



August 12, 1997

Mr. Howard Canter
Acting Director
Office of Fissile Materials Disposition
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585

**Comments of the Nuclear Control Institute
on DOE's Program Acquisition Strategy**

Dear Mr. Canter:

We are writing to comment, on behalf of the Nuclear Control Institute, on the Department of Energy's *Program Acquisition Strategy for Obtaining Mixed Oxide (MOX) Fuel Fabrication and Reactor Irradiation Services (PAS)*. The July 17 draft PAS raises many troubling issues and ignores several others.

Solicitation of bids. It is important to emphasize at the outset that DOE is committed to a two-year study period in which both the reactor and immobilization options are to be fully evaluated contemporaneously to eliminate uncertainties and provide all cost and technical information available on both options. This approach was announced by former Energy Secretary Hazel OpLeary when she released the final plutonium disposition PEIS in December 1996, in consultation with ACDA Director John Holum (in return for ACDA's withdrawal of its formal objections to the MOX/immobilization "hybrid approach"), and the types of studies and reviews needed are identified in the Record of Decision.¹ The two-year study period is intended to permit acquisition of all relevant data, including reliable cost estimates for both MOX and immobilization, for a 1998 Presidential decision on specific disposition technology alternatives.²

We are concerned, therefore, that there is apparently no parallel Program Acquisition Strategy for immobilization. Paper studies are underway, but we are not aware of any DOE plans to issue a Request for Proposals or to solicit bids for immobilization work. At the Argonne workshop, DOE should explain how it hopes to analyze completely and contemporaneously the two options in a "dual-track approach," absent the kind of cost information that it intends to acquire through a bidding process in the case of MOX but not, apparently, immobilization.

We also question why the bidding process, if it is to be done at this stage, should not be open to prospective providers of MOX and immobilization services. The Record of Decision makes clear that immobilization can do the entire job of disposing of surplus plutonium, stating that "DOE reserves the option of using the immobilization approach for all of the surplus plutonium."³ By opening the bidding process to both MOX and immobilization providers, DOE would obtain a fair comparison of costs and ensure that a dual-track approach will, in fact, be followed. Westinghouse-Savannah River, BNFL and Cogema, for example, are in a position to bid on the needed elements of a plutonium immobilization programs, such as a can-in-a-canister facility required for vitrification of plutonium with highly radioactive wastes in the Defense Waste Processing Facility (DWPF) at SRS.

Allocation of disposition costs. Regardless of the technology mix, plutonium disposition will be very expensive, and one essential question is how these costs will be allocated between the federal government and private industry engaged in disposition. In the case of MOX, such cost allocation

is extremely unclear. The PAS specifies no limits on federal government payments to nuclear utilities participating in a MOX disposition program, other than to state that reduced capacity factors that might result from changes in cycle lengths between fuel reloads would not be compensated [PAS, A-11].

NCI agrees that DOE should not compensate utilities for reduced capacity factors. Utilities should also be fully responsible for the cost of the low-enriched uranium fuel reserve capacity specified by the PAS [PAS, A-10]. Further, any additional costs that arise due to mismanagement on the part of a nuclear-electric utility that chooses to use MOX fuel (such as violations of NRC safety regulations or plant shutdowns due to operator error or mishandling of MOX fuel) should be borne by the utility. DOE should be prepared at the Argonne workshop to articulate criteria for allocation of disposition costs between government and industry.

A number of additional operation costs are likely to arise from the use of MOX fuel that have a bearing on the issue of cost allocation. The PAS specifies that initial MOX loadings will be limited to fuel types already qualified for use in European reactors [PAS, A-9]. These fuel types, for example in France, have limitations on burn-up that are considerably below the average burn-ups of U.S. commercial reactors. The PAS specifies that "the reactor owner should avoid MOX fuel cycle designs which require that the MOX fuel be depleted to significantly higher burnups than the experience base in Europe." [PAS, A-11] As a result, use of MOX fuel may force U.S. utilities to switch to shorter operating cycles, increasing reactor outages and significantly increasing costs for replacement power. Only those utilities willing to bear these costs should be invited to bid for participation in a MOX disposition program.

