DOE/EIS-0310-SA-01

Supplement Analysis for the Programmatic Environmental Impact Statement (PEIS) for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility

Introduction and Background

The Department of Energy (DOE), pursuant to the National Environmental Policy Act (NEPA), issued the Final PEIS for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility (Nuclear Infrastructure (NI) PEIS, DOE/EIS-0310) in December 2000. Under the Authority of the Atomic Energy Act of 1954, the DOE's missions include: (1) producing isotopes for research and applications in medicine and industry; (2) meeting nuclear material needs of other Federal agencies; and (3) conducting research and development activities for civilian use of nuclear power. In the NI PEIS, DOE evaluated potential enhancements to its nuclear infrastructure that would allow it to meet these responsibilities over the next three to four decades.

To meet its responsibilities to the National Aeronautics and Space Administration and national security missions, DOE produces plutonium-238 (Pu-238) that is used in production of general purpose heat sources and electrical power systems. The starting feed material for production of Pu-238 is neptunium-237 (Np-237). In the past, Pu-238 was produced by irradiating Np-237 in the reactors located at the DOE's Savannah River Site (SRS). After shutdown of these reactors, DOE has continued to store Np-237 at SRS. In the NI PEIS, DOE evaluated shipment of this stored Np-237 (after conversion to neptunium oxide, NpO_2, a stable form) to another site with irradiation capability for storage until needed for production of Pu-238. The sites evaluated included the Oak Ridge Reservation (ORR) in Tennessee, which has the High Flux Isotope Reactor (HFIR) and the Idaho National Engineering and Environmental Laboratory (INEEL), which has the Advanced Test Reactor (ATR). In the Record of Decision (ROD) for the NI PEIS, published in the Federal Register on January 26, 2001, DOE decided to ship Np-237 (as neptunium oxide, NpO_2) to the Radiochemical Engineering Development Center (REDC) of the Oak Ridge National Laboratory (ORNL) on the ORR for irradiation in HFIR at ORNL and in ATR at INEEL.

Proposed Action and the Basis for Change

Subsequent to the terrorist attacks of September 11, 2001, DOE has instituted enhanced security measures for all Special Nuclear Materials (SNM). Np-237 is categorized as special nuclear material that requires enhanced security measures. However, REDC located at ORNL, the site selected in ROD for storage of NpO_2, does not meet the requirements for storage of SNM. The security infrastructure at ORNL would have to incur costly upgrades to meet such security requirements. DOE has, therefore, examined other locations that meet the security requirements for storage of SNM and can provide

for storage of NpO_2. DOE has identified the Argonne National Laboratory (ANL-W) site in Idaho that has the enhanced security infrastructure, has other similar materials in storage, and can provide for storage of NpO_2. Therefore, DOE is proposing to change the storage location for NpO_2 from REDC at ORNL to the Fuel Manufacturing Facility at ANL-W.

This Supplement Analysis (SA) was prepared in accordance with the Council on Environmental Quality (CEQ) and DOE regulations implementing NEPA. CEQ regulations at Title 40, Section 1502.9(c) of the Code of Federal Regulations [40 CFR 1502.9 (c)] require Federal agencies to prepare a supplement to an EIS when an agency makes substantial changes in the proposed action that are relevant to environmental concerns or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE regulations at 10 CFR 1021.314(c) direct that when it is unclear whether a supplement to an EIS is required, an SA be prepared to determine whether an EIS should be supplemented; a new EIS should be prepared; or no further NEPA documentation is required. This SA analyzes whether this proposed change in transportation and storage (change of NpO_2 storage location from ORNL to ANL-W) is substantial relevant to environmental concerns and whether a supplement to the NI PEIS should be prepared.

Analysis of the Relevant Environmental Concerns

Among all of the alternatives analyzed in NI PEIS, none of NpO_2 transportation and storage alternatives was found to have significant environmental impacts. The relevant environmental concerns for the proposed change of storage location from ORNL to ANL-W are the transportation of NpO_2 from SRS to ANL-W and normal and accidental radiological consequences to the public and the workers.

The proposed plan calls for the shipment of approximately 70 drums containing small cans of NpO_2 to ANL-W beginning in FY 2004 and ending in FY 2006. For shipment from SRS, one to three (depending on mass of neptunium, no more than 6 kg) crimp-sealed can(s) of NpO_2 will be placed inside a 35-gallon shipping drum. The drums will be transported to ANL-W where the material will be stored until needed for Pu-238 production.

