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June 7, 1996

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

Dear Mr. Rudy:

We are writing to provide our comments on the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement ("DPEIS"). Despite the substantial effort that went into preparation of the draft analysis, there are a number of important issues that were given inadequate attention or no attention at all. These defects, as discussed below, must be corrected if the final PEIS is to meet the requirements of the National Environmental Policy Act and the Department of Energy's (DOE) implementing regulations (10 C.F.R. 1021).

Nonproliferation and Cost Analyses Must Be Included in the DPEIS and Integrated Into the NEPA Decision-Making Process

DOE is still preparing a cost analysis and a non-proliferation analysis of disposition options. At the April 18 public hearing on the DPEIS, you stated that those analyses eventually would be made available to the public when completed, but not prior to the end of the comment period, then scheduled for May 7. (At the urging of several public-interest groups, including some of those signing this letter, the comment period was extended to June 7, but not to 45 days after the cost and nonproliferation analyses are made publicly available, as requested.)

DOE claims that these analyses are not required for inclusion in the PEIS, which focuses on environmental issues. This is an inappropriately narrow view of the scope of programmatic environmental impact statements. As spelled out in the letter to Secretary O'Leary of April 5 requesting the delay, previous EIS's have included detailed nonproliferation analyses, even making non-proliferation a primary decision criterion. Cost analyses have been included as decision factors in a number of EISs, as well. The plutonium disposition DPEIS explicitly cites "non-proliferation," "security," and "cost-effectiveness" as among the screening criteria used in the disposition PEIS process to rule out certain disposition alternatives. Certainly the cost and non-proliferation analyses used to support these decisions must be incorporated into the PEIS itself. 1/08.00.00

It is our position, therefore, that the public comment period should remain open until 45 days after all relevant support documents, including the cost and non-proliferation analyses, are made publicly available. Therefore, these analyses, together with public 2/08.02.00

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08 00 00 Comment Number 1

In the interest of openness and more informed decisionmaking, DOE released Technical Summary Reports to the public as soon as they became available. Cost data, along with technical and schedule data, were provided in Technical Summary Reports of both storage and disposition in the summer of 1996. Results of the nonproliferation analysis were made available in the Fall of 1996. Each of these analyses along with the environmental analysis and public input will be integrated into DOE's decisionmaking process.

08 02 00 Comment Number 2

At the request of several organizations and individuals, the public comment period for the PEIS was extended to a total of 92 days. The technical, cost, and schedule analyses were made available to the public for review beginning in July 1996. The nonproliferation analysis was made available to the public for review beginning in October 1996. These analyses, along with consideration of public comments on these analyses and the Final PEIS are fully integrated in DOE's decisionmaking process.

comments on them, must be fully integrated in the Department's decision-making process under NEPA. 2/08.02.00 cont.

Issues That Must Be Included in the Nonproliferation Analysis

The National Academy of Sciences' (NAS) 1994 study[1] of weapons-plutonium disposition proposed three proliferation risk factors for use in comparing plutonium-disposition options: risk of theft, risk of reversal, and impact on arms reduction. These are important criteria that should guide DOE's analysis, but the DPEIS does not specifically address them. These risks must be fully evaluated in the non-proliferation analysis and be made part of the DPEIS. 3/01.06.00

Analysis of the risk of theft and diversion must include a thorough examination of difficulties encountered with plutonium accountancy at mixed-oxide (MOX) fuel fabrication plants. In particular, the 70-kilogram plutonium discrepancy at the Plutonium Fuel Production Facility (PFPF) in Japan is now the subject of an extensive clean-out inspection by the International Atomic Energy Agency (IAEA). The discrepancy results from excessive hold-up of plutonium in the process line of this purportedly a state-of-the-art MOX fuel fabrication facility, and raises serious questions as to whether MOX disposition options can be adequately safeguarded. Nor does the lack of knowledge by the IAEA of the results of in-process materials accounting at MOX fabrication plants within Euratom provide any basis for assuming that these plants are subject to effective safeguards either. 4/01.06.00

Analysis of the risk of reversal must address the comparative difficulty of retrieving plutonium from final waste forms. Appendix H of the DPEIS, "High-Level Waste Forms Comparative Analysis," fails to examine these issues. A detailed comparative analysis of plutonium retrievability from spent MOX fuel and immobilized glass and ceramic waste forms must be included along with the factors already addressed, such as regulatory issues, criticality, thermal load, radiation, and releases. 5/01.06.00

Analysis of risks to arms control and nonproliferation must include a thorough assessment of the international repercussions of a U.S. decision on disposition technology. The DPEIS implicitly acknowledges the importance of what the NAS study called the "fuel cycle policy signal" when it posits that one of the goals of the disposition process is "to strengthen national and international arms control efforts by providing a storage and disposition model for the international community." But the DPEIS does not explicitly consider the fuel cycle policy signal that the MOX option would send relative to alternative immobilization options. 6/01.06.00

[1] Committee on International Security and Arms Control, National Academy of Sciences, Management and Disposition of Excess Weapons Plutonium, 1994.

