COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL, WILLIAM F. NAUGHTON
PAGE 1 OF 9

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ComEd

May 4, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Attention: Draft Programmatic Environmental Impact Statement Comments on Storage and Disposition of Weapons-Usable Fissile Materials

Dear Madam/Sir:

Commonwealth Edison Company (ComEd) is pleased to have the opportunity to provide comments to DOE's Draft Programmatic Environmental Impact Statement (PEIS). ComEd believes that incorporation of the comments contained herein will improve the overall clarity, consistency, strength of the draft PEIS.

In the Enclosure, ComEd has categorized its comments for DOE's convenience and ease of reference. ComEd believes that the Summary PEIS document should include and highlight all significant findings that distinguish the various alternatives. To that end, ComEd will identify those areas requiring special emphasis in the enclosed comments.

Very truly yours,

William F. Naughton
Project Manager Fuels
Nuclear Strategic Services

enclosure

F-015

ENCLOSURE

ComEd Comments on Draft DOE PEIS
for
Storage and Disposition of Weapons-Usable fissile Materials

GENERAL

- **MOX LWR History.** Since 1963 the Europeans have manufactured, safely loaded, and burned over 400 tons of LWR MOX fuel. The manufacturing and use of MOX fuel is a fully developed and deployed industry that the U.S. can look to with confidence for information and assistance in the deployment of a similar MOX program in the U.S. for the disposition of excess weapons plutonium. 1/08.03.01

- **Immobilization Uncertainty.** In contrast, while much is known about immobilization of trace amounts of actinides in glass or ceramic, very little is known about the immobilization of plutonium in glass or ceramic, let alone the impact of the deep borehole burial option, and therefore large uncertainties have to be assumed requiring extensive research and development, with little assurance of success. These uncertainties need to be more clearly delineated both in the complete and Summary documents. 2/04.02.00

- **Rapid Deployment.** Special weight should be given to options that enable rapid implementation and encourage similar actions within the former Soviet Union. After all, the real threat of this material is not the inventory stored in the U.S., but the inventory that exists in Russia. The sooner a disposition path is chosen that is compatible with Russian methods of disposal, the more likely Russia will proceed with its own disposition. The former Soviet Union views its excess weapons plutonium as an asset that should be utilized as MOX fuel. Thus, a similar rapidly deployed program in the U.S. would provide impetus to both countries. 3/01.03.00

- **Benign LWR Impact.** The advantage to the LWR alternative is clearly the none to minimal impact to land use, visual resources, air quality, local geology, biological (which includes impacts to endangered species, etc.), historic resources, paleontological, resources, etc. as delineated in Draft PEIS pages 4-680 through 4-686. This is in comparison to constructing new facilities or substantially expanding the facilities at the up to 7 DOD sites for the various alternatives evaluated, which may have substantial impact to some if not all the aforementioned environmental concerns. 4/08.03.01

F-015

08 03 01 **Comment Number 1**

The Department of Energy acknowledges the commentor's support for the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

04 02 00 **Comment Number 2**

Further information on the technical viability of alternatives was provided in the Technical Summary Report and related alternative summary reports published beginning in July 1996. These documents are referenced in the Final PEIS and were made available to the public.

01 03 00 **Comment Number 3**

Comment noted.

08 03 01 **Comment Number 4**

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL, WILLIAM F. NAUGHTON
PAGE 3 OF 9

