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**NUCLEAR CONTROL INSTITUTE COMMENTS ON THE SCOPE AND
CONTENT OF THE NUCLEAR REGULATORY COMMISSION
ENVIRONMENTAL IMPACT STATEMENT FOR THE MIXED OXIDE FUEL
FABRICATION FACILITY**

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Scientific Director
May 21, 2001

Introduction

The Nuclear Control Institute (NCI) welcomes the opportunity to comment on the scope and content of the Nuclear Regulatory Commission (NRC) Environmental Impact Statement for the Mixed Oxide Fuel Fabrication Facility (MFFF). NCI has closely monitored the plutonium disposition program of the Department of Energy (DOE) since its inception, and has commented extensively on the inadequacies of DOE's own National Environmental Policy Act (NEPA) documentation for the program. Now that NRC is in a position to rectify these inadequacies, we hope that it will take full advantage of this opportunity and conduct a thorough assessment of the environmental liabilities of DOE's MOX program, as well as an honest comparison of the MOX approach and its alternatives.

In NCI's opinion, all available evidence clearly shows that the immobilization option is superior to MOX with respect to environmental impact, cost, programmatic risk and non-proliferation, and NCI is confident that NRC's own review will reach the same conclusion.

Comments

- **The EIS must evaluate direct and indirect impacts for all the MOX fuel preparation alternatives that are currently being considered by DOE, not only the one reflected in the Duke Cogema Stone & Webster (DCS) Construction Authorization Request (CAR). The EIS should also evaluate the all-immobilization option. Since the spectrum of alternatives will not be known until the completion of a National Security Council (NSC) review on fissile material disposition policy and a DOE technical review of excess plutonium processing options, closure of the scoping process should be delayed until these reviews are publicly available.**

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DOE's plutonium disposition program is in a state of flux and is rapidly moving away from the preferred alternative identified in the 1999 DOE Surplus Plutonium Disposition Final EIS (SPD FEIS) and confirmed by the subsequent Record of Decision (ROD). Programmatic decisions that have occurred since the CAR was submitted in February of this year --- precipitated by a dramatic and alarming cost escalation of the MOX project --- may result in major changes to the MFFF design basis as described in the CAR. DOE is currently reviewing the entire technical basis of the SPD FEIS ROD. In addition, the entire program is now undergoing a policy review by the National Security Council (NSC) that may result in additional changes in the program. Since it is unlikely that DOE will conduct any additional NEPA analysis of these program changes, this task is now NRC's responsibility. Thus the scope of the NRC MFFF EIS will have to be greatly expanded beyond the narrow question of whether or not to issue a Construction Authorization based on the version of the CAR currently before NRC.

These programmatic changes include (1) the likely cancellation of the Plutonium Immobilization Plant (PIP) and (2) the possible cancellation of the Pit Disassembly and Conversion Facility (PDCF). DOE's previous plan was to construct both of these facilities at the Savannah River Site (SRS) in accordance with the SPD FEIS ROD. Although NRC's NOI states that the PDCF is not in the scope of this EIS, one can argue that these facilities are so tightly integrated with one another with respect to design and operation that it does not make sense to evaluate only the MFFF in isolation.

The cancellation of the PIP would require redesign of the MFFF to accommodate up to 16 metric tons (MT) of excess plutonium in impure forms now slated for immobilization. For an alternative in which the PIP is cancelled but the PDCF is not, the EIS must evaluate, for example, the impacts of transferring the feed preparation modules for impure materials now designated for immobilization from the PIP to the PDCF and augmenting the MFFF polishing unit so that it is capable of purifying these materials to render them suitable for processing into MOX fuel. These changes are likely to have a significant effect on MFFF impacts with respect to the areas of waste generation, worker dose and accident consequences. Socioeconomic consequences would also result from the loss of a promising technology, plutonium immobilization, that in time might have been widely exported to nations with large stockpiles of excess separated plutonium and have provided benefits to its developers.

