Nuclear Awareness Project

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FAX RECORD

Date: Thursday, June 6, 1996

To: 202-586-2710
U.S. Department of Energy
Office of Fissile Materials Disposition

From: Irene Kock
Nuclear Awareness Project

Total pages (including cover): 8 pages + cover sheet

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

Please note that attachments and original submission are being sent express post -- attachements are not included with this fax

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June 6, 1996

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

BY FAX: 202-586-2710 (Original in the mail with attachments)

Re: Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (PEIS).

To whom it may concern,

Attached please find a submission from Nuclear Awareness Project on the topic of the proposed use of mixed-oxide (MOX) fuel, containing plutonium from dismantled U.S. nuclear warheads, at the Bruce "A" Nuclear Generating Station. Our submission is endorsed by the following environmental organizations: Concerned Citizens of Manitoba, Saskatchewan Inter-Church Uranium Committee, and FACTS - For A Clean Tonawanda Site (New York). The MOX-CANDU reactor proposal is noted in the Department of Energy (DoE) document *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement* as one of the options under consideration by the DoE for plutonium disposition.

Nuclear Awareness Project is a non-profit environmental organization founded in 1983, dedicated to raising public awareness about nuclear issues and energy alternatives in Ontario, around the Great Lakes basin and across Canada. The group has over 300 members and supporters, and conducts research and public education programs, in addition to publishing a newsletter and operating a public resource centre.

We have reviewed the proposal *Plutonium Consumption Program - CANDU Reactor Project*, Final Report, July 1994, by AECL Technologies, as well as the relevant sections of the DoE PEIS. The attached submission outlines our views on a range of issues regarding this proposal. Nuclear Awareness Project does not support the importation of plutonium in any form into Canada. We urge the DoE to rule out the option of using CANDU reactors located in Canada for plutonium disposition purposes. We believe that a better alternative would be immobilization of the plutonium within the United States. | 1/08.03.01 | 2/08.03.01

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08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the use of the CANDU Reactor Alternative for the disposition of Pu. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. In addition, according to the Canadian Government (see letter sent by the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD) an appropriate level of analysis by Canada would be required before any decision on burning Pu in a CANDU reactor is implemented. Before implementation, further negotiations between the United States and Canada will be required as this will include actions on the disposal of the spent fuel.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for the Immobilization 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.

Sincerely,

Irene Kock

Irene Kock

attachments

c.c. Concerned Citizens of Manitoba
Dave Taylor
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June 6, 1996

Submission to the U.S. Department of Energy Regarding the *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement*

Capacity Factors and Reliability of CANDU Reactors

The Atomic Energy of Canada Limited (AECL) proposal assumes that the four Bruce "A" Nuclear Generating Station reactors will be retubed regardless of whether or not the mixed-oxide (MOX) fuel scheme is implemented, and that these reactors will operate at an average capacity factor of 80% for a further 25 year period. These assumptions are inappropriate, given current debates about the future of the electricity sector in Ontario, and given operating experience at CANDU reactors.

The AECL Final Report *Plutonium Consumption Program - CANDU Reactor Project* notes:

> "It is assumed for the purposes of this study that the Bruce NGS A units will be retubed because there is a demand for electricity."[1]

Retubing is the rebuilding of a CANDU reactor core where all fuel channels are replaced at a cost now estimated by Ontario Hydro at about $350 million per reactor.[2] The DoE should note that the Bruce reactor 2 was shut down in 1995 to avoid this cost and other major repairs, primarily to steam generators. The other 3 reactors are scheduled for retubing starting in 2000, but could instead by shut down at that time. The Bruce "A" Station began operations between 1977 and 1979. It is unlikely that Ontario Hydro will be able to justify the expense of retubing its aging reactors when faced with increasing competition in the electricity sector. 3/01.03.00

The AECL Final Report also notes:

> "... it is assumed that during the 25 year mission time the average capacity factor of the units is 80%, which is generally consistent with Ontario Hydro's experience..."[3]

A review of capacity factors for CANDU reactors in Ontario shows that the 80% capacity factor target is not realistic. Bruce "A" is approaching 20 years of operation, and trends show that CANDU reactor performance deteriorates with age. The 1994 annual and the lifetime capacity factors for the Bruce "A" Station are shown in Table 1.