- **CANDU Must Be Evaluated.** Evaluation of environmental impacts must not be limited to inside the U.S. borders unless some normalizing factor can be applied to U.S. options to account for the differences. In particular, the inclusion of the CANDU Reactor alternative with virtually no environmental assessment implies that there are no environmental impacts associated with that alternative. At the Washington, D.C. public meeting DOE indicated that such an impact will be required of the Canadian government. If so, that should be unequivocally stated both in the Summary and detailed PEIS Documents. Additionally, prior to issuance of a final PEIS, the U.S. public should also have an opportunity to comment on the Canadian EIS for the CANDU alternative. 5/06.05.09 6/08.02.00
- **Timely Action Impact.** The draft PEIS should evaluate the need for timely action and the potential environmental consequences for delays in terms of the increased proliferation risk. Also, appropriate benefits should accrue to those options that can be implemented immediately. Thus, the implementation timelines of the various disposition alternatives should be evaluated and compared for their overall environmental impacts. 7/01.00.00 8/08.03.00
- The No Action and Storage options fail to even acknowledge the increased possibility for clandestine diversion and usage of the highly visible nuclear weapons materials by terrorist groups or hostile governments especially since these options most likely will be chosen based on Russian actions. In fact, these essentially are the status quo options from which the "clear and present danger" concerns stemmed. This aspect clearly needs to be addressed in the Final PEIS. 9/13.00.00
- **Decommissioning Environmental Impacts.** Environmental impacts of decommissioning of all facilities have not been included in the PEIS. Only the LWR option is currently planning/accounting for this aspect. The LWR and CANDU are only alternatives that are not impacted in the PEIS as they will be decommissioned whether or not weapons material is disposition in their facilities. All other alternatives require further review to account for the environmental impacts of decommissioning. These impacts need to be addressed in the Final PEIS. 10/01.02.00
- **Finally, Western European's extensive experience in LWR MOX fuel provides overwhelming evidence that the LWR MOX options under consideration in the draft PEIS are superior to the other options, not only in terms of environmental, health, and safety aspects, but also in terms of cost/benefit, ability for rapid deployment, and compatibility with the former Soviet Union's objectives.**

F-015

06 05 09 Comment Number 5

The PEIS states that the environmental impacts in Canada for the CANDU Reactor Alternative are not included, but that such impacts would be addressed in Canada in accordance with Federal law.

08 02 00 Comment Number 6

The Canadian Government has informed the United States that they will not start their environmental analysis until the United States has completed its actions and has stated that the CANDU Reactor is the Preferred or one of the Preferred Alternatives. The means by which U.S. citizens can comment on a Canadian environmental analysis process is beyond the scope of this PEIS.

01 00 00 Comment Number 7

Analyses of the cost, schedule, and proliferation impacts are discussed in separate documents to support DOE's ROD. The documents related to technical, cost, and schedule analysis were available for public review beginning in July 1996. The nonproliferation analysis was made available to the public beginning in October 1996. A series of public meetings to discuss the proliferation analysis were conducted by DOE prior to issuance of the Final PEIS.

08 03 00 Comment Number 8

Schedule information, including the time required to start and complete all of the alternatives, will be provided to the decisionmaker as part of the overall process of making decisions on implementation of alternatives. However, the environmental impacts are not dependant upon the schedule or time required for implementation.

13 00 00 Comment Number 9

Analysis of the No Action Alternative is required by NEPA to serve as a baseline. As stated in Chapter 1 of the PEIS, the purpose of the Proposed Action is to provide safe, secure, and cost-effective storage for the uninsurable weapons-usable fissile materials and for the surplus Pu pending disposition, since the disposition process would take time. The intent is to conduct the disposition, maintaining appropriate levels of security until all

MOX FABRICATION FACILITIES

- **May Not Be Needed.** The Draft PEIS states on pages S-15, S-22, and S-32 that a dedicated facility would have to be built at a U.S. site to implement the LWR alternative. ComEd agrees that a facility or facility expansion will be required for the CANDU alternative, but disagrees with DOE that it must be built for the LWR alternative. **A MOX fabrication facility may have to be built, but for the PEIS it should not be required.** Since existing European facilities would be used to meet the interim fuel needs of the existing LWR alternative, **DOE should also explore the environmental impacts/benefits of using existing excess European capacity or elasticity in plant capability to meet the LWR weapons disposition alternative. Both alternatives should be analyzed and evaluated in the Final PEIS.** However, the use of excess European capacity and elasticity should be explored first. Let the ultimate decision be based on an integrated examination and comparison of all the issues associated with a foreign versus domestic MOX fabrication supply. Note that by providing a dual fabricaton facility option that: 11/06.01.09
  1. **For the LWR alternative, the Environmental impact is significantly reduced without a required MOX fabrication facility, not to mentioned the reduced cost of the option;**
  2. **There is no change for the CANDU alternative as a MOX fabrication facility will be needed for either case;** and
  3. A U.S. MOX fabrication facility on a DOE site may negatively impact the Russians from a trust and integrity perspective, as a strong case can be made that such a facility would not be economically justified in the commercial sector. Hence, a Russian perspective could include a hidden agenda, siphoning off weapons plutonium, etc.

