NUCLEAR CONTROL INSTITUTE
Washington, D.C.

REVISED: August 13, 1996

Mr. Jon Wolfsthal
Office of Arms Control and Nonproliferation (NN-42)
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585

Nuclear Control Institute Comments on

Nonproliferation and Arms Control Assessment Proposed Outline

Dear Mr. Wolfsthal:

I am writing to submit the comments of the Nuclear Control Institute ("NCI") on the draft outline of the Nonproliferation and Arms Control Assessment (the "Assessment") of weapons-usable fissile material storage and plutonium disposition alternatives.

We commend you and your office for preparing the Assessment, and for involving NGOs and the public in the process. It is a difficult task, but a thorough, real-world nonproliferation analysis of plutonium storage and disposition options by the Department of Energy is overdue. If properly conducted, it will bring a most important set of issues into focus for the Secretary when she chooses among the several alternatives later this year.

A (IV) (A) Main Nonproliferation Considerations -- Technical Factors

Timeliness. We caution here against undue pessimism regarding vitrification/immobilization, and undue optimism about MOX options. The DPEIS, for the most part, analyzes "greenfield" (i.e. new facility) options for vitrification/immobilization. The rationale given is that such facilities serve as "bounding" scenarios for the PEIS, because their environmental impacts would be greater than incremental changes to existing facilities. However, the time required could also be overestimated if an invalid assumption is made that a "greenfield" vitrification plant must be built from scratch. The "can-in-a- canister" option, which would incorporate cans of immobilized weapons plutonium into the canisters of vitrified high-level waste being prepared at the DWPF at Savannah River, is one of the most promising immobilization alternatives.

Also, it should not be assumed that a MOX option in the United States will be up and running more quickly simply because some other countries have experience with MOX fuels now. Construction and licensing of facilities required for this option would take several years, most likely more time than required for many immobilization options. These delays must be taken into account.

Risk of Diversion in Process. The term "safeguards" is not mentioned in the technical factors section but should be because all U.S. nuclear weapons materials declared surplus to defense needs is eventually to be placed under International Atomic Energy Agency (IAEA) safeguards. These safeguards have a number of shortcomings,[1] and can in no sense be relied on as sufficient to alleviate proliferation risks associated with fabrication and use of MOX fuel. Although we advocate placing declared surplus defense materials under IAEA safeguards immediately and permanently, it

does not by any means follow that these safeguards justify the MOX disposition option. The Assessment should identify the limitations of IAEA safeguards in MOX plants as well as the limitations of EURATOM safeguards in such plants (See "Process Throughput" below).

Transport Security. Please take careful note of the concerns raised in the transportation section of our comments on the draft PEIS. In particular, NCI emphasizes that any shipment of weapons-usable plutonium or MOX fuel should be given the same degree of security as is applied to shipments of nuclear weapons.

Process Through-put, Material Inventories. The Assessment must carefully examine material control and accounting issues at MOX fuel fabrication plants. These plants typically experience considerable difficulty in reconciling the amount of plutonium fed into the plant with the amount of plutonium that emerges in the fabricated MOX fuel product because of the tendency of plutonium oxide powder to stick to surfaces of processing equipment.

For example, the PFPF plant at Tokai in Japan, purportedly designed to deal effectively with this problem, has a severe and ongoing problem with plutonium "hold-up." Significant amounts of plutonium oxide have become stuck, or "held up," in the automated glove-boxes at PFPF. Between the plant's commissioning in 1988 and early 1994, approximately 70 kilograms of plutonium were apparently held up in process---enough for more than eight nuclear bombs.2 Japanese authorities are now conducting a clean-out inspection at the request of the IAEA at considerable cost.3 The Assessment should report on the results of this inspection and on whether the hold-up problem at the PFPF plant has been eliminated.

DOE's Assessment should survey and report safeguards results (uncertainty factor in measurement, MUF, etc.) at MOX fuel fabrication plants in Europe as well as Japan. If the companies operating these facilities refuse to cooperate with DOE in providing such information, it should be duly noted in the Assessment and raised as a major negative factor in considering the option of using European facilities to produce MOX fuel from U.S. warhead plutonium.

In regard to the Sandia National Laboratory "Red Team" report on proliferation vulnerabilities in weapons-plutonium storage and disposition options, now under preparation:

Even in the face of the sensitivity of the report, a declassified version can be prepared and should be issued, in order to facilitate more informed consideration and discussion of specific proliferation risks.

