



January 16, 1998

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

Additional Comments on the Department of Energy's
Draft Request for Proposals
For MOX Fuel Fabrication
And Reactor Irradiation Services

Dear Mr. Canter:

We are writing to supplement [the December 5 comments of the Nuclear Control Institute](#) ("NCI") on the Department's Draft Request for Proposals for MOX Fuel Fabrication and Reactor Irradiation Services ("draft RFP"). In this regard, we are also responding to the summary question/comment document ("Q&A") which DOE prepared after the December 11 public meeting at Argonne National Laboratory.

NCI has stated its position that the United States should not proceed with the RFP process for MOX in the absence of an overall agreement with Russia. DOE responded in the Q&A that the U.S. should move ahead with the "dual-track approach" in advance of such an agreement for two reasons. (Q&A, p. 20) First, according to DOE, such action would signal U.S. "resolve" and "strengthen the U.S. negotiating position." This position is counterintuitive. If the United States signals that it will proceed with MOX plutonium disposition independent of Russian disposition actions, there is little incentive for Russia to proceed with disposition on a timely basis or to proceed with immobilization at all.

Second, DOE claims that failure to proceed now with MOX will lead to significant delays in disposition later, because the technical and programmatic groundwork for disposition would not be in place. Even if this questionable argument is accepted, it does not justify a DOE commitment to hundreds of millions of dollars in contracts, construction of a full-scale MOX fuel fabrication plant, and eventually the large-scale irradiation of MOX fuel. Some experimental and R&D work might be justified in the absence of an agreement with Russia, but a full-scale MOX disposition program most certainly is not. Yet, the entire MOX program is the subject of the RFP, as are the contracts to be signed.

1. Base Contract and Contract "Options"

NCI is concerned that the current base contract/option structure could allow a MOX consortium to "low ball" its initial bid in order to win the base contract, and then negotiate exorbitant costs and fees for subsequent options, without either competitive bidding or effective public scrutiny. The Q&A seems to confirm these concerns, explaining that "DOE will award the base contract to only one Offeror" (p. 25) and that "[o]nly the base contract will be priced initially." (p. 5)

We reiterate our recommendation that DOE abandon the consortium approach and open each of the option contracts to competitive bidding at each phase.

In addition, the Q&A notes several comments critical of DOE's proposed formula for compensation during the reactor irradiation phase of the program. (Q&A, pp. 5-6) These comments expressed an industry view that the Contractor should receive compensation in the event that the cost of producing MOX fuel were to exceed the cost of purchasing an alternative supply of LEU fuel. Such compensation is not provided for in the formula given in the draft RFP. DOE said that it was taking these comments into consideration.

We strongly urge that the formula not be amended to allow for such compensation. Otherwise, the fee structure for the irradiation phase would resemble that of a "cost-plus" contract, and there would be no incentive for the Contractor to minimize MOX-fuel production costs. The potential for cost escalation under such circumstances would be quite large.

2. Evaluation Criteria for Bids

We commend DOE's statement that, in its evaluation of MOX consortia bidding for disposition work, "[s]afety is a paramount concern for which the Offeror must 'demonstrate an overarching commitment to safety.'" (Q&A, p. 2) We take this to mean that safety will be the most important evaluation criterion. However, it is still not clear how safety and performance records will be weighed against other criteria. DOE should develop a framework of minimum safety and performance criteria for nuclear utilities in the consortia bidding for disposition work as part of the final RFP.

3. Public Availability of Contractor Work Plans

We are pleased to note DOE's agreement with our comment that MOX contractor work plans should be available to the public. (Q&A, p. 20)

4. MOX Fuel Qualification Plan

NCI has stated its concern that DOE's initial stock of substantially gallium-free, non-weapons-grade plutonium may not provide representative lead test assembly irradiation results. According to DOE, "[t]hese oxides may be sufficient for addressing certain qualification needs" (Q&A, p. 26). However, weapons-grade plutonium increases the probability and severity of certain accident scenarios relative to either LEU fuel or non-weapons-grade plutonium MOX fuel. The plutonium used in lead test assemblies should be representative of the plutonium that would be used to fabricate MOX throughout the entire disposition exercise.

Further, DOE suggests that test irradiation for fuel qualification may be discretionary when it states, "DOE recognizes that the Fuel Qualification Plan is a responsibility of the successful Offeror." (Q&A, p. 11) If a MOX disposition program proceeds, irradiation and evaluation of lead test assemblies should be made *mandatory*, and not be left to the discretion of the consortium. This mandatory approach should be specified in the final RFP.

5. Generic vs. Site-Specific Licensing Decisions

Experimental data from the Cabri MOX tests, noted in our December 5 comments, suggest that MOX fuel has a higher failure potential than LEU fuel at comparable burn-ups, with significant safety implications. The Q&A does not respond to NCI's comments on MOX fuel burn-up, nor to our recommendation that a MOX burn-up ceiling be imposed, consistent with European practice.