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01 06 00 Comment Number 3

The purpose of the Proposed Action is, in part, to establish the technical and program infrastructure that will enable the United States to take unilateral action or negotiate reciprocal actions with other nations for the disposition of surplus weapons-usable Pu. This PEIS addresses the environmental impacts of the reasonable alternatives for DOE's Proposed Action. Analyses of the cost, schedule, technical, and nonproliferation policy impacts are described in separate documents and will be considered in DOE's decision. The documents related to technical, cost, and schedule analyses were made available for public review beginning in July 1996. The nonproliferation analysis was made available to the public beginning in October 1996. DOE also conducted a series of public meetings, prior to the issuance of the Final PEIS, to discuss the analysis of the nonproliferation analyses, *Draft Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Plutonium Disposition Alternatives*, as it relates to the Proposed Action and alternatives.

The analysis of the nonproliferation impacts examines, among other things, the risk of theft, risk of reversal, and arms reduction impacts for the various Reactor Alternatives using MOX fuel and Immobilization Alternatives.

01 06 00 Comment Number 4

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations (including the nonproliferation analyses), and public input. The nonproliferation analyses, *Draft Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Plutonium Disposition Alternatives*, examines the potential diversion risk using MOX fuel fabrication, safeguards, "hold-up" material, and accountability to the IAEA and international community, among other things. These nonproliferation analyses have been made available for public comment and will be considered in the decisionmaking process.

01 06 00 Comment Number 5

One of the goals of materials disposition is to make the Pu as inaccessible and unattractive for weapons use as the residual Pu contained in commercial

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In its September 27, 1993 non-proliferation policy statement, the Clinton administration declared that "the United States does not encourage the civil use of plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes." The possibility that the MOX option would have an adverse affect on U.S. non-proliferation policy by stimulating the use of MOX in civil nuclear power programs and thereby encouraging plutonium reprocessing and recycling must be addressed in the DPEIS's analysis. 7/01.06.00

Cost Analysis Must Include Subsidies to Nuclear Utilities and Be Integrated into the NEPA Decision-Making Process

Like the non-proliferation analysis, the cost analysis of plutonium disposition options now being prepared by Oak Ridge National Laboratory must be integrated into the NEPA decision-making process. That analysis must include all costs of the various disposition options, including subsidies being demanded by nuclear electrical utilities that have expressed interest in using weapons-plutonium MOX fuel. Given recent regulatory changes and the severe diseconomics of nuclear electricity generated at some facilities, these utilities face strong competition from non-nuclear electrical generators. An industry technical analysis fully anticipates that some utilities will insist upon not simply compensation for direct costs related to warhead plutonium disposition in their reactors, but subsidization of the electricity these reactors produce to guarantee that it is economically competitive with electricity from alternative non-nuclear sources, a subsidy that could cost U.S. taxpayers *billions of dollars over the life of the plutonium-disposition program.*[2]. These costs must be carefully calculated in advance, so that they can be taken into account in the decision on disposition alternatives. 1/08.00.00 cont.

Pyroprocessing Immobilization Alternative Must Be Fairly Assessed

The DPEIS (Section 2.4.3.3) posits "electrometallurgical treatment" as one of the immobilization options. This technology, also known as "pyroprocessing," was developed by Argonne National Laboratory as part of the Integral Fast Reactor (IFR) Program, which DOE has since cancelled, largely on non-proliferation grounds.

Because it involves reprocessing technology, pyroprocessing poses a proliferation risk and undercuts U.S. non-proliferation policy aimed at discouraging reprocessing. Nor is it a sensible technical alternative; both a recent National Academy of Sciences study and an 8/01.04.00

[2] One study calculates that such a subsidy may run as high as six cents per kilowatt-hour, depending upon the utility and plants, equivalent to billions of dollars. GE Nuclear Energy, Study of Plutonium Disposition Using Existing GE Advanced Boiling Water Reactors, NEDO-32361, Prepared for the U.S. Department of Energy, June 1, 1994, p. 1.2-4.