The Red Team report should examine in detail diversion scenarios associated with safeguards problems at MOX fuel fabrication plants. In particular, the Red Team should examine the vulnerability of the low-level waste (LLW) stream as a possible diversion route. The LLW stream at civilian MOX fuel fabrication facilities has not been subject to the same safeguards scrutiny as other potential diversion pathways. During a 1988 Bundestag investigation, the German government confirmed that the Hanau MOX fuel fabrication plant operated by Siemens did not have neutron coincidence counting and other plutonium detection equipment to secure its LLW stream against diversion.4 Do such Achilles heels exist at other MOX facilities?

The Red Team should take a candid look at security at U.S. commercial nuclear power plants. Fresh MOX fuel, readily convertible into weapons-usable material by simple chemical techniques, will be stored onsite, for months or years. There have been many disturbing reports about the inadequacy of security at commercial U.S. nuclear facilities.5 In 1993, a former mental patient was able to drive his station wagon into the Three Mile Island facility and crash into the turbine building. Security personnel were unable to locate and detain him for four hours. There is a long history of remarkable security gaps at even the most sensitive U.S. government nuclear weapons facilities.6 Is security at these facilities adequate to protect storage and disposition of nuclear-weapon material?

Risk of Re-use in Weapons: Final material form and attractiveness. The Assessment should not overemphasize or overstate the nonproliferation value of isotopic degradation of weapons-grade plutonium to reactor grade. Weapons plutonium in irradiated MOX fuel contains a considerably smaller proportion of fissile isotopes after irradiation than before. This factor, however, is not nearly as important from a non-proliferation perspective as some have argued. Many MOX

proponents emphasize the degree to which the isotopics of the weapons plutonium would be altered by irradiation in a particular reactor---that is, the degree to which the Pu-239 proportion can be reduced---as if this factor should be decisive in choosing among disposition technologies.

This is an inappropriate criterion by which to assess proliferation risks because it perpetuates a dangerous myth that reactor-grade plutonium is unsuitable for workable weapons. The ability to construct a weapon from reactor-grade plutonium was demonstrated decades ago. It is dangerous even to consider it an open question. Hans Blix, director-general of the IAEA, informed our Institute that there is "no debate" on this point in the Safeguards Department of the IAEA, and that the agency considers virtually all isotopes of plutonium, including high burn-up reactor-grade plutonium, to be usable in nuclear weapons.7 In June 1994, U.S. Energy Secretary Hazel O'Leary declassified further details of a 1962 test of a nuclear device using reactor-grade plutonium, which successfully produced a nuclear yield. 8

Isotopic degradation does not pose a substantial barrier to re-militarization of warhead plutonium, and therefore does not constitute a compelling argument in favor of the MOX option. It is important to note that the 1995 NAS study agreed with this conclusion. In its comparison of the MOX and immobilization options it found that "[t]he plutonium in the spent fuel assembly would be of lower isotopic quality for weapons purposes than the still weapons-grade plutonium in the glass log, but since nuclear weapons could be made even with the spent fuel plutonium this difference is not decisive."9 [Emphasis supplied.] This point should be made explicitly in the nonproliferation analysis.

D (II) Nonproliferation Analysis

Every effort should be made to *compare* proliferation risks of the various disposition alternatives for the Secretary. Simply listing proliferation pros and cons of each alternative, with no comparison or weighing of risks, would not be nearly as useful to her decision-making on storage and disposition options.

While your office is not empowered to make decisions to include or exclude any alternative, your Assessment should not flinch from making clear that a particular alternative is unacceptable from a nonproliferation perspective because of no feasible means to mitigate proliferation risks. Otherwise, the danger is that the Assessment would merely be cited as a *post hoc* justification for a preferred alternative selected on "policy" grounds.

D (III) Steps to mitigate negative nonproliferation implications

NCI is troubled by the apparent assumption reflected in the draft outline of the Assessment that the proliferation risks of any alternative can be mitigated by additional steps. This perspective ignores the possibility that some disposition alternatives are so fundamentally flawed from a nonproliferation perspective that they cannot be salvaged by any combination of Presidential policy directives, safeguards regimes, etc. It cannot be assumed that there are fixes for every proliferation risk presented by each alternative. This apparent assumption should be revisited.