- **Adjuts to LWR Alternative.** Requiring the construction of a MOX fabrication facility may add substantially to the perceived risk of the LWR alternative as the environmental impacts of constructing and operating the MOX facility are currently included in the LWR alternative. Thus, alternative or comparative analyses that include both utilization of existing capacity as well as a new facility need to be included in the PEIS to ensure accurate and unbiased comparisons. 12/06.02.08

F-015

surplus Pu materials are taken care of. Security and proliferation are further discussed in the nonproliferation analysis (*Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*), which was issued for public comment in October 1996 and will be considered in the ROD.

01 02 00 Comment Number 10

Environmental impacts of decommissioning the disposition facilities will be addressed in the next tier NEPA documents, as appropriate, once the sites for these facilities have been determined.

06 01 09 Comment Number 11

Europe is moving toward a balance between the capacity to fabricate MOX fuel and the capacity to utilize MOX fuel in reactors. Additionally, Europe has excess separated Pu stores that they intend to use as MOX fuel as the fuel fabrication infrastructure and reactor infrastructure permits. Therefore, use of European reactors for consumption of U.S. Pu-source MOX fuel would merely displace the use of separated European Pu and result in no net reduction in world inventories of separated Pu. Hence, the statement that Europe has no excess MOX capacity. Additionally, facility utilization projections indicate that, while some excess MOX fuel fabrication capacity may exist in Europe for the next few years, current capacity is soon expected to be fully utilized for commercial MOX fabrication. Therefore, the United States may not be able to rely on the use of existing European MOX fabrication capacity for the entire disposition campaign. However, as a part of efforts to develop weapons-grade Pu MOX fuel, DOE is consulting with European Fuel Fabricators to benefit from their experience in MOX fuel fabrication and may have some MOX Lead Test Assemblies and/or initial core loads fabricated in Europe. Also, participation in the construction and operation of a MOX Fuel Fabrication Facility in the United States will be open to European fuel vendors.

06 02 08 Comment Number 12

It is envisioned that excess MOX fuel fabrication in Europe will be insufficient to satisfy DOE's Office of Fissile Materials Disposition need for

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL, WILLIAM F. NAUGHTON
PAGE 5 OF 9

NON-LIGHT WATER REACTOR ALTERNATIVES

- **CANDU**
  1. **MOX fabrication facility will be required for this option.** — 13/06.05.08
  2. **Virtually no environmental impacts were assessed incrementally which is a must to ensure a balanced evaluation.**
  3. **Comparison of current uranium based CANDU should be assessed with MOX based impact in all aspects.**
  4. **Extension of designated CANDU plants life should be included as shutdown of the units proposed for the disposition has been considered if the CANDU MOX alternative is not chosen. The plants are already beginning a three-year license renewal (April 11, 1996 Nucleonics Week). Therefore, in the Final PEIS DOE should evaluate this situation as being equivalent environmentally with the building of a "new" plant (same as Evolutionary LWR) with respect to MOX usage.** — 14/06.05.08
  5. **The CANDU alternative would require fabrication of a much larger quantity of MOX fuel to dispose of the same quantity of plutonium than the LWR alternative.** — 13/06.05.08 cont.

- **BOREHOLE**
  1. **Unproven Technology.** This technology is not proven. The risks calculated are estimated based on modeling of an undetermined site, hence there are large uncertainties in the analysis. A more balanced comparison should be made to the risks at existing facilities which are much better defined, being based primarily on extrapolations of existing conditions, which have much less uncertainty. — 15/04.00.00
  2. **Major Uncertainty.** Since for this alternative:
     No site has been specified;
     No previous EIS; and
     No previous licensing experience,
     the siting/licensing of the facility would be time consuming resulting in extended interim storage. Based on the previous DOE experience in a similar arena, specifically the fact that the U.S. has been unable to finalize siting of the HLW facility and the LLW facilities by the various state compacts, the degree of uncertainty of this alternative even being viable within the timeframe of the "clear and present danger" envelope is a major point that needs to be addressed. — 16/04.03.00
  3. The mixing facility will require eventual decommissioning, adding to the burden at both the HLW and compact LLW sites.

F-015

MOX fuel fabrication; thus, a domestic MOX fuel facility would likely be required. Pending operation of the domestic facility, DOE is considering using foreign fuel facilities to make MOX fuel for the initial stage of the Pu disposition campaign.

06 05 08 Comment Number 13

Comment noted.