Cancellation of the PIP will also affect the evaluation of other elements of the MOX program such as reactor irradiation. Since only four reactors at two sites (Catawba and McGuire) are currently willing to use MOX, the maximum amount of plutonium that can be absorbed per year according to the current plan is about 1.8 MT. Under the September 2000 U.S.-Russian Plutonium Disposition Agreement, both parties are committed to implementing a program capable of disposing of 2 MT/yr by 2008, and ramping up to a 4 MT/yr program as soon as practicable. Clearly, the transfer of additional plutonium to the MOX track will increase the environmental impacts from reactor irradiation, by increasing the plutonium loading per reactor, the irradiation time or the number of program reactors. Each of these alternatives will have to be evaluated.

If the PDCF is also cancelled, its functions would likely be consolidated with those of the aqueous processing ("polishing") module that is now part of the MFFF, and the combined process line would be housed either in existing facilities at SRS like the F-Canyon or in a new aqueous processing facility. This would result in a reduction of the size, complexity and cost of the MFFF in exchange for significant additional expenditures elsewhere in the DOE budget.

DOE is currently conducting a study to evaluate all of these options, and the NRC EIS therefore must also evaluate them. For instance, use of F-Canyon chemical separation facilities in lieu of a MFFF polishing module would require an extension of F-Canyon operation for at least twenty years beyond the date when these facilities are currently projected to cease operation. This extension of the lifetime of a 50-year-old facility experiencing an increasing number of leaks and incidents of worker contamination will clearly have significant environmental impacts directly linked to MFFF operation.

For consistency and completeness, NRC should also evaluate the impacts of the all-immobilization option. There is good reason to believe that this option will prove to have the least environmental impact.

Since the spectrum of possible alternatives will not be known until the completion of the aforementioned NSC and DOE reviews, NRC should defer closure of the EIS scoping process until these reports are completed and made publicly available.

- **The EIS must contain a thorough, life-cycle environmental analysis of all alternatives for both normal operation and accident conditions, in order to accurately identify the alternative with the smallest environmental impact. This analysis must be technically rigorous and fully account for random and epistemic uncertainties.**

DOE's NEPA technical analyses of the plutonium disposition program are deficient both in substance and in presentation. Some of the deficiencies are discussed in detail in NCI's comments on these analyses, which are in the public record.¹ NRC staff apparently has similar concerns about the quality of DOE's SPD FEIS, which are documented in an unsigned enclosure to a May 3, 2000 letter to DCS from NMSS.² In this enclosure, it is stated that "the basis for many of the qualitative impacts presented in the FEIS are unclear...in many cases it appears that it would be difficult or impossible to independently duplicate the calculations due to lack of information ... the data needs to be presented in enough detail to permit the reviewers to perform independent analyses."

¹ For example, see Edwin S. Lyman, "Nuclear Control Institute Comments on the Department of Energy's Supplement to the Surplus Plutonium Disposition Environmental Impact Statement," June 28, 1999. Web: www.nci.org/e/el62899.htm

² "U.S. Nuclear Regulatory Commission Staff Review of the U.S. Department of Energy Surplus Plutonium Disposition Final Environmental Impact Statement," letter to Peter Hastings, DCS, from Melanie A. Galloway, NMSS, May 3, 2000, Enclosure 1, p.4.

NCI concurs with NRC's statement. Of particular concern to NCI are the calculations carried out to estimate the additional public health impact of severe accidents at nuclear power plants associated with changing from low-enriched uranium (LEU) to MOX fuel. This is a serious shortcoming, because such accidents are important components of the life-cycle risk associated with DOE's MOX program. Without this information, it is impossible to do a fair comparison of the environmental and public health impacts of the plutonium disposition alternatives.

