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24305 Clematis Drive,
Gaithersburg, MD 20882,
May 3, 1996.

DOE - Office of Fissile Materials Disposition,
c/o SAIC PEIS,
P.O. Box 23786,
Washington, DC 20026-3786.

Re: DOE/EIS-0229-D, Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement, dated February, 1996.

Dear Sir/Madam:

Thank-you for the opportunity to comment upon the subject environmental impact statement. The PEIS covers an important area that DOE needs to address with a reasonable alternative (or alternatives) in a timely manner with cost effective means. My comments follow:

1. The alternatives are of different categories and need to be clarified and explained better. For example, the long-term storage alternatives are site variations, while the disposition alternatives include disposal, wasteform, and reuse variations. The draft EIS should try and follow the classic categories of storage, reuse/recycle, and disposal. These should be displayed graphically and show endpoints (e.g., plutonium disposal site, Federal repository). There may also be other subcategories based on plutonium/HEU form and facilities (e.g., igloo, bunker, vault). The analyses also should accommodate the fact that reactor alternatives are reuse options producing a valuable resource; usually EIS's include the value of the resource (avoid latent fatalities, say by avoidance of emissions and consumption of other resources) or use a difference type analysis. Ideally, this should be summarized in a table in the Summary. 1/01.00.00

2. The proposed action is stated to consist of long-term storage and disposition (i.e., the two main categories of alternatives). This is contradictory and confusing. While DOE often defers the specific preferred/proposed action to the final EIS, the proposed action is usually more definitive than the two principal categories of alternatives. DOE needs to pick one or the other, and the text should be modified to reflect that choice. 2/01.00.00

3. The draft does not adequately discuss the type of plutonium. This includes physical (e.g., pit, classified shape, unclassified shape, billet, powder) and chemical (e.g., metal, 3/01.04.00

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01 00 00 Comment Number 1

Comment noted. The Final PEIS text format is the same as that suggested, and information requested is already in the text (Chapter 2). As described in Appendix H of the Final PEIS, DOE is still evaluating the suitability of a repository site. An expanded discussion of avoided environmental impacts has been included in Section 4.9 of the Final PEIS.

01 00 00 Comment Number 2

Separating storage from disposition would not effectively meet the purpose of and need for the Proposed Action. Planning for storage of the surplus Pu pending disposition is closely related to that for the disposition activities and would be affected by the technology(ies) selected to implement the Proposed Action. DOE is confident that a decision can be made on disposition technologies at this time, and is continuing to expand a range of small scale tests and demonstrations of some Pu disposition technologies to remove uncertainties in viability.

01 04 00 Comment Number 3

Most of the Pu addressed in the PEIS is in either a metal or oxide form. Some of the Pu metal is in a classified pit form. The form, shape, and location of the Pu materials does not have a major bearing on the technologies chosen for disposition or the siting of those technologies. Although some of the Pu has chemical or isotopic constituents that would make it unsuitable for use in MOX fuel, it is a relatively small amount of the total Pu inventory. The immobilization technologies could be used for disposition of all forms of Pu.

oxide, ceramic, glass, impurities) forms. This is important because it can affect the viability of certain alternatives vis-a-vis others, and should be discussed better. 3/01.04.00 cont.

4. The EIS appears partial against the reactor and MOX option by including old data and omitting actual operating results. Presented reactor and fuel characteristics in the EIS appear to be from the 1970's and are completely out of date. The EIS presents cases that would imply lower throughputs and longer completion times with a reactor MOX option as compared to the other options. This is an artifact of the writers' assumptions and contradicts actual experience (i.e., the writers assumed 2-4 reactors, but Europe currently has some 20 reactors licensed and burning MOX, and the United States currently has some 100 plus reactors running, with several utilities willing to investigate MOX cycles with the government). The text includes several misleading and/or incorrect statements:
   - For MOX use, you don't convert the reactor, you change the fuel. The text should also mention 30% versus 100% MOX use (the latter is essentially the uncompleted LWR alternative).
   - The evolutionary/advanced LWR designs plan to use LEU fuel like current reactors. Use of MOX constitutes the same option as for current reactors, although a new reactor of any type can be tailored for MOX use. 4/06.01.08
   - The use of terms like "pay a premium for such MOX fuel" should be explained and referenced - European experience indicates comparable or slightly lower costs with MOX usage.
   - The text should also explain the scheme assumed - 30% vs. 100% load etc. (the text implies 100% is used for all of the reactor options).

   Furthermore, the reactor-MOX alternative is the only option with an analogue operating on an industrial scale, under full IAEA safeguards and external regulatory practices. The correct facts on the reactor-MOX option need to be included in the EIS so that the public and the policy-makers are informed with current, accurate information and practices.

