

## POLICY ISSUE (Notation Vote)

September 6, 2001

SECY-01-0171

**FOR:** The Commissioners

**FROM:** Janice Dunn Lee, Director  
Office of International Programs /RA/

**SUBJECT:** PROPOSED SUBSEQUENT ARRANGEMENT TO AUTHORIZE THE RETRANSFER OF U.S.-ORIGIN URANIUM AND PLUTONIUM IN MIXED OXIDE (MOX) FUEL ASSEMBLIES FROM JAPAN TO THE UNITED KINGDOM

**PURPOSE:**

To obtain the Commission's approval of a proposed response to the Department of Energy (DOE).

**DISCUSSION:**

The DOE has forwarded a proposed subsequent arrangement request from the Department of Energy to retransfer approximately 3,439 kilograms of U.S.-origin uranium and plutonium from Japan to the United Kingdom (UK). The material is contained in mixed oxide (MOX) fuel assemblies originally intended for use at the Takahama Nuclear Power Station, Unit No. 4, operated by the Kansai Electric Power Co., Inc. The total amount of plutonium in the assemblies is approximately 255 kilograms. The material is being returned to British Nuclear Fuels PLC (BNFL) in the UK where it will be stored pending recovery of the contained plutonium (see Attachment 1).

The material involved is a portion of the MOX fuel assemblies manufactured by BNFL that have been found to have faulty quality control (QC) data due to improper procedures at BNFL. Attachment 2 is a recent Nuclear Fuel Article that provides further background concerning this "tainted fuel." The existence of these improper manufacturing procedures was first disclosed to the public in 1999. The MOX assemblies involved in this retransfer request had already been shipped to Japan and, after lengthy discussions, the Japanese customer refused to accept final delivery, thus, necessitating its return to the manufacturer in the UK.

During its return, the material will be subject to the same conditions regarding compliance with U.S. Government statutory and policy approval requirements that applied to the original

**CONTACT:** SSchuyler-Hayes, OIP  
415-2333

shipment of the material to Japan. Once it arrives back in the UK, the material will be subject to the 1996 Agreement for Cooperation in the Peaceful Uses of Nuclear Energy between the U.S. and the European Atomic Energy Community (EURATOM). The physical protection arrangements for the shipment by sea from Japan to the UK are documented in a classified Security Plan prepared by the Japanese and UK authorities. This Security Plan has been approved by the Executive Branch, subject to any significant change in the threat environment. NRC staff has also reviewed the security plan and concurs with the Executive Branch view.

Section 131 of the Atomic Energy Act of 1954, as amended, requires the Department of Energy to obtain the concurrence of the Department of State and to consult with the NRC and the Department of Defense before entering into a proposed subsequent arrangement. The Secretary of Energy must then make a written determination, noticed in the *Federal Register*, that the subsequent arrangement will not be inimical to the common defense and security.

U.S. approval for the proposed retransfer is being sought under the U.S.-Japan and U.S. EURATOM Agreements for Cooperation in the Peaceful Use of Nuclear Energy.

**POLICY CONSIDERATIONS:**

While the circumstances of this particular retransfer case are unique, the request does not raise any unusual policy considerations and approval would be consistent with current U.S. policy concerning the disposition of plutonium and other nuclear material subject to U.S. consent rights.

**CONCLUSION:**

The NRC staff agrees with the DOE that the proposed subsequent arrangement is not inimical to the common defense and security of the United States.

**RECOMMENDATION:**

That the Commission approve the response to DOE at Attachment 3.

**COORDINATION:**

NMSS and EDO concur in this paper. OGC has no legal objection.

Janice Dunn Lee, Director  
Office of International Programs

- Attachments:
1. Undated letter from T. Dedik, DOE (received at NRC/OIP on 8/23/01)
  2. Nuclear Fuel Article, 8/20/01
  3. Proposed letter from R. Hauber to T. Dedik



**Department of Energy**  
**National Nuclear Security Administration**  
Washington, DC 20585

Mr. Ronald D. Hauber  
Office of International Programs  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Hauber:

This subsequent arrangement concerns the retransfer of eight unirradiated mixed-oxide (MOX) fuel assemblies containing 3,439,377 g of U.S.-origin uranium (9,879 g U-235); and 255,086 g plutonium from the Kansai Electric Power Co., Inc. to the Euratom Supply Agency. The material which is currently located at the Takahama Nuclear Power Station Unit 4, Japan, is being returned to British Nuclear Fuels PLC, United Kingdom, because it cannot be utilized as originally intended. Upon its return to British Nuclear Fuels, the material will be stored in an approved facility pending recovery of the plutonium contained in the unirradiated fuel assemblies. The recovered plutonium will be returned to Japan in the form of fresh MOX fuel assemblies.

I would appreciate your concurrence as soon as possible. If you have any questions, please contact Sean Oehlbert of my staff at (202) 586-3806, or fax me at (202) 586-6789. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Trisha Dedik".