DOE's use of accident probability and source term information from the Catawba and McGuire Individual Plant Examinations (IPEs) in its reactor accident calculations should receive particular attention from NRC. NRC staff have questioned the validity of the early containment failure frequencies contained in these reports, since they appear to underestimate the risk of ice condenser containment failure due to hydrogen combustion during station blackout events, and a recent NRC-sponsored report by Sandia National Laboratories (NUREG/CR-6427) has confirmed that the vulnerability of ice condenser containments to hydrogen explosions is considerably greater than the results of the IPEs would suggest. Lack of systematic peer review of IPE results, both for accident frequencies and for accident consequences, limits their credibility and usefulness.

Another troubling feature of DOE's accident analysis is its use of probabilistic risk assessment (PRA) information without any accompanying uncertainty analysis and with only cursory and haphazard sensitivity analysis. This lack of rigor greatly diminishes the credibility of the results. This problem does not only apply to DOE's reactor accident analysis, but is symptomatic of the quality of the analyses throughout DOE's NEPA evaluations.

To correct these mistakes, NRC must ensure that the calculations it provides conform to the most rigorous standards of quality control, peer review and uncertainty analysis. The quality of these calculations should be no less than those expected of PRA calculations submitted in the regulatory arena. NRC should also take the advice that it provided to DCS in preparing its own EIS by ensuring that all calculations are fully documented and repeatable by interested readers.

It must be noted that significant technical uncertainties and unresolved safety issues exist, especially with regard to MOX irradiation. For instance, it is not known whether severe accident radionuclide release fractions derived for uranium fuel will be appropriate for MOX fuel. NRC has only just begun its research program to address these issues. Moreover, some issues may not be resolved until the completion of severe accident testing of high-burnup MOX lead test assemblies from the McGuire plant, which will not be available until at least 2006. Therefore, NRC must acknowledge that any results of severe accident analysis obtained at this point for the purposes of this EIS have large uncertainties and are conditional on future resolution of these issues.

- **The EIS must clearly establish that SRS workers uninvolved with the DCS MOX plant are "members of the public" with respect to MOX facility impact assessment.**

The assumption in the DCS CAR that the SRS site boundary, and not the MOX plant area fence, is the appropriate place to calculate radiation exposure to "members of the public" from MOX plant operation or accidents is not sufficiently protective of SRS workers who are not involved in the MOX plant and do not benefit from its operation. Therefore, this assumption should not be employed in the EIS.

- **The EIS must contain a public summary of all safeguards and physical protection issues associated with the plutonium disposition alternatives.**


Safeguards and physical protection of materials and facilities are among the most important issues to be considered in evaluating the impacts of the plutonium disposition alternatives. NCI understands that because of the sensitive nature of these subjects, public involvement in discussions of them are necessarily limited. However, every effort should be made on the part of NRC to ensure that the public is provided access to unclassified or non-safeguards information.

NRC has not made such an effort to date. To NCI's knowledge, not a NRC single meeting on safeguards and security issues associated with the MOX program has been open to the public at any time. Meeting summaries, when they are issued, are frustratingly vague and not an adequate substitute for actual public participation. The entire safeguards-related sections of the DCS CAR have been withheld from the public. Meanwhile, what little public information that does emerge --- such as the fact that DCS is seeking exemptions from the physical protection regulations for fresh MOX fuel stored at reactor sites --- foments distrust and raises the question of whether exemptions or more lenient standards are being sought by DCS for safeguards and physical protection at other stages of the MOX process.

In the EIS, NRC has an opportunity to rectify this situation by providing a public, unclassified summary of the safeguards and physical protection measures that are being evaluated. The NRC will not enjoy public confidence in this process unless it provides greater assurances that it will enforce the most stringent standards in those areas that are shielded from independent review by the public. NCI notes that the NRC staff was dissatisfied by the assertion in the DOE SPD FEIS that "physical protection and safeguards and security for the MOX facility would be acceptable to NRC" since DOE did not provide any basis for this statement.³ Similarly, an NRC assertion that any measures it approves in the safeguards arena would be acceptable to the public is not likely to be believed without further evidence.

Thank you for your consideration of these comments.

Sincerely,


Edwin S. Ilymah, PhD
Scientific Director

³ Ibid, p.5.