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Subject: NRC DEIS comments

Dear Colleagues,

Here are my comments on the NRC's draft EIS for the MOX fuel fabrication facility, for your information. You will note that on page 2-24, they mention our report on Storage MOX explicitly.

with best regards,

Allison

Comments on NRC's "Environmental Impact Statement on the Construction and Operation of a Mixed Oxide Fuel Fabrication Facility at the Savannah River Site, South Carolina" NUREG-1767, February 2003

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There are a number of unresolved, significant issues in the NRC's draft environmental impact statement on the construction of a MOX fuel fabrication facility (MOX FFF) at the Savannah River site, in South Carolina (hereafter DEIS). I outline them below.

(1) Cart Before the Horse.

The most alarming problem is the NRC's endorsement of a cart-before-the-horse plan. The entire point of a new environmental impact statement was to address the changes wrought by DOE's decision to use only MOX to disposition plutonium, instead of the hybrid immobilization and MOX plan. These changes will result in an expansion of a process at the MOX FFF called the "aqueous polishing" process. This process is simply a version of that used to reprocess spent nuclear fuel, including the PUREX process. New radioactive waste streams will result from "aqueous polishing", and these will require further processing at a facility to be constructed called the Waste Solidification Building (WSB). Herein lies the problem: the WSB is part of the Pit Disassembly and Conversion Facility (PDCF), which will be constructed after the MOX FFF is operational!

In fact, DOE has changed the design of the MOX FFF, which was originally to include equipment to solidify radioactive liquid waste, but now, according to DOE's Supplement Analysis and Amended Record of Decision of April 2003, this equipment is to be located in the WSB.

DOE's current schedule, laid out in its February 15, 2002 Report to Congress, call for construction of a MOX FFF from 2004-2007, once licensed by the NRC, with operations beginning in 2007. The PDCF will be constructed from 2006-2009, with startup in 2009. What does DOE

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plan to do with the waste streams generated by "aqueous polishing" in the MOX FFF in the interim?

Furthermore, exactly which plutonium stocks will the DOE process at the MOX FFF until the PDCF is complete? Clearly DOE cannot use plutonium metal until the PDCF is completed. My understanding of the remaining plutonium stocks (25 MT being pure metal) is that of the available weapons grade plutonium to be processed (6.5 MT according to DOE's SA and ROD 2003) is all of the impure variety. These impure stocks, therefore, will require "aqueous polishing", which will create waste streams. The NRC's DEIS does not address the issue of what will happen to these waste streams in the interim.

I would suggest that the NRC in its EIS carefully address the scheduling issues with regards to the treatment of radioactive waste. In its DEIS, the NRC acknowledges the existence of "connected actions" in that the PDCF must exist first to handle the waste streams generated by the MOX FFF, the subject of the DEIS. I would argue that acknowledgement of these connections is simply not enough to license a facility whose operation without the PDCF will produce potentially large safety impacts to humans and the environment, especially since the DOE has explicitly stated that the required facility will not operate until years after the MOX FFF is planned to begin operations.

(2) Waste Streams.

In its account of liquid wastes, the NRC details a number of the waste streams to be dealt with including chloride, americium, and uranium. NRC does not mention other impurities that exist in some of the plutonium oxide stocks. They are listed below. How will these wastes be dealt with?

Impurities in Plutonium Feedstock for MOX FFF

ImpurityConcentrationAm-241<200 ppm to ~15 wt%Depleted U<200 ppm to >70 wt%Enriched UTrace to >99 wt%NpHighly variableThHighly variableAl, C, Ca, Cl, Cr, Fe, F, Ga, K, Mg, Mo, Na, Si, Ta, W, and Zn<100 ppm to ~90 wt%Other potential impurities and forms of impurities: MgF₂, CaF₂, NaCl, KCl, MgCl₂, ZnCl₂, CaCl₂, Co, Ni, Hf, Nb, B, P. The salts can be driven off through heating (they are volatile).