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nuclear spent fuel (that is, the Spent Fuel Standard). The Pu contained in spent MOX fuel or in an immobilized glass or ceramic form is deemed to meet the Spent Fuel Standard. The proliferation resistance of the final MOX spent fuel and immobilized forms is compared for the various alternatives and variations in DOE's nonproliferation study, *Draft Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*, which was made available for public review in October 1996. DOE also conducted a series of public meetings, prior to the issuance of the Final PEIS, to discuss the analysis of the Nonproliferation Policy as it relates to the Proposed Action and alternatives. The proliferation analysis, along with the PEIS, public comments, cost, schedule, and technical analyses will be part of the decisionmaking process to support the ROD.

01 06 00 Comment Number 6

Converting surplus Pu into MOX fuel is not the end state. The end state is to use the MOX fuel in a reactor so that it meets the Spent Fuel Standard for proliferation resistance after irradiation. While the Pu is in the MOX fuel form, it would be subject to high standards of safeguard and security.

While the PEIS discusses the generation of spent fuel as an indirect result of potential disposition actions, any subsequent reprocessing and extraction of Pu from that spent fuel is not being proposed by DOE and is beyond the scope of the fundamental nonproliferation purpose of the disposition effort. The fact that the PEIS evaluates disposition of surplus weapons Pu through use in MOX fuel, but does not further propose or evaluate reprocessing of the spent fuel, does not suggest or propose reprocessing for the management or disposition of the spent fuel.

The President's Nonproliferation Policy does not prohibit the use of MOX fuel, but rather restricts the separation of Pu for civilian use. Fabricating MOX fuel from surplus weapons-usable Pu and using that fuel in a once-through fuel cycle would meet the Purpose and Need of the PEIS for Pu disposition and would not violate the President's policy.

internal DOE report[3] reject it as a viable weapons-plutonium disposition alternative. DOE has ignored these considerations in its analysis. They must be included in the Final PEIS analysis, which, accordingly, must reject electrometallurgical treatment as an option for plutonium disposition. 8/01.04.00 cont.

Safety and Health Impacts of Disposition Options Must Be Consistently and Accurately Assessed

A major objective of the DPEIS should be to present a thorough evaluation of the occupational and public health risks of different weapons-plutonium disposition options. Disposition options then should be ranked according to the risks they pose, and this ranking should play an important role in the eventual choice of disposition option.

The DPEIS, however, fails to accomplish this objective. Its methodology for evaluating and comparing the safety risks of different disposition options is logically inconsistent and confusing. These inconsistencies serve to exaggerate the risks of the immobilization options relative to the reactor-based options. They must be corrected in the final version to provide a fair presentation of the evaluation and ranking of the safety risks of immobilization and reactor-based disposition options. 9/09.09.08

Such a presentation would show that the health and safety impacts of the immobilization options will be substantially lower than those associated with the reactor options. However, the DPEIS is structured to minimize the significance of this fact.

What follows is a partial listing of the deficiencies we have identified:

- The DPEIS overestimates the safety and health impacts of the immobilization options by explicitly including only the absolute impacts of options requiring new facilities, and not the incremental impacts associated with existing facility process variants, such as can-in-canister at the Defense Waste Processing Facility (DWPF). On the other hand, the DPEIS does explicitly evaluate the incremental impacts of the existing Light Water Reactor (LWR) MOX option with respect to normal (as distinguished from accidental) emissions. This leads to an inconsistent comparison of the two options. 10/09.09.08

- The accident analysis of the LWR option is based entirely on an irrelevant case, an evolutionary LWR fueled with low-enriched uranium, which does not account for the numerous unresolved safety issues associated with the use of full-core, weapons-grade 11/09.09.08

[3] "Comments on the Electrometallurgical Process," attachment to letter to Bill Danker, MD-1, from Leonard Gray, Task Leader, Fissile Materials Immobilization Task [sic], Fissile Materials Disposition Project, August 30, 1995; Gregory R. Choppin, et al., An Evaluation of the Electrometallurgical Approach for Treatment of Excess Weapons Plutonium, National Research Council, 1996.

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01 06 00 Comment Number 7

The President's Nonproliferation Policy says the United States will not recycle Pu. Burning weapons-usable Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.