The economic and other costs of "mitigation measures" must also be analyzed thoroughly. Costs of implementing such measures could be too great for such measures to be justified. For instance, one could attempt to resolve accounting problems resulting from in-process plutonium hold-up at a MOX fuel fabrication facility by a full clean-out inspection, such as the one being done at PFPF. However, the PFPF clean-out is projected to cost about $100 million.10 How much should we be willing to pay for "mitigation," in an attempt to make a dangerous alternative acceptable in policy terms?

Conclusion

In closing, I reiterate our position that the nonproliferation Assessment should be a formal part of the NEPA process, rather than an adjunct or an afterthought that is not subject to public comments which must be considered before issuance of the final PEIS and Record of Decision. As we noted in our comments on the draft PEIS, a number of previous DOE EIS's have incorporated

nonproliferation analysis into the formal NEPA process, and nonproliferation analysis should be included in every DOE EIS of actions with potential proliferation impacts.

Attached to this letter is a paper that Paul Leventhal and I prepared for a conference in Berlin last year, providing a comparison of MOX and immobilization options from a nonproliferation perspective, and highlighting the proliferation risks of the MOX alternative.

Please do not hesitate to contact me if you would like further information on any of these points.

Sincerely,

(signed)
Steven D. Dolley
Research Director

Attachments

What's New Page  NCI Home Page

---

nci@mailback.com

End Notes

1. Marvin Miller, "Are IAEA Safeguards on Plutonium Bulk-Handling Facilities Effective?," Nuclear Control Institute, August 1990; Paul Leventhal, "IAEA Safeguards Shortcomings---A Critique," Nuclear Control Institute, September 12, 1994 (attached). Back to document

2. "'Astounding' Discrepancy of 70 Kilograms of Plutonium Warrants Shutdown of Troubled Nuclear Fuel Plant in Japan," Nuclear Control Institute, May 9, 1994. Back to document

3. Mark Hibbs, "Rebuild at PNC's PFPF Plant Will Cost Japan $100- Million," NuclearFuel, October 9, 1995, pp. 11-12.Back to document

4. Paul Leventhal, Milton Hoenig, and Helen Hunt, "Nuclear No Man's Land: Low Level Radioactive Wastes as an Unpoliced Diversion Path for Thefts of Weapons-Usable Nuclear Material," Nuclear Control Institute, September 16, 1988. Both the majority and minority final reports of the Bundestag Investigation Committee acknowledged the risk of diversion via inadequately safeguarded LLW streams. Final Report of German Bundestag Investigation Committee -- 2nd Investigation in the 11th Legislative Period -- German Bundestag, Bonn, Germany, Printed Matter Number 11/7800, October 15, 1990 (original in German), pp. 98 (majority), 684-685 (minority). An expert witness, Dr. Buecker, testified that a "complicated and complex technique" combining active and passive measurement technologies would be required to safeguard effectively the LLW stream, "but for the moment we do not have this technique for measurements." Ibid. Back to document

5. Daniel Hirsch, Committee to Bridge the Gap, Threat of Sabotage and Terrorism to Commercial Nuclear Powerplants, Subcommittee on General Oversight and Investigations, House Committee on Interior and Insular Affairs, March 9, 1988, p. 130. Back to document

6. Peter Stockton, research analyst, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, in Nuclear Terrorism: Defining the Threat, Ed. Paul Leventhal and Yonah Alexander, 1986, pp. 89-91. Back to document

7. Letter from Hans Blix, Director-General of the IAEA, to Paul Leventhal, NCI, November 1, 1990; "Blix Says IAEA Does Not Dispute Utility of Reactor- Grade Pu for Weapons," Nuclear Fuel, November 12, 1990, p. 8. However, Blix made this statement after the Nuclear Control Institute challenged assertions by IAEA officials earlier that year that reactor-grade plutonium was unsuitable for use in weapons. Back to document

8. U.S. Departrnent of Energy, Office of the Press Secretary, "Additional Information Concerning Nuclear Weapon Test of Reactor-Grade Plutonium," DOE Fact Sheet released as part of the Openness Initiative, June 27, 1994. The fact that the test occurred and produced a nuclear yield was declassified in 1977. Robert Gillette, "Impure Plutonium Used in '62 A-Test," Los Angeles Times, September 16, 1977, part 1, p. 3.Back to document

9. NAS 1995, p. 413. Back to document

10. Mark Hibbs, ibid. Back to document

---

nci@mailback.com