5. The experience of the Europeans and other countries with plutonium disposition is essentially neglected by the EIS. The EIS incorrectly states that Europe (Euratom facilities) has no "excess" MOX capacity. Europe has selected the reactor-MOX option for civilian plutonium, and is recommending the same route for excess weapons-usable fissile materials. To date, some 400 tonnes of MOX fuel, containing some 20 tonnes of plutonium, have been manufactured and irradiated in reactors. Over twenty commercial nuclear reactors in Europe are currently licensed and using MOX fuel. Europe currently has an operating MOX fabrication capacity of over 100 te/yr as MOX (about 6-7 te/yr as plutonium). The Europeans have built two new facilities (Melox and SMP) which are increasing the MOX capacity to close to over 300 te/yr. Both facilities have 5/06.01.08

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06 01 08 **Comment Number 4**

Comment noted. The Final PEIS was revised to reflect comments received.

06 01 08 **Comment Number 5**

Comment noted.

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space for an additional line of some 50-60 te/yr each and have offered this space (for a fee of course) for disposition of excess weapons-usable fissile materials via MOX fabrication and burning in power reactors. Capacity does not appear to be a limiting factor, and the report should reflect this. All of these facts need to be included in the EIS, perhaps as a separate section. The EIS should also discuss the use of the European experience in the U.S., such as by construction of a Melox or an SMP in our country, or use of European-MOX experience in licensing reactors. 5/06.01.08 cont.

6. Furthermore, the reactor-MOX option produces a benefit (electricity and less resource usage), isotopically modifies the plutonium so it is essentially useless for weapons, and renders it self-protecting (the ANS has issued a white paper making these points and supporting the reactor-MOX approach). It also destroys a significant percentage (50% plus) of the original plutonium. None of the other alternatives has these benefits. This discussion is not included in the text, but should be included in the final EIS. 6/06.01.08

7. Some form of "stabilization" is needed for long-term storage; this is only briefly mentioned in the text. It is unlikely that fifty-year storage of pits will be "acceptable" to the public, to the IAEA, and to arms control treaties. "Stabilization" will probably constitute the greatest fraction of the storage impacts. Stabilization for storage may also be a subset of stabilization for disposition. This needs to be discussed in the text. 7/02.00.08

8. The draft suffers from the "build new things" syndrome, particularly for the consolidation alternative. Existing facilities do not seem to receive equal consideration. I would speculate that there is probably adequate room in FMEF for all of the material (I note that FMEF is heavily shielded and should not require any additional shielding). There are also other facilities within DOE that are not even mentioned. These include DAF, E-MAD, and R-MAD at NTS, and the TAN and ICPP areas at INEL. The Barnwell plant adjacent to the SRS also has large vaults and cells suitable for plutonium/HEU storage and/or processing. These should be mentioned (they are viable facilities for operations that would be required under this EIS). The EIS should also distinguish between facilities that are suitable but need equipment and new facilities - 75-80% of the time and costs are associated with the building, not the equipment. 8/01.02.00

9. Information on LANL and LLNL facilities is not included, but is stated to be added to the final EIS. Usually, sites not mentioned in the draft do not show up in the final EIS. 9/01.04.00

10. It seems reasonable to exclude U-233 from this EIS. However, the stated reasons appear to refer to nonpurified and irradiated U-233, not to pure U-233, and could also be applied 10/01.04.00

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06 01 08 Comment Number 6

Comment noted.

02 00 08 Comment Number 7

A basic assumption for this environmental analysis is that the materials are already in a stabilized form before they are received for storage. Actions taken for materials stabilization are covered by analyses under the Environmental Management Program.

01 02 00 Comment Number 8

The Department of Energy looked at many of the facilities you mentioned in assessing the Upgrade at Multiple Sites Alternative. These facilities must meet the selection criteria which include cost-effectiveness, timeliness, and technical viability, and the facilities would not be used for other missions. For example, the FMEF is included as a reasonable alternative at Hanford.

01 04 00 Comment Number 9

One and one-half tons of Pu material located at LANL was designated as surplus. None of the Pu material located at LLNL has been designated as surplus. Although LANL is not a candidate site for either long-term storage or disposition of surplus Pu, it is analyzed in the Final PEIS under the No Action Alternative since this material would remain at LANL. The Draft PEIS mentions that the LANL No Action Alternative for storage would be addressed in the Final PEIS.

01 04 00 Comment Number 10

The Department of Energy continues to maintain the same position presented in the Draft PEIS. Since uranium-233 (U-233) disposition is not ready for a decision, DOE is not currently proposing to take action on the disposition of surplus U-233, which will continue to be stored at current locations.

to plutonium. (The handling properties of purified, unirradiated U-233 are similar to HEU.) The rationale should be explained better. | 10/01.04.00 cont.

