Amended Interim Action Determination

Disposition of Plutonium Materials from the Department of Energy (DOE) Standard 3013 Surveillance Program at the Savannah River Site (SRS)

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. 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. DOE issued a revised Notice of Intent for the SPD SEIS on July 19, 2010 (75 Federal Register [FR] 41850). At present, DOE anticipates that the earliest completion date for the SPD SEIS would be late in Calendar Year (CY) 2011.

In December 2008, the Manager of the Savannah River Operations Office approved an Interim Action Determination, *Processing of Plutonium Materials from the DOE Standard 3013, Surveillance Program in H-Canyon at the Savannah River Site.* This Amended Interim Action Determination amends the 2008 Determination by adding a second alternative, disposition as transuranic (TRU) waste at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. The 2008 Determination is attached to this Amended Interim Action Determination.

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 (kg) of plutonium-239 (Pu-239) material from the surveillance program through H-Canyon in Fiscal Years (FY) 2009, 2010, and 2011. Through February 2011, DOE has processed approximately 95 kg of this surveillance material. 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 (SRS)* (DOE/EA-1538, December 2005). DOE evaluated the environmental impacts of processing of plutonium materials in the Interim Management of Nuclear Materials (IMNM) EIS (DOE/EIS-0220, October 1995). In 2003, DOE amended the Record of Decision (ROD) for the IMNM EIS to dispose of some plutonium materials as TRU waste, based on the analysis found in DOE/EIS-0217, *SRS Waste Management (WM) EIS* (July 1995).

DOE regulations for implementing the 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 Surveillance Materials

DOE proposes to dispose of approximately 180 kg 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 DOE Standard 3013 and no appropriate storage space for material not packaged in accordance with the DOE Standard 3013. 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 CY 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 either process this material in H-Canyon for vitrification in the Defense Waste Processing Facility (DWPF) or package it for disposal as TRU waste at WIPP. 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. As of February 2011, DOE has disposed of approximately 95 kg of this material by processing in H-Canyon for vitrification in the DWPF.

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 DWPF. 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 kg of surveillance program plutonium.

Alternatively, DOE would prepare plutonium for disposition at WIPP. Containers would be opened in the K-Area Interim Surveillance Facility, and samples would be sent to the Savannah River National Laboratory for analysis. The remaining material from the sampled cans, which would be the majority of the contents of the can, would be repackaged and sent to the HB-Line Facility. Inside gloveboxes in HB-Line, the cans would be opened and the plutonium divided into less than 175 gram quantities, mixing the plutonium with Termination of Safeguards Material, packaging the mixture in cans, and placing the cans in pipe overpack containers. The pipe overpack containers would be sent to H-Canyon and staged for shipment to E-Area at SRS where they would be certified for shipment to WIPP. Certified packages would be loaded into TRU waste package transporter (TRUPAC-II) shipping containers and transported by truck to WIPP for disposal. Preparing and packaging the remaining approximately 85 kg of plutonium from the surveillance program would result in about 115 cubic meters of TRU waste and require 15 shipments to WIPP for disposal.

Dispositioning plutonium materials in FY 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. DOE would make minor modifications to two glovebox panels in the HB-Line Facility to allow for efficient movement of cans in and out of the glovebox. SRS and WIPP would work together to establish a shipment schedule that would accommodate other scheduled TRU waste shipments to WIPP.

Environmental Impacts

In the 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 FR 61099, November 14, 1997), DOE added *Processing for Storage and Vitrification in the DWPF* to the suite of alternatives previously selected (60 FR 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.

The surveillance program plutonium that could be disposed of as TRU waste would represent a small fraction of the SRS TRU waste generated, stored, and dispositioned to date. The potential impacts of disposition would not exceed those described for TRU waste treatment and storage in Table 2-17 of the SRS WM EIS. In 2003, DOE amended the ROD for the IMNM EIS to dispose of some plutonium materials, without further processing, as TRU waste, based on the analysis found in DOE/EIS-0217, SRS WM EIS (July 1995). DOE estimated that about 10 cubic meters of TRU waste would be disposed as a result of that action, compared to 130 cubic meters of TRU waste DOE estimated could result from processing rather than disposing of the material. Similarly the surveillance plutonium materials could be disposed of without further processing, and would result in 115 cubic meters of TRU waste for disposal. Therefore, disposal of surveillance plutonium as TRU waste would not result in adverse environmental impacts.

Choice of Reasonable Alternatives

In the SPD SEIS, DOE is evaluating alternatives for disposition of up to 6 metric tons of surplus non-pit plutonium. Alternatives include processing for vitrification in DWPF, preparing the plutonium for use as feedstock for the MFFF, vitrification in a small facility that would be installed in K-Area at the SRS, and packaging for shipment to WIPP and disposal as TRU

waste[1]. Early processing of 180 kg, or about three percent of the total that might be processed in H-Canyon, or preparing approximately 85 kg for disposal as TRU waste, would not affect the choice of alternatives for the remaining 97 percent of the material that might be dispositioned using the alternatives evaluated in the SPD SEIS.

Conclusion

DOE has reviewed the environmental analysis relevant to processing plutonium materials from the DOE-STD-3013 surveillance program in H-Canyon for vitrification in DWPF and for disposal as TRU waste in WIPP. DOE believes the analyses in the IMNM EIS and the SRS WM 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 or from disposal as TRU waste in WIPP. In addition, because of the small quantities involved relative to the 6 metric tons of plutonium materials being evaluated in the SPD SEIS, disposal of this material would not affect DOE's ultimate selection of disposition alternatives. DOE would realize significant advantages by disposing of these materials in the near-term rather than waiting until a ROD for the SPD SEIS 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, March 30, 2011

David C. Moody

Dr. David C. Moody, Manager
Savannah River Operations Office

[1] The SPD SEIS will evaluate the disposal of 6 metric tons of plutonium using each alternative; DOE may choose to dispose of some fraction of the 6 metric tons using either alternative.

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.

Approved at the Savannah River Site, Aiken, South Carolina, December 8, 2008

FOR

Jeffrey M. Allison, Manager
Savannah River Operations Office