01 04 00 Comment Number 8

The Department of Energy acknowledges the commentor's opposition to the Electrometallurgical Treatment Alternative. Information and assessments on Electrometallurgical Treatment will be taken into account in the decision process. Separate technical, schedule, and cost analyses on the disposition options, including the Electrometallurgical Treatment Alternative, were issued by DOE beginning in late July 1996; the nonproliferation analysis of the disposition options, including electrometallurgical treatment, was issued for public comment in October 1996. The Electrometallurgical Treatment Alternative is analyzed in the PEIS because it is a "reasonable" alternative, and as such, must be analyzed under NEPA. Section 2.4.4.3 of the PEIS has been revised to note the NAS concerns regarding the use of electrometallurgical treatment for Pu disposition. Further, Electrometallurgical Treatment Alternative is not included in the Preferred Alternative.

09 09 08 Comment Number 9

Potential human health impacts from Proposed Actions are analyzed and documented in this PEIS as required by NEPA. To inform the public and decisionmakers, all latent cancer risks associated with the alternatives are presented in the PEIS regardless of their risk magnitude. The ranking or decisionmaking analysis of the alternatives will be based on various factors including human health impacts. DOE's intent in the PEIS is to provide an unbiased environmental analysis of all alternatives. However, the Reactor Alternatives generally do have more available information than other disposition alternatives because of industry experience.

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MOX fuel in existing LWRs or CANDUs. As a result, the important issue of how accident impacts may increase if MOX is substituted for LEU in existing reactors is not addressed. This is a crucial point because the *incremental* accident risks resulting from this substitution *may actually exceed the absolute risks* of an evolutionary LWR accident as cited in the DPEIS. 11/09.09.08 cont.

• A DPEIS reference document[4] lists LWR accidents with higher frequency *and* greater consequences than the most severe LWR accident sequence evaluated in the DPEIS; 12/09.09.08

• The geographical range of the safety analysis is unjustifiably limited: the choice of *an 80-km threshold for consideration of public health impacts leads to absurd conclusions,* such as the notion that an accident in a Canadian CANDU reactor would have no environmental impact in the US; 13/09.09.08

• The absence of discussion of economic and other external factors severely impairs the credibility of the safety analysis, especially as it applies to the MOX option. 14/09.09.08

Transportation Safety and Security Issues Must Be Addressed

The DPEIS does not discuss the security arrangements for sea shipments of plutonium or MOX reactor fuel, which would be necessary if warhead-plutonium MOX fuel were fabricated in Europe. These arrangements may be included in the classified appendix on transportation.[5] If so, some aspects of these arrangements should be made a part of the public record and subject to independent evaluation. Further, there is no discussion of transportation security arrangements with the government of Canada if CANDU reactors were used. These matters require clarification. The DPEIS needs to state publicly what level of security will be required for shipments of plutonium and MOX. This can be done without providing explicit details regarding armament, routing and scheduling that might prove useful to a potential adversary. 15/10.00.00

Appendix G compares transportation impacts for the different disposition alternatives. The analysis understates the environmental hazards of transporting radioactive material by embracing the Type B transport standards and assigning a low probability to an accident that could result in a breach of the Type B cask. The appendix ignores recent 16/10.02.00

[4] Fissile Material Disposition Project, Lawrence Livermore National Laboratory, Evolutionary/Advanced Light Water Reactor Data Report, UCRL-ID-123411, February 9, 1996, Table 8-5, p. 8-14.

[5] This classified appendix is mentioned on page 4-783 of the DPEIS, but a citation is not given and no further information is provided.

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09 09 08 Comment Number 10

The human health impacts for both the existing condition (No Action) and the Proposed Actions are evaluated and presented for all Proposed Alternatives in the PEIS, including the Existing LWR Alternative (The health impacts from potential accidents for the three Reactor Alternatives using MOX fuel are also analyzed.) The incremental impacts are those impacts from Proposed Actions over existing conditions at the same site. For example, the incremental impacts of using the partially completed LWR would be represented by the total impacts because the LWR was not operated before. Whereas, the incremental impacts of using the existing LWRs would be represented by the differences between using the proposed MOX fuel and the current uranium dioxide (UO_2) fuel. Section 4.3.5.2.9 of the Final PEIS has been modified to show the incremental and total impacts.

Appendix O was added to the Final PEIS to provide a description of the immobilization variants utilizing the can-in-canister approach at SRS. The DWPF (an existing facility) is included in this description. The preferred alternative in the Final PEIS includes the immobilization alternative in new or modified existing facilities. Further tiered NEPA analysis will be provided, as appropriate, for the alternatives selected in the ROD. Table 2.4–1 of the PEIS also included possible variants, many of which utilize existing facilities.