(3) Alternatives Considered But Not Analyzed in Detail.

(a) Immobilization

NRC discounts consideration of immobilization as a path for disposing of plutonium because of the DOE decision to cancel the immobilization plant. Though part of DOE may no longer require immobilization facilities for dispositioning some weapons-grade plutonium, the fact remains that DOE currently has no plans for the remaining 10.5 MT of plutonium, both weapons- and reactor-grade, from the original 17 MT that was to be sent to an immobilization facility. Even if DOE transfers "ownership" of this plutonium from one subdepartment (materials disposition) to another (environmental management), it is quite possible that an immobilization facility will be necessary to dispose of this material that the government declared excess to military needs. It seems short-sighted, then, to completely discount immobilization as a "reasonable" alternative.

A smaller point: on page 2-23, lines 20-21, in the DEIS, NRC states

that it "solicited views" on whether immobilization should be considered. Whose views did it consider?

(b) Off-Spec MOX Fuel

First, as one of the "principal proponents" of this approach, I must point out that the off-spec MOX alternative is simply a variant of immobilization. NRC seems to stumble on to that fact near the end of their discussion of this issue. I am flattered, thought, that they have given this option a reasonable amount of consideration, but I have a number of comments on this section.

First, on page 2-24, lines 5-6, there is no need for a country like the United States to limit its radiation barrier for the off-spec MOX to spent fuel. Most reactors do not have facilities to separate fuel pins from assemblies, which would be required by countries that do not have large quantities of high-level waste waiting to be vitrified. Instead of using spent fuel, one could adopt a variant of the can-in-canister approach planned for the immobilization facility. One could emplace the pellets of off-spec MOX into high-level waste glass, for instance. NRC should not limit itself to such narrow analysis.

The analysis in lines 23-32 all applies to immobilization in general, of course.

Inlines 43-46 on page 2-24, continued on page 2-25 (lines 1-2) NRC makes a specious argument. It should be omitted from this analysis. Yes, Am-241 would not be removed from the impure plutonium in immobilization. But the MOX fuel method does not eliminate it from the planet - it just puts it into a different waste stream. Am-241 will still poses a hazard. Moreover, there will be very little Am-241 in the plutonium because it will be weapons-grade plutonium, not reactor-grade plutonium - at least for that covered by the Bilateral Plutonium Disposition Agreement.

Lines 4-8 on page 2-25 report yet another specious argument. By DOE's own analysis, the immobilization method (via can-in-canister) would be much cheaper than the MOX-only plan they are currently following. In its 2001 cost estimate (the last time DOE compared MOX and immobilization costs), the MOX FFF was projected at \$2.5 billion versus \$1.5 billion for the immobilization facility (planned for 50 MT of plutonium through-put). That's a savings of \$1 billion, even given the "fuel credit."

In its February 2002 Report to Congress, DOE asserts its 2002 plutonium disposition budget projections are \$2 billion less than its 2001 estimates. The reduction is due, they claim, to the elimination of the immobilization program, the streamlined design of the PDCF, and the shorter operating lifetimes of both the MOX FFF and the PDCF. The total cost of the disposition program in 2001 was estimated to be \$6.2 billion versus \$3.8 billion in the 2002 estimate. Removing the immobilization facility from the 2001 numbers reduced the difference between the 2001 and 2002 budgets by \$1 billion. The remaining \$1 billion difference between the 2001 and 2002 cost estimates is from the PDCF, whose capital costs have been inexplicably halved. Though additional modifications will be required of the MOX FFF, the costs presented in the congressional report do not reflect that. They also

do not reflect the capital cost of dealing with the additional waste streams created by plutonium purification. Furthermore, the 2002 cost estimates do not reflect the additional operating time needed to (1) handle more material through the MOX FFF (34 MT versus 25.6 MT), (2) purify the surplus plutonium streams that would previously have remained untreated in the immobilization program, and (3) to handle the additional wastes generated from purifying the contaminated plutonium.

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