of up to 320 kilograms of plutonium-uranium materials, comprised of plutonium-enriched uranium mixtures (Pu-EU) and plutonium-contaminated highly enriched uranium (Pu-contaminated HEU), and up to 100 kilograms of fuel-grade plutonium metal that are not suitable for MFFF feed or disposal at the Waste Isolation Pilot Plant (WIPP).

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[1] In November, 2008 DOE determined that processing 180 kilograms of plutonium materials that would come from the surveillance program required by DOE Standard 3013, *Stabilization, Packaging, and Storage of Plutonium Materials,* is an allowable interim action in accordance with DOE's NEPA regulations. Thus, DOE would process about 600 kilograms or 10 percent of the total amount of plutonium that might be processed in H-Canyon following completion of the SPD SEIS.

The Pu-EU and Pu-contaminated HEU, and fuel grade metal would be dissolved and the resultant solutions processed to separate uranium for the HEU Blend Down Program. The remaining plutonium solution would transfer directly to preparation tanks to be incorporated in sludge batches (this is, waste that does not contain cesium, or salt waste) in preparation for processing in the DWPF. Sludge batches would be combined with borosilicate glass, vitrified, and poured into stainless steel DWPF canisters for storage at the Savannah River Site (SRS) pending disposal in a repository. Processing up to 420 kilograms of Pu-EU and Pu-contaminated HEU, and fuel grade metal would result in up to four DWPF canisters in addition to the approximately 6,000 that would be generated without processing Pu-EU and Pu-contaminated HEU, and fuel grade metal.

Starting the processing of plutonium materials, prior to completion of the SPD SEIS, presents significant advantages over delaying processing until the SPD SEIS is completed. Because DWPF will continue to process sludge batches during this period, DWPF feed that could be used for vitrifying plutonium materials would be lost if processing was delayed. Plutonium materials could be incorporated in the DWPF process stream while the blending chemistry is optimal, ensuring that safe plutonium loading limits are met.

Environmental Impacts

In the Interim Management of Nuclear Materials (IMNM) EIS (DOE/EIS-0220, October 1995) DOE evaluated the environmental impacts of alternatives for stabilizing a variety of plutonium and uranium materials. One alternative evaluated was Processing for Storage and Vitrification in the DWPF, the same process currently proposed for up to 420 kilograms of Pu-EU and Pu-contaminated HEU, and fuel grade metal. Only minor modifications of existing equipment would be required to process the materials, and processing would result in no emissions or waste streams that were not identified in the IMNM EIS. In 1997 (62 Federal Register 61099, November 14, 1997) DOE added Processing for Storage and Vitrification in the DWPF to the suite of alternatives previously selected (60 Federal Register 65300, December 12, 1995) to stabilize plutonium and uranium stored in vaults at SRS. DOE evaluated the impacts of this alternative in the IMNM EIS. For example, DOE determined that processing all of the plutonium and uranium stored in vaults for vitrification in DWPF would result in 0.07 latent cancer fatalities (or zero) in the offsite population, and 0.11 latent cancer fatalities (or zero) in the worker population. These are conservative estimates; therefore, processing the much smaller inventory comprising Pu-EU and Pu-contaminated HEU, and fuel grade metal, would not result in adverse environmental impacts.

Choice of Reasonable Alternatives

In the SPD SEIS, DOE is evaluating alternatives for disposition of up to 13 metric tons of surplus non-pit plutonium. Alternatives include processing in H-Canyon for vitrification in DWPF, preparing the plutonium for use as feedstock for the MFFF, and vitrification in a small facility that would be installed in K-Area at SRS. An additional alternative,

preparing plutonium material for disposition as TRU waste at the WIPP in New Mexico is also under consideration. In the SPD SEIS, DOE is considering processing up to 6 metric tons of plutonium in H-Canyon for vitrification in DWPF; early processing of 420 kilograms, or about 7 percent of the total that might be processed in H-Canyon, would not affect the choice of alternatives for the remaining 93 percent of the material that might be processed in H-Canyon or in a small scale vitrification facility in K-Area. In combination with 180 kilograms of surveillance plutonium, a total of 600 kilograms, or 10 percent of the 6 metric tons considered in the SPD SEIS, would be processed prior to a Record of Decision (ROD).

Conclusion

DOE has reviewed the environmental analysis relevant to processing Pu-EU and Pu-contaminated HEU materials, and fuel grade metal in H-Canyon for vitrification in DWPF. DOE believes the analyses in the IMNM EIS are still representative of the impacts of processing these materials. Therefore, no adverse environmental impacts would result from processing Pu-EU and Pu-contaminated HEU materials, and fuel grade metal in H-Canyon for vitrification in DWPF. In addition, because of the small quantities involved relative to the 6 metric tons of plutonium materials being evaluated for processing in H-Canyon in the SPD SEIS, processing this material would not affect DOE's ultimate selection of disposition alternatives. DOE would realize significant advantages by processing these materials in the near-term rather than waiting until a ROD for the Surplus Plutonium Disposition Supplemental EIS is completed. Therefore, this action is clearly an allowable interim action in accordance with DOE regulations for implementing NEPA at 10 CFR 1021.104 and 1021.211.

Approved at the Savannah River Site, Aiken, South Carolina, September 25, 2009

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