11. In the EIS, the HLW repository should be referred to as the Federal repository (for spent fuel and HLW - its main function is actually for commercial SNF). Also, there should be a statement and reference for the CANDU MOX SNF staying in Canada after discharge. | 11/12.00.00

12. It is unclear why the immobilization alternative has a 5 te/yr (plutonium) capacity, while the MOX plant/reactor alternative is around 2-3 te/yr (the Melox and SMP each have a capacity of 120 te/yr MOX - about 6 te/yr plutonium per plant). Capacity and schedule would appear to favor reactor MOX use. These points should be discussed, and, at a minimum, the capacity of MOX should at least equal that of the other alternatives for consistency. | 12/01.02.00

13. The EIS should elaborate upon statements such as "... no waste forms are currently licensed for disposal in an HLW repository." This is half true because the repository is not licensed. However, vitrified wasteforms are generally recognized by the regulators as being acceptable - the EPA has even determined that vitrification constitutes BDAT for HLW. These points should be brought out. | 13/09.11.08

14. The site and facility sizes seem huge for the operations involved - these need to be explained and the bases presented. The basis for the one mile buffer zone needs explanation. The MOX sites in Europe do not require 2,200 acres, and the disparity needs explanation. | 14/09.01.08

15. The EIS appears to be naive on spent nuclear fuel management. For example:
    - Dry storage technologies already exist - they don't require development.
    - Cooling time in the pool varies with fuel history and dry cask design; 5 years (not 10 years) is typical, and this should be pointed out in the text.
    - The additional SNF assemblies due to MOX is puzzling, and should be explained. The European experience indicates that the irradiation times and quantities for MOX assemblies should be the same as for LEU assemblies.
    - Typical fuel cycles are 18-24 months, not 12-18 months. | 15/06.00.08

16. There should be a check for consistency and the use of the same bases throughout the document (e.g., time, disposition rate etc.) | 16/16.00.00

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12 00 00 Comment Number 11

It is true that commercial spent nuclear fuel constitutes the majority of the waste for disposal in a geologic repository. Since this analysis assumes a hypothetical operating repository, DOE elected to refer to it as a HLW repository. Disposal options for CANDU spent nuclear fuel are discussed in Section 2.4.5.5 of the PEIS.

01 02 00 Comment Number 12

The assumptions for throughput of the various facilities are based on the lifecycle of the entire alternative, not just how fast the facility can process the materials. Analyses of the cost, schedule, and technical aspects of the various alternatives are presented in a separate document available for public review beginning in late July 1996.

09 11 08 Comment Number 13

A sentence has been added to Section H.1 of the Final PEIS to acknowledge the fact that the EPA did announce in a *Federal Register* notice in June 1990 that vitrification constitutes the best demonstrated technology available for HLW.

09 01 08 Comment Number 14

Land area requirements during operation for disposition alternatives appear to be much greater than for storage alternatives. This is attributed to the site-specific nature of the storage alternatives which incorporate the infrastructure and environmental features of the DOE analysis site versus the greenfield condition of most disposition alternatives. Additionally, the need for buffer zones would increase the total land area requirement. Since all storage alternatives would be situated on a DOE site, buffer zones are already established. The greenfield requirement for a 1.6-km (1-mi) buffer zone area would be reduced at some DOE storage sites where existing site conditions preclude compliance. Additional buffer zone areas, as part of the operations total land area requirement, would not be added to the storage alternatives.

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17. The impacts need to be verified and their consistency checked. For example, the reactor-MOX options are shown as having a high power consumption, which is incorrect because there is a large, positve power production (if you will, "negative consumption"). Some other impacts of reactor-MOX alternatives also appear anomalous (e.g., land use, LCFs). Again, a difference-type analysis focusing just on the MOX effect would be beneficial and correct. 17/06.01.08

I notice that a 60 day comment period has been allotted for this EIS. This seems unrealistically short for an EIS of this importance and inconsistent with other recent EISs, which typically allow 90 or 120 days for comments. If possible, it would be beneficial if an additional 30 days could be allowed for public comment. 18/08.01.00

The EIS has the beginnings of a good document and the comments should help the writers complete it. I greatly appreciate the opportunity to comment on this EIS, and please feel free to contact me if you have any questions.

Sincerely,
Alex Murray
Alexander P. Murray.

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Buffer zones relate to such issues as providing sufficient access around building exteriors to accommodate emergency vehicles, as well as open space for security patrols. Distances from facilities to the site boundaries and between facilities are based on technical, safety, and security considerations. The buffer zone is not necessarily used exclusively as open space. Some support facilities (for example, sanitary landfills or stormwater management ponds) may be located in the buffer zone. The need for buffer zones would be determined during site-specific reviews that would follow this PEIS. Siting criteria would generally follow DOE Order 430.1, *Life Cycle-Asset Management.*

As a greenfield site, the MOX Fuel Fabrication Facility Alternative would require approximately 890 ha (2,200 acres) during operation to accommodate the facility and at least a 1.6-km (1-mi) buffer zone. However, the operating facility (that is, MOX Fuel Fabrication Facility, support facilities, roads, and parking lots) would only disturb approximately 81 ha (200 acres).

06 00 08 Comment Number 15

Corrections/changes have been made to Chapter 2, Sections 4.3.5.2.10 and 4.3.5.3.10 of the PEIS.

16 00 00 Comment Number 16

A consistency check was performed on the Final PEIS as a part of the Quality Assurance Procedure.

06 01 08 Comment Number 17

Comment noted.

08 01 00 Comment Number 18

At the request of several organizations and individuals, the public comment period was extended to a total of 92 days.