06 05 08 Comment Number 14

Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. This will include an appropriate level of analysis concerning the CANDU Reactor Alternative. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

04 00 00 Comment Number 15

Since no sites have been selected for a deep borehole and because there are no existing deep boreholes utilized for waste disposal, DOE chose to analyze a generic borehole site for environmental impacts. Some of the other disposition technologies require facilities which are similar to existing facilities in the United States. Therefore, DOE chose to pick representative sites for some of the other disposition alternatives.

04 03 00 Comment Number 16

Further information on the technical viability of alternatives was provided in the Technical Summary Report and related alternative summary reports made available for public review beginning in July 1996.

- **VITRIFICATION**

1. **This technology is not proven with a high content of plutonium and should** require extensive and lengthy research, development, and testing in a protype facility before it could be viewed as an alternative for the LWR alternative from an industrial pespective. DOE needs to address this aspect fully in the final PEIS. 17/05.01.08
2. This technology, contrary to the LWR alternative, **does not reduce the plutonium inventory and does not degrade the plutonium isotopic composition from military grade to reactor grade level.** Thus, it is not comparable to the LWR alternative from a non-proliferation perspective. 18/08.03.01
3. This technology is **not contemplated by the Russians** and would therefore, not bring any advantage in terms of compatibility with the former Soviet Union's objectives.

F-015

05 01 08 Comment Number 17

Further information on the technical viability of alternatives was provided in the Technical Summary Report and related alternative summary reports made available for public review beginning in July 1996.

08 03 01 Comment Number 18

The Department of Energy acknowledges the commentor's opposition to the Vitrification Alternatives. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

06 02 09 Comment Number 19

To get the MOX fuel to the Spent Fuel Standard as soon as possible and then remove it from the reactor, we would necessarily shorten the refueling cycles and cause more spent fuel to be removed from the reactor over the program life. Since the amount of spent fuel, radioactive waste, security, and radiation

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL, WILLIAM F. NAUGHTON
PAGE 7 OF 9

LIGHT WATER REACTOR ALTERNATIVE

- **LWR Work Force Unchanged.** The proposed increase of 40-105 workers per single unit at the LWR facilities (Figure on S-141) is totally unrealistic. Other than minor increases to the security force, there would be no incremental change to the site labor force required for MOX utilization. This aspect needs complete revision including the modifications to all the other environmental impacts impacted, e.g. worker carcinogenic risks, etc. — 19/06.02.09

- **Unrealistic LWR Fuel Cycles.** The PEIS (page 4-692) assumes yearly fuel cycles with single cycle MOX fuel assembly usage. This scenario is unrealistic for the commercial LWR alternative, especially for the the necessity of operating and producing a stable and reliable product for its customers. The assumption that LWRs would always be unloading once burned MOX fuel and replacing with fresh MOX does not consider the implications on the remaining fuel in the reactor and the necessary complications and substantial additional wasted resources from the uranium portion of the fuel cycle that would be necessary to effect such a scheme. Some observations about the once through scheme: — 20/06.02.09 — 21/01.00.00
  1. **Spent fuel pools would fill up faster with the once through sheme.** The disposition issue then becomes a high level waste issue which currently shows no indication of being resolved in the intermediate future;
  2. Once burned MOX assemblies will retain higher residual reactivities when discharged and will impose new safety and licensing issues on existing Spent Fuel Pool licensing bases, especially in light of the quantities of assemblies being discharged each cycle.
  3. Once burned MOX assemblies with their higher residual reactivities and heat load will impact HLW transportation and disposal within the repository as current requirements on reactivity and heat loads assumes nearly depleted spent fuel.
  4. **The environmental impacts are significantly increased for the once through scheme** versus the current LWR two to three eighteen month fuel cycles. — 22/06.02.09
  5. **Impact on MOX Fabrication.** The requirements for the once through scenario will certainly tax whatever fabrication facility or capacity that is to be used. Additionally, it is questionable that DOE can convert the weapons material rapidly enough into LWR compatible fabrication material to meet such capacity requirements. DOE needs to evaluate their proposed schemes in concert with reasonable fabrication capability. The environmental impacts are directly proportional. A balance needs to be analyzed.

- **For current LWR operations:**
  1. There will be NO increase in spent fuel storage needs; and
  2. All waste forms (HLW, LLW, and Intermediate Waste) will be the same for MOX or uranium fuel cycles.