Trisha Dedik  
Director  
Office of Nonproliferation Policy



Printed with soy ink on recycled paper

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DEPARTMENT OF ENERGY  
Office of Arms Control and Nonproliferation

PROPOSED SUBSEQUENT ARRANGEMENT

AGENCY: DEPARTMENT OF ENERGY

ACTION: SUBSEQUENT ARRANGEMENT

**SUMMARY:** This notice has been issued under the authority of Section 131 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2160). The Department is providing notice of a proposed "subsequent arrangement" under the Agreement for Cooperation Between the United States and Japan Concerning Peaceful Uses of Nuclear Energy and the Agreement for Cooperation in the Peaceful Uses of Nuclear Energy between the United States and the European Atomic Energy Community (EURATOM).

**This** subsequent arrangement concerns the retransfer of eight unirradiated mixed-oxide (MOX) fuel assemblies, containing 3,439,377 g of U.S.-origin uranium (9,879 g U-235) and 255,086 g plutonium, from the Kansai Electric Power Co., Inc. to the Euratom Supply Agency. The material, which is currently located at the Takahama Nuclear Power Station Unit 4, Japan, is being returned to British Nuclear Fuels PLC, United Kingdom, because it cannot be utilized as originally intended. Upon its return to British Nuclear Fuels, the material will be stored in an approved facility pending recovery of the plutonium contained in the unirradiated fuel assemblies. The recovered plutonium will be returned to Japan in the form of fresh MOX fuel assemblies.

In accordance with Section 131 of the Atomic Energy Act of 1954, as amended, we have determined that this subsequent arrangement is not inimical to the common defense and security.

This subsequent arrangement will take effect no sooner than fifteen days after the date of publication of this notice, and after fifteen days of continuous session of the Congress, beginning the day after the date on which the reports required under Section 131 of the Atomic Energy Act, as amended, are submitted to the Committee on Foreign Affairs of the House of Representatives and the Committee on Foreign Relations of the Senate. The two time periods referred to above may run concurrently.

DATED:  
For the Department of Energy

Trisha Dedik  
Director  
Office of Nonproliferation Policy



20. 7. 01

Annex I-b

**AGREEMENT FOR CO-OPERATION IN THE PEACEFUL USES OF NUCLEAR ENERGY BETWEEN EURATOM AND THE UNITED STATES OF AMERICA**

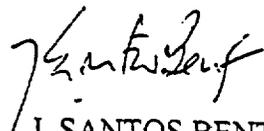
<u>To:</u> US Department of Energy NN-43, Room GA045 Washington, DC 20585-0440 Attention: Mr Rich Goorevich	<u>Fax n°:</u> DOE: (1) 202 5861348
<u>From:</u> J. Santos Bento, Head of Unit Euratom, Luxembourg, ESO-3 <u>E-mail:</u> Jean.Binck@cec.eu.int (J. BINCK)	<u>Fax n°:</u> +352 4301 33545

**ACKNOWLEDGEMENT OF RECEIPT OF PRIOR NOTIFICATION**  
Ref. : EUR-J-02/2001

In response to the prior notification of the Japanese Mission to the EU in Brussels concerning the indirect transfer from Takahama Nuclear Power Station Unit 4, Japan of eight assemblies with 3 439 377 g U-tot (9 879 g U-235) and 255 086 g Pu scheduled for the period of April - December 2002, the Commission confirms that British Nuclear Fuels plc, UK, is a legal person duly authorised to receive nuclear material transferred pursuant to the Agreement. Form US DOE MB#10 attached gives full details of the transfer.

The nuclear material is being returned to the United Kingdom, because it cannot be used in the Nuclear Power Station due to problems with the quality control data.

The Commission confirms that the nuclear material related to this indirect transfer will become subject to the Agreement upon receipt and further confirms that the exact quantity of nuclear material to be included in the inventory of nuclear material subject to the Agreement will be that established through exchange of the information contained in Annex III A of the Administrative Arrangement relating to the above referred transfer.

  
J. SANTOS BENTO

Encl.: 1 MB-10 form

Copy: - Supply Agency, Brussels (ref.: AGF/5609/1) Mme Flingou et M. Ennals

MB#10

Number

APPROVAL FOR RETRANSFER OF SPECIAL NUCLEAR MATERIAL  
OF UNITED STATES ORIGIN

The approval of the United States Department of Energy is hereby requested to the transfer

from The Government of Japan (for Kansai Electric Power Co., Inc.)  
(Transferor)

to Euratom Supply Agency (for British Nuclear Fuels plc)  
(Transferee)

of the United States supplied special nuclear material in the quantity and meeting the specifications described below (hereinafter called "specified material") which the transferor obtained pursuant to its Agreement for Cooperation for Civil Uses with the United States Government. Material was originally obtained by transferor from the U.S. Department of Energy, under Contract or Order Number AT(