Nor does the Q&A address our view that the generic MOX fuel-qualification process must include experiments in support of a new regulatory source term specific to weapons-grade MOX fuel.

Finally, the Q&A does not address our elaboration of site-specific safety issues related to weapons-grade plutonium MOX fuel irradiation. These issues require a case-by-case analysis in site-specific license amendment proceedings, rather than a generic finding of "no significant hazard," even in a situation in which MOX fuels have been qualified on a generic basis.

6. European MOX Fuel Fabrication Option

DOE still leaves open the option of European fabrication of MOX lead test assemblies. (Q&A, 10) We reiterate NCI's strong opposition to this option on safety and security grounds as elaborated in our December 5 comments. We urge DOE to exclude this hazardous option from the final RFP.

7. Licensing of MOX Fuel Fabrication Plant

NCI agrees with DOE that the MOX fuel fabrication plant should be licensed by NRC. (Q&A, p. 29) According to DOE, "[d]iscussions between DOE and the NRC are now underway on exactly how licensing of the MOX Fuel Fabrication Facility will be handled by the NRC. Legislative authority to allow NRC to license a DOE-owned facility will be required." (Q&A, p. 16) We reiterate our recommendation that no contractor licensing plan be accepted by DOE until a *comprehensive* legal structure is in place to implement NRC external regulation of DOE facilities.

Establishing special NRC regulatory authority for individual DOE facilities and programs, prior to the creation of a more general legislative framework, would set a bad precedent, leading to a fragmented and inconsistent regulatory regime. Thus, NCI opposes legislative action to provide NRC with special authority to license a DOE- owned MOX plant for plutonium disposition in advance of enactment of a comprehensive framework for NRC regulation of DOE facilities.

8. Safeguards at the MOX Fuel Fabrication Plant

NCI's December 5 comments highlighted a number of safeguards concerns, particularly those related to plutonium inventory "hold-up" at MOX fuel fabrication plants. We objected to the draft RFP's proposed "plutonium utilization factor" of 99.5%, because we calculated that, for a full-scale MOX plant, in order to detect a diversion of 1 SQ in one year with 95% confidence, no more than 8.1 kg of plutonium (0.23% of throughput) should end up in scrap and hold-up annually. Thus, the amount of plutonium that DOE would allow to be retained in the form of scrap or held-up material must be lowered by at least a factor of two.

DOE responded that "[t]he plutonium utilization factor of 99.5% relates to the maximum amount of transuranic waste to be generated, not material inventory uncertainties." (Q&A, p. 17) This somewhat cryptic comment does not seem to address our concerns. We are not claiming that the plutonium inventory measurement uncertainty would be 0.5%. In fact, it would likely be much higher: current techniques are subject to statistical errors of 10-50% when measuring MOX scrap, and 20-30% uncertainty when measuring plutonium held up in process. (NCI Comments, 12/5/97, p. 6).

To permit 0.5% of the MOX plant's annual plutonium throughput to end up in "scrap" or "transuranic waste" would create a situation in which over 17 kg (more than 2 SQ) of plutonium annually would fall within the range of measurement uncertainty, preventing detection of its diversion at a 95% confidence level. Such a situation would be inconsistent with goals posited for IAEA safeguards. This standard, if adopted by both nations, would be unlikely to provide either Russia or the United States with sufficient confidence in the other side's MOX disposition process. It would also present a risk of diversion of weapons-grade plutonium via the low-level waste stream.

Prior to authorizing design and construction of a MOX fuel fabrication plant, DOE should prepare a report addressing these issues, including the results of the clean- out inspection at the PFPF facility in Japan. No contract should be awarded for construction of a MOX plant unless and until these safeguards concerns have been resolved.

9. Security at MOX Reactor Sites

DOE has still not provided sufficient justification for storing fresh MOX fuel at reactor sites for as long as six weeks (Q&A, p. 17). Such extended storage creates an unacceptable security risk, on a scale not previously encountered at U.S. civilian nuclear power plants. NCI reiterates its call for adherence to the National Academy of Sciences' "stored weapons standard": fresh MOX fuel must be accorded the same degree of security as would an actual nuclear warhead.

10. Shutdown of MOX Fuel Fabrication Plant

We are pleased to note that, in response to our initial comments, DOE has confirmed that the MOX fuel fabrication plant will be dedicated solely to the mission of surplus weapons plutonium disposition, and will be shut down and decommissioned at the conclusion of the disposition exercise (Q&A, p. 12).

Sincerely,

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Research Director

Paul Leventhal
President

Dr. Edwin Lyman
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cc: Marlene Martinez



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