Other costs to utilities that are likely to lead to requests for subsidies include those necessary to compensate utilities for operation of plants that, for economic reasons, they might not otherwise operate. Would DOE subsidize the year-round operation of the WNP-2 reactor, for example, which normally operates only intermittently due to seasonally plentiful hydroelectricity in the northwest, if the reactor were irradiating MOX as part of the disposition program? These various subsidies could amount to hundreds of millions, if not billions, of dollars, and should not be paid by the federal government. The PAS should specify each of these prospective additional costs and should clearly indicate which of them might be subsidized by DOE, so that a valid cost comparison with the alternative plutonium- disposition technology (immobilization) can be made.

European MOX fabrication. The many safety and security risks attendant upon international transportation (by sea or air) of separated plutonium and MOX fuel---which we have detailed in our comments on the Surplus Plutonium Disposition PEIS and in our comments on the proposed scope of the site-specific EIS---are not addressed in the PAS, either in terms of identifying the security measures that would be required to minimize them or of the costs of these measures and whether they are to be covered by industry or government. NCI opposes any use of European MOX fabrication capacity in the disposition program, including fabrication of lead test assemblies, because of the additional safety and security risks associated with transport, as well as the fact that European facilities are not subject to IAEA safeguards.

Licensing and regulation. The entire question of licensing and regulation of a MOX fuel fabrication plant is highly uncertain. The Record of Decision specifies that the MOX fuel fabrication plant is to be owned by DOE,⁴ and DOE has stated that such a facility should be licensed by NRC.⁵ The PAS gives few details on the licensing of a MOX fuel fabrication facility. It specifies that, if such a facility were to be licensed, one of the consortium members would be a licensee [PAS, A-2]. There is currently no statutory authority for NRC to license and regulate a DOE MOX fabrication facility, nor has legislation been introduced in Congress to provide such authority. If legislation authorizing NRC regulation of DOE facilities is not adopted, would DOE contractors proceed with construction and operation of a DOE MOX fuel fabrication plant that would not be licensed by NRC (i.e., operated exclusively under DOE regulation)? DOE should explain how consortia can present accurate cost estimates in their bids in such an uncertain regulatory situation.

Warhead-plutonium MOX safety. There is no commercial experience with the irradiation of MOX fuel made from warhead plutonium and no discussion in the PAS of how reactor safety margins are reduced by the use of such fuel, and what compensatory safety measures will be required. For

example, the different isotopes of weapons-grade plutonium significantly reduce the delayed neutron fraction of a reactor using such MOX fuel. Also, warhead plutonium contains trace amounts of gallium, which could affect reactor performance.

Rather than require that such safety issues be resolved before MOX disposition proceeds, the PAS offers to provide the MOX consortium with limited amounts of gallium-free plutonium, much of which is not even weapons-grade, for use in fabricating lead test assemblies [PAS, A-7]. This is unacceptable, as it allows the lead-test assembly process to sidestep entirely safety and operational problems that might arise from the presence of gallium and from the use of weapons-grade plutonium. The plutonium used in lead-test assemblies must be representative of the plutonium that would be used to fabricate MOX throughout the entire disposition exercise. This issue should be fully aired at the Argonne workshop.

Utility safety and performance criteria. Use of warhead-plutonium MOX fuel in commercial nuclear power reactors will increase the complexity of reactor operations, and will result in an unavoidable degradation of key safety margins (such as the excess shutdown margin). Consequently, utilities that choose to take on the additional challenge of using MOX will need to increase substantially the attention and resources devoted to safety matters. These utilities should have a demonstrated ability to cope efficiently with major changes to the design basis, and to respond effectively to unusual operating events.

The PAS requests that reactor safety and performance information be included in bids, but provides no specification of minimum acceptable safety or performance records for utilities interested in using MOX fuel [PAS, Attachment D]. Thus, a utility with as poor a safety record as Commonwealth Edison, with half of its 12 reactors on NRC's "Watch List," is free to bid for MOX work. DOE and NRC should be prepared to posit minimum safety and performance criteria for utilities, and the PAS (and subsequent request for Expressions of Interest) should establish a clear framework for the design and implementation of those criteria. The PAS process should in no way encourage bids from utilities with poor safety records and weak management histories. They should be weeded out so as not to burden the selection and licensing process in the years ahead. Perhaps the best way to start is to develop a questionnaire that fully vets a utility's safety and management record---beginning with a list of reactors placed on NRC's Watch List, for how long, and why.