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01 03 00 Comment Number 3

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. These negotiations will include performing further environmental analyses, as appropriate.

Table 1: Annual and Lifetime Capacity Factors for the Bruce "A" Nuclear Generating Station.[4]

Bruce "A" Reactor	Annual Capacity Factor for 1994	Lifetime Capacity Factor to Dec. 94
1	53.0	68.0
2	53.4	59.0
3	37.6	75.0
4	50.6	72.2

The Pickering "A" Station is a case in point, since the four Pickering "A" reactors were retubed between 1983 and 1993. Reactors 1 and 2 were retubed prior to 1990, and post-retubing performance averaged only 70% for the five year period from 1990 to 1994. See Table 2.

Table 2: Post-Retube Capacity Factors for Pickering Reactors 1 and 2.[5]

YEAR	Pickering 1	Pickering 2
1990	67	65
1991	67	72
1992	65	91
1993	77	95
1994	19	88
5 year average capacity factor = 70%		

The degree of over-optimism and actual error in AECL's two assumptions about reactor rehabilitation and performance expectations brings into question the validity of all of the findings in the AECL Report.

Costs and Subsidies

The total gross cost for using plutonium fuel in CANDUs is estimated by AECL at over $2.2 billion (1993 U.S.$). This price does not include the cost of retubing the Bruce "A" reactors or improving security at the Bruce site. The price of plutonium fuel production and shipping is estimated at $70 million per year — about three to four times the cost of CANDU uranium fuel. It has been reported that Ontario Hydro representative John Lucat has said that the DoE will pay the difference between the cost of CANDU uranium fuel and mixed-oxide fuel, estimated at $54 million per year.[6] Yet the budget presented by AECL for this project doesn't mention any subsidies to Canada or

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Ontario Hydro from the DoE. What is the DoE's policy on subsidizing utilities which use MOX fuel made from DoE plutonium? 3/01.03.00 cont.

If the DoE does not pay for retubing and security improvements at Bruce "A", then Ontario rate-payers will have to pay those costs, which could easily approach $1 billion to retube and rehabilitate 2 reactors and 'harden' the Bruce Nuclear Power Development against terrorist attacks. This is in addition to paying what it would cost to use CANDU uranium fuel, and the usual operation, maintenance and administration costs, as well as capital modification costs associated with the reactors. This is not a bargain for Ontario electricity rate-payers, as is being implied by Ontario Hydro — it is a burden. Other cheaper and safer energy supply and demand management options are readily available. The pressure to implement full cost accounting and integrated resource planning in decision making on electricity options will only increase as Ontario shifts into an era of increased competition in the electricity sector. It is likely that reactor rehabilitation will not be economical compared to these other options.

Spent Fuel Management and Burial

The end result of using plutonium fuel in CANDU reactors under this proposal is that foreign military radioactive waste would remain in Canada. From the environment community's point of view, accepting radioactive waste from a foreign country would set a dangerous precedent. The issue of high level radioactive waste burial in Canada is currently being reviewed by a Federal Environmental Assessment Panel.[7] The current proposal, put forward by AECL, involves burial of the wastes in the Canadian Shield. Many reviewers, including the Atomic Energy Control Board, Environment Canada and the Panel's own Scientific Review Group, found significant technical deficiencies in the AECL proposal, which took almost 15 years to prepare. Canadians are far from achieving consensus on the best management strategy for nuclear fuel wastes, and there has been no public consultation on the option of accepting foreign wastes for burial here. Therefore, the assumption in the DoE PEIS, that "Spent fuel generated by a CANDU reactor would be accommodated within the Canadian spent fuel program" is unwarranted and premature. Nuclear Awareness Project certainly does not support the storage or burial of foreign radioactive wastes in Canada. 1/08.03.01 cont.

