Interim Action Determination

Processing of Plutonium Materials from the DOE Standard 3013 Surveillance Program 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 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 2010.

In order to carry out the requirements of the surveillance program established by DOE Standard 3013, ensure worker safety, and conserve available storage space for plutonium materials, DOE has a need to process up to 180 kilograms of plutonium-239 (Pu-239) material from the surveillance program through H-Canyon in Fiscal Years 2009, 2010, and 2011. DOE described processing of plutonium materials from the surveillance program in H-Canyon as a possible alternative to storage in the Environmental Assessment for the Safeguards and Security Upgrades for Storage of Plutonium Materials at the Savannah River Site (DOE/EA-1538, December 2005). DOE evaluated the environmental impacts of processing of plutonium materials in the Interim Management of Nuclear Materials EIS (DOE/EIS-0220, October 1995).

DOE regulations for implementing NEPA, at 10 CFR 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 Surveillance Materials

DOE proposes to process approximately 180 kilograms of plutonium materials that would be removed from 3013 containers as required by the surveillance program for plutonium stored in compliance with DOE Standard 3013, Stabilization, Packaging, and Storage of Plutonium-Bearing Materials. DOE Standard 3013 mandates a surveillance program involving destructive and non-destructive evaluations to ensure stored plutonium materials continue to meet the safety-based requirements of DOE Standard 3013. At the present time DOE has no capability to repackage these materials in accordance with the 3013 standard and no appropriate storage space for material not packaged in accordance with the 3013 standard. Most of this material would likely meet

the specifications for feed for the MFFF. However, safe storage space in that facility, or the capability to use the material as feed, will not be available until the MFFF becomes operational, currently scheduled for 2016. Therefore, in order to avoid costs associated with constructing and operating restabilization capability and storage space for a relatively small quantity of material (three percent of the six metric tons considered in the SPD SEIS) DOE would process this material in H-Canyon for vitrification in the DWPF. This action is needed to allow DOE to continue to comply with the safety-based requirements of the surveillance program mandated by DOE Standard 3013.

Plutonium would be dissolved, and the resultant plutonium-bearing solutions sent to liquid radioactive waste tanks for incorporation in sludge batches (this is, waste that does not contain cesium, or salt waste) in preparation for processing in the Defense Waste Processing Facility. Sludge batches would be combined with borosilicate glass and poured into stainless steel DWPF canisters for storage at SRS pending disposal in a geologic repository. Appropriate criticality controls would be applied and plutonium quantities would be such that the plutonium quantity in the DWPF glass would not exceed that specified in DOE's license application for disposal in the Yucca Mountain Repository. No additional DWPF canisters would be generated by processing up to 180 kilograms of surveillance program plutonium.

Processing plutonium materials in fiscal years 2009, 2010, and 2011 presents significant advantages over delaying until completion of the SPD SEIS. 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 bearing 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 materials, including Pu-239 materials. One alternative evaluated was Processing for Storage and Vitrification in the DWPF, the same process currently proposed for approximately 180 kg of surveillance material. No equipment upgrades or new processes would be required to process the Pu-239 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 Pu-239 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 surveillance material 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 Mixed Oxide Fuel Fabrication Facility, and vitrification in a small facility that would be installed in K-Area at the Savannah River Site. In the SPD SEIS, DOE is considering processing up to six metric tons of plutonium in H-Canyon for vitrification in DWPF; early processing of 180 kilograms, or about three percent of the total that might be processed in H-Canyon, would not affect the choice of alternatives for the remaining 97 percent of the material that might be processed in H-Canyon or in a small scale vitrification facility in K-Area.

Conclusion

DOE has reviewed the environmental analysis relevant to processing Pu-239 materials 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 surveillance material in H-Canyon for vitrification in DWPF. In addition, because of the small quantities involved relative to the six metric tons of plutonium materials being evaluated 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 Record of Decision 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.

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