The PAS implicitly acknowledges the fundamental mismatch between the MOX program, which, because it is subject to "evolving policy," cannot be depended on to provide a reliable supply of fuel, and the need of utilities for stability in their fuel supply. However, the proposed solution of the PAS---selecting reactors and fuel cycles with as much flexibility in the plutonium loading rate as possible---is clearly unacceptable. MOX technology is not at the stage at which MOX and LEU fuel elements are freely interchangeable in LWR cores. It is unclear whether fluctuations of up to 30% in the supply of MOX fuel can be readily accommodated by reactors without significant impacts on safety, necessitating a detailed regulatory analysis for each refueling. Furthermore, operation of reactors in such a variable mode is not consistent with the current MOX experience in Europe.

Safeguards and security. The PAS discussion of implementation of security and safeguards at MOX fuel fabrication plants and reactor sites is particularly vague. The PAS states that MOX disposition activities "must accommodate IAEA activities" [PAS, A-12], but does not specify the type and the intensity of IAEA safeguards that would be required for manufacture, storage and use MOX fuel. Also, the PAS fails to address the urgent question of authorizing use of deadly force to protect plutonium-based MOX fuel at reactor sites, and of who pays for the additional security costs involved.

As noted in the PAS, written comments received prior to August 15 will be subject to individual responses by DOE at the Argonne PAS workshop on August 28. Accordingly, NCI looks forward to responses at the workshop to each of the matters raised above.

Sincerely,

Paul Leventhal
President

Steven Dolley
Research Director

[NCI Supplemental Comments on PAS, September 12, 1997](#)

End Notes

1. "The timing and extent to which each of these disposition technologies is deployed will depend upon the results of future technology development and demonstrations, site-specific environmental review, detailed cost proposals, and the results of negotiations with Russia, Canada, and other nations." U.S. Department of Energy, *Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* ["ROD"], January 14, 1997, p. 21. [Back to document](#)

2. "Technical, institutional and cost uncertainties exist with both the immobilization and reactor options. Accordingly, DOE, over the next two years, will complete the necessary tests, process development, technology demonstrations, site-specific environmental reviews and detailed cost proposals for both approaches. Final decisions to use either or both of these technologies depend on the results of this work as well as nonproliferation considerations and progress in efforts and negotiations with Russia and other nations." DOE Statement, December 9, 1996, in "DOE unveils strategies to reduce nuclear danger," *DOE This Month*, January 1997, p. 8. At the press conference announcing the final PEIS, Secretary O'Leary stated that "I'm clear that within two years, we should be very close to announcing a decision. We will have been through all of the processes we need to go through both as a matter of the technology, and I event hink we will have overcome answering some of the institutional or social issues that have to be answered to go forward." *Department of Energy Press Conference Re: Nuclear Weapons Complex*, December 9, 1996, Federal News Service transcript, p. 41. In a nationally-televised interview that evening, O'Leary further explained that "the reason we're not certain yet is because we need to finish playing out the experiments doing what we call bench models of both of these technologies to determine which one works best, to determine which one is the most cost effective, to determine also which one citizens living near by sites where the work will be done prefer. So we've got a lot of work to do ... If we're very, very careful with our process, and we have been so far, we'll actually be engaged in bench scale demonstrations in two years." *The Newshour with Jim Lehrer*, Show #5716, December 9, 1996, transcript, pp. 3-4. [Back to document](#)

3. ROD, p. 1. [Back to document](#)

4. ROD, p. 20. [Back to document](#)

5. Howard Canter, acting director, Office of Fissile Materials Disposition, DOE, "Briefing by DOE on Plutonium Disposition," Nuclear Regulatory Commission, January 27, 1997, transcript, p. 38. [Back to document](#)



[Pu Disposition Page](#)



[What's New Page](#)



[Home Page](#)

nci@mailback.com