Alternatives evaluated in the NI PEIS for storage of NpO_2 included the Fluorinel Dissolution Process Facility (FDPF) and the CPP-651 storage vault at INEEL. The impacts due to transportation and storage at ANL-W would be virtually the same as these facilities analyzed in the NI PEIS. ANL-W is located 15 miles to the east of the FDPF and CPP-651. Impacts due to transportation of NpO_2 from SRS, for both normal and accident conditions, will be the same or slightly lower than those analyzed for FDPF and CPP-651 because the transportation route from SRS to the ANL-W storage facility is approximately 15 miles shorter. The proposed use of the Fuel Manufacturing Facility at ANL-W is very similar to FDPF and CPP-651. As the three facilities are in a remote location, impacts due to air emissions from both normal and accident conditions will be virtually the same.

Radiological dose rates to workers from the management (off-loading and storage) of the NpO_2 will not be significantly different for the alternatives since the SNM facilities have similar vaults and management practices.

Table 1. Impacts on Occupational and Public Health and Safety for Alternative 2

Options	Radiological Risks from Normal Operations over 35 Years			Radiological Risks from Accidents over 35 Years			Hazardous Chemical Risks from Normal Operations over 35 Years	
	Maximally Exposed Individual (LCF Risk)	Population (LCF)	Workforce (LCF)	Maximally Exposed Individual (LCF Risk)	Population (LCF)	Workforce (LCF)	Maximum Cancer Risk	Hazard Index
Alternative 2: Use Only Existing Operational Facilities								
8 FDPF/ CPP-651 at INEEL	$4.6x10^{-12}$	$6.7x10^{-8}$	0.17	$1.5x10^{-5}$	0.03	$3.5x10^{-4}$	$1.3x10^{-7}$	0.0031

LCF – Latent Cancer Fatality

Table 2. Impacts of Transportation on Occupational and Public Health and Safety for Alternative 2

Options	Transportation Distance (millions of kilometers) *	Incident-Free Transportation over 35 Years			Transportation Accidents over 35 Years	
		Public: Radiological (LCF)	Workers: Radiological (LCF)	Public: Vehicle Emissions (fatalities)	Public: Radiological (LCF)	Public: Vehicle Collisions (fatalities)
Alternative 2: Use Only Existing Operational Facilities						
8 FDPF/ CPP-651 at INEEL	0.99	0.052	0.002	0.0030	$4.4x10^{-5}$	0.024

LCF-Latent Cancer Fatality

* - These distance figures are for the entire proposed action in the NI PEIS which includes neptunium oxide storage, target fabrication, irradiation, target processing, and Pu-238 production. The actual transportation distance from the Savannah River Site to storage at REDC in Tennessee (Option 7) is less than that for transportation to storage in Idaho at ANL-W or FDPF/CPP-651(Option 8).

Potential normal and accident radiological impacts for FDPF and CPP-651 (Alternative 2, Option 8 in NI PEIS) are discussed in 4.4.8 of NI PEIS. The impacts are insignificant and are listed in Table 1. Potential transportation impacts for shipment to FDPF and CPP-651 at INEEL (Alternative 2, Option 8 in the NI PEIS) are discussed in Sections 4.4.8 of NI PEIS. The impacts are insignificant and are listed in Table 2.

The proposal to store NpO_2 at ANL-W has been examined for seismic safety, criticality safety, radiation safety, etc. through the Un-reviewed Safety Questions evaluation process. The current plan is to store the NpO_2 exclusively in the security category I vault in the FMF at ANL-W. Special criticality-safe racks are planned for the NpO_2. The NpO_2 would be removed from its DOE 9975 shipping package inside the Fuel Manufacturing Facility, then weighed, inspected and placed in the long-term storage racks.

Determination

Impacts of shipment of NpO_2 from SRS to storage locations at ORNL, INEEL, and Hanford sites were analyzed in NI PEIS. The new proposed storage site, ANL-W, is located close to FDPF and CPP-651 at INEEL. By proximity of location, similar distance for shipment, and similarity of operations, it is inferred that the impacts of shipment to and storage at ANL-W would also be similar to those assessed for FDPF and CPP-651. As mentioned above, the impacts were assessed to be insignificant for all alternatives and options evaluated in NI PEIS. Therefore, the proposed changes in storage location for NpO_2 from REDC to ANL-W at the Idaho site do not constitute substantial changes in the proposed action. There are no significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. DOE has, therefore, determined that for the proposed change of storage location, no additional NEPA review would be required.

Supplement Analysis approved.

Supplement Analysis not approved; additional NEPA review required.

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William D. Magwood, IV, Director
Office of Nuclear Energy, Science
and Technology