F-015

protection personnel requirement would increase, there would be a need for additional personnel. Also, the addition of a new fuel handling building would require additional personnel for security. A ratio, derived from a 14-percent increase in the amount of spent fuel generated, would probably impact personnel by approximately 10 percent of that amount, or about 1.4 percent. A four unit BWR normally necessitates about 2,819 people, and 1.4 percent of 2,819 is 39 people. These are conservative considerations used for the environmental analysis. Optimization of the fuel cycle would reduce the personnel requirements.

06 02 09 Comment Number 20

The PEIS fuel cycle was an idealized case selected for analyses. Any real fuel cycle would be designed to closely match reactor operating cycles, typically 18 to 24 months.

01 00 00 Comment Number 21

Comment noted.

06 02 09 Comment Number 22

A real fuel cycle would require a transition from low-enriched uranium (LEU) fuel to MOX fuel in a staged manner where the LEU would be replaced as it is burned out. The PEIS case is an idealized fuel cycle prepared for analyses of environmental impacts.

09 09 08 Comment Number 23

Comment noted. Section 4.9 of the PEIS has been modified to further describe avoided impacts.

- **The LWR alternative:**
  1. Destroys plutonium to below weapons grade;
  2. Is consistent with the plans of the Russians and other nuclear weapons countries;
  3. Is an irreversible process and therefore favored by non-nuclear states;
  4. Is based on existing, proven technology; and
  5. Has a portion of the cost offset by revenues from energy production.

4/08.03.01 cont.

- **Environmental Benefits.** The PEIS does not contemplate the environmental benefits associated with lower mining and milling levels for uranium, less energy consumption for conversion and enrichment, and materials and energy necessary for fabrication through the avoidance of purchasing uranium based fuel. Assuming the replacement of 4.5w/o fuel for 40 Mt of Pu, avoids the need for 5 million SWUs and 21.6 million lbs U3O8. The energy required per SWU is 2,150-2400 KWHe per SWU from coal fired stations for USEC gaseous diffusion production. This would result in a substantial decrease in tails production, and, in fact, would result in current tails be used as the blend material to make the MOX. Additionally, the avoided risks associated with not producing traditional uranium fuel assemblies, i.e. mining and milling accidents, transportation of fuel assemblies and materials, worker impacts in all phases including fabrication, etc. need to be credited to the LWR alternative.

- **LWR Offsets.** Additionally, the LWR alternative should be credited with the huge energy and environmental "offset" values as compared to the other alternatives:
  Energy Value - assuming that all 40 Mt of excess weapons grade plutonium were manufactured into MOX fuel, a new fuel worth of $1.6-2.1 billion would result with approximately 45 GW years of electricity worth approximately $32 billion in revenues; and
  Waste Generated - Since MOX fuel displaces uranium fuel that would otherwise have to be obtained by mining, milling, converting, enriching, and fabricating uranium, the wastes that the vitrification option would generate would have to be considered because of the need for new uranium fuel. Thus, vitrifying ~40 MT of PU would not only generate repository waste volumes in the form of approximately 360 cubic meters of extra HLW glass, the vitrification of this Pu would result in 5.6 million additional cubic meters of mill tailings and 3800 cubic meters of enrichment tails caused by the mining of uranium to displace the plutonium as new reactor fuel.

23/09.09.08

- **Offset of Uranium Fuel Transport.** The PEIS indicates an incremental increase in the number of transportation fatalities associated with MOX fuel transport, primarily due to increased number of vehicles used to provide safe transport. Utilization of standard transportation accidents and resulting fatal injuries statistics per number of vehicles may not be accurate when one considers the intent of the increased vehicles, i.e. to ensure safe and secure transport. Presumably, the transport teams would have a significantly lower overall potential accident rate and thus, fatality rate than just that

24/10.02.00

F-015

10 02 00 Comment Number 24

Standard transportation accidents and resulting fatal injuries statistics, per number of vehicles, were used because they are conservative and documented. The number of fatalities is based on several factors including the radiation environment of the package, type of package used, type of vehicle, number of miles to be traveled, and type of roads to be traveled. The standard approach is applied to all alternatives and sites. This is appropriate at the programmatic level.

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL, WILLIAM F. NAUGHTON
PAGE 9 OF 9

associated with number of vehicles on the road. In this field as well, the extensive experience of MOX transport in Europe without incident may be viewed as an asset. | 24/10.02.00 cont.

F-015