09 09 08 Comment Number 11

The human health impacts for both the existing condition (No Action) and the Proposed Action are evaluated and presented for all alternatives in the PEIS, including the Existing LWR Alternative. (The health impacts from potential accidents for all three Reactor Alternatives using MOX fuels are presented in the Final PEIS.) Incremental impacts are those impacts from the Proposed Actions over the existing conditions at the same site. For normal operations, both incremental impacts and total impacts are presented in the PEIS for each disposition alternative. While incremental impacts may appear lower for existing alternatives, the total impacts do not cause misleading impressions. Also, an inclusion of potential avoided environmental impacts from a Proposed Action is appropriate to the NEPA process. The avoided environmental impacts are presented when the potential environmental

expert reports that challenge the adequacy of the Type B standards,[6] as well as ongoing initiatives within the IAEA and the International Maritime Organization (IMO) to re-evaluate these standards in the context of historical data about accident conditions. Instead, the DPEIS relies on earlier reports to assert the adequacy of Type B containers. The DPEIS' analysis is cursory and outdated, and must be revised to take into account the most recent studies and the ongoing IAEA and IMO re-evaluations of these casks. 16/10.02.00 cont.

We believe that all of the above issues must be thoroughly addressed for the PEIS to conform with NEPA requirements and provide an adequate basis for the Secretary's decision on long-term disposition of weapons-usable fissile materials.

If you would like further detail on the above points, please contact Steven Dolley of the Nuclear Control Institute at 202-822-8444.

Sincerely,

Paul Leventhal
Nuclear Control Institute

Christopher Paine
Natural Resources Defense Council

Daryl Kimball
Physicians for Social Responsibility

Jennifer Weeks
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[6] Illinois Institute of Technology Research Institute (IITRI), "Definition of Bounding Physical Tests Representative of Transport Accidents—Air and Marine," IITRI KO6019, November 1983; ECO Engineering, Inc., Annapolis, MD., "A Review of the Proposed Marine Transportation of Reprocessed Plutonium from Europe to Japan," March 1992; Edwin S. Lyman, Princeton University School of Engineering/Applied Sciences, "Safety Issues in the Sea Transport of Vitrified High-Level Radioactive Wastes to Japan," December 1994.

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impacts from the Proposed Action are less than the impacts from the existing condition.

09 09 08 Comment Number 12

The accident impacts for existing and partially completed LWRs were taken from existing documents for a set of representative facilities. Accident impacts presented in the PEIS were the average impacts of the representative facilities. However, the Final PEIS includes quantitative health risk analyses for the evolutionary, existing, and partially completed LWRs using MOX fuel for both normal operations and potential accidents.

09 09 08 Comment Number 13

Like any other EIS, a realistic impact area has to be defined to conduct radiological impact assessment. Federal guidance defines two major impact regions. NUREG-0654 defines 16 km (10 mi) as the plume exposure region and 80 km (50 mi) as the ingestion exposure region for the nuclear facility accident emergency planning zone. While populations at greater distances may receive some exposure from an accidental release of radioactive material into the environment, this exposure would be considerably less than the exposure to the population within the 80 km (50 mi) region. Also, extending the assessment to further distances would introduce greater analytical uncertainties to the calculated impacts.

It is acknowledged that if the source term was very large then the boundaries chosen could be extended. Nevertheless, NUREG guidance is an appropriate and reasonable choice for NEPA analysis.

09 09 08 Comment Number 14

Technical, cost, and schedule analyses were made available to the public beginning in July 1996. The nonproliferation analysis was made available to the public in beginning in October 1996. Input from each of these analyses will be integrated in the DOE's decisionmaking process.

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10 00 00 Comment Number 15

The PEIS analysis assumes that transport of Pu by ship would be done by dedicated British Nuclear Fuel, Limited, or COGEMA ships from military seaports in the United States to seaports in Great Britain or France. The transport would meet applicable IAEA requirements and the International Maritime Organization (IMO) code. While in temporary storage at the seaports and during transport on the ship, appropriate escort security measures would be implemented. Section G.1.2.5 provides a description of the transportation effects on the global commons and includes the results of an environmental assessment of the sea shipment of Pu, *Environmental Assessment of the Import of Russian Plutonium-238*, referenced in the PEIS as DOE 1993x. Technical and licensing issues related to the MOX fuel fabrication have been considered by DOE in the technical evaluations of the storage and disposition alternatives, which were issued in late July 1996. It is anticipated that MOX fuel fabricated in Europe would not be used in a reactor in Canada.

10 02 00 Comment Number 16

Type B packagings are currently certified safe for transporting radioactive materials. The comments were given consideration for the PEIS, but the analysis used is for currently certified packagings. If the safety certification for the packaging is withdrawn, then new analyses would be required.