Canada's Non-Proliferation Policy

The use of plutonium fuel would violate the spirit of Canada's non-proliferation stance, which is intended to isolate the Canadian nuclear industry from the military nuclear weapons programs of other countries. This plutonium fuel scheme would integrate Canada into the nuclear weapons program of the United States through: 1) making Ontario Hydro a commercial recipient of military fissile material; 2) undertaking security measures within Canada for fissile plutonium of foreign origin; and 3) providing radioactive waste disposal for foreign decommissioned nuclear weapons. Nuclear Awareness Project supports the maintenance of a clear separation between Canadian nuclear programs and the military nuclear programs of foreign powers. 4/01.03.00

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01 03 00 Comment Number 4

Once the Pu is converted to MOX fuel, it is no longer considered weapons-usable without extensive chemical processing and, therefore, would not involve the Canadian nuclear programs in the military nuclear programs of foreign powers.

Environment and Public Health Hazards

The operation of CANDU reactors in Ontario causes negative environmental and public health impacts due to routine emissions of radioactive pollution, especially tritium, which is found at levels far exceeding 'background' in the vicinity of all CANDU reactors. See the attached excerpt from Nuclear Awareness Project's Spring 1996 newsletter "Tritium Hits Port Elgin" for details of a recent incident at Bruce "A" (Attachment A). 3/01.03.00 cont.

The possibility of severe accidents at the Bruce "A" reactors cannot be ruled out, and the risk becomes greater as the reactors age. Such an accident would likely impact the entire Great Lakes basin. The enclosed excerpt from the *Nuclear Hazard Report 1991 - 1992*, addresses some of these reactor safety concerns in detail (Attachment B). A major concern is the risk that trade-offs are being made between safety and maintenance and capital costs, as outlined in section 3.1 of the *Nuclear Hazard Report*.

The AECL proposal is incomplete in a key area that concerns public safety. Plutonium fuel can become "critical" under certain conditions. Transportation and handling accidents could be disastrous for those exposed to radiation. The AECL proposal fails to provide details of the circumstances under which this may happen and how each situation might be prevented or mitigated. AECL simply notes that:

> "Accident scenarios with MOX fuel may be postulated which could lead to criticality concerns. These range from accidental immersion in light water during transportation... The complete range of such accidents would be analyzed as part of the licensing basis for MOX operation, however, based upon a review of some scenarios no difficulties are foreseen."[9]

To leave a full assessment of criticality risks to the licensing stage is unacceptable. The AECL proposal fails to address any accident conditions, only outlining some possible storage configurations to show how the fuel would behave under normal conditions.

There is no guarantee that the plutonium fuel scheme will undergo an environmental assessment at either the provincial or federal level. An exemption was granted to the Bruce "A" Station in 1976 under the Ontario Environmental Assessment Act, and the use of MOX fuel may come under this exemption. The undertaking would be regulated by the Atomic Energy Control Board, which may not require a public hearing under Canada's Environmental Assessment Act. Nuclear Awareness Project is concerned that every effort will be made by our governments at the provincial and federal level to avoid an environmental assessment on this proposal. We believe that it is unacceptable for the DoE to be considering the MOX -CANDU reactor scheme in the absence of a firm commitment from the government of Canada to conduct a comprehensive Environmental Assessment with full public hearings under the Canadian Environmental Assessment Act. 5/01.03.00

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01 03 00 Comment Number 5

Should the CANDU Reactor Alternative be selected at the ROD, agreement with the Canadian Federal and Provincial Governments would be reached on the Pu disposition process, including appropriate environmental analysis with public involvement.

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Public Notification and Access to Information

Nuclear Awareness Project was pleased to receive the U.S. Department of Energy's *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement*, and have the opportunity to comment. However, it was only through a conversation with colleagues in the U.S. that we knew about this Environmental Assessment at all. To the best of our knowledge the DoE did not provide notification to the Canadian public about this review process. Certainly Ontario Hydro and AECL made no effort that we know of to inform the Canadian public of this opportunity to comment on their proposal. We hope you will give due consideration to our comments, even though the DoE is not accountable to Canadians. 6/01.03.00

Nuclear Awareness Project has been aware of the proposal to use mixed-oxide fuel containing weapons-grade plutonium in CANDU reactors since 1994, and began requesting a copy of the proposal that year. After over a year of run-around and unfulfilled promises by Ontario Hydro to provide the document, it was requested formally under Freedom of Information legislation. Ontario Hydro refused to release the report and instead, directed us to obtain a copy from the U.S. Department of Energy. The DoE eventually directed us to AECL Technologies Inc. in the U.S., and a "Controlled Copy" of *Plutonium Consumption Program - CANDU Reactor Project* was received in April 1996. Ontario Hydro and AECL have deliberately withheld vital information on the MOX fuel proposal as long as possible in order to stifle public debate. This is unacceptable behaviour from any corporation, let alone provincial and federal crown corporations.

Ontario Hydro has also been uncooperative in releasing information on other aspects of the proposal, such as public opinion polls. Nuclear Awareness Project requested a copy of the results of a public opinion poll conducted for Ontario Hydro on the plutonium fuel issue in 1995. The script of the poll was released, however, Hydro refused to reveal the results and analysis, under the Freedom of Information Act, noting: "The survey will be used in Federal Cabinet policy discussion. Release of the survey would interfere with a fair and unbiased Cabinet review of the issues". Hydro's reply also noted that: "... release of the survey could generate negative news coverage that would affect the economic interests of Ontario Hydro."[10]

Conclusion

Nuclear Awareness Project does not support the importation of plutonium fuel for use in the Bruce "A" Nuclear Generating Station for the following reasons:

- In order to use MOX fuel at two reactors, the Bruce "A" Nuclear Generating Station will require in the order of $1 Billion in repairs and security upgrades which would have to be paid by the electricity rate-payers of Ontario; 3/01.03.00 cont.
- the Bruce reactors are otherwise likely to be shut down early, saving capital repair costs, as well as operating, maintenance and administration costs — electricity can be supplied, or demand managed more cost effectively;

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01 03 00 Comment Number 6

The Department of Energy is committed to the NEPA process which includes consideration of all public comments. All comments are given equal consideration in the decisionmaking process.

- the use of MOX fuel would set a precedent for Canada to become a dumping ground for foreign military radioactive waste, an undesirable prospect for many Canadians;
- the use of MOX fuel would reverse Canada's longstanding non-proliferation policy of isolating itself from foreign nuclear weapons programs;
- the use of MOX fuel would create unprecedented security problems to prevent theft or diversion of plutonium;
- the use of MOX fuel would pose a public health and environment threat, since plutonium is one of the most carcinogenic substances known, and there is a risk of criticality accidents.

3/01.03.00 cont.

Therefore, Nuclear Awareness Project urges the Department of Energy to rule out the option of using CANDU reactors located in Canada for plutonium disposition purposes. We believe that a better alternative would be immobilization of the plutonium within the United States.

Endnotes

1. AECL Technologies Inc., *Plutonium Consumption Program - CANDU Reactor Project*, Final Report, July 1994, U.S. DoE Contract DE-AC03-94SF20218, p. 1-10.

2. Mittelstaedt, M., "Plague-ridden Bruce reactor shutting down after half life", *Globe & Mail*, August 31, 1995.

3. AECL Technologies Inc., p. 1-10.

4. *Nuclear Engineering International*, April 1995, p. 29.

5. Atomic Energy Control Board Staff Annual Reports on the Pickering Nuclear Generating Station.

6. Silver, R., "Ontario Hydro Nuclear Eyes Pu Burning as Way to Save Bruce-2", *Nucleonics Week*, December 22, 1994.

7. For more information contact the Nuclear Fuel Waste Environmental Assessment Panel, Canadian Environmental Assessment Agency (CEAA), 819-953-0179.

8. U.S. Department of Energy, *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement*, Summary, February 1996, p. 8-16.

9. AECL Technologies Inc, C-20.

10. Letter to Irene Kock, Nuclear Awareness Project, from S.M. Lang, Corporate Records and Freedom of Information Officer, Ontario Hydro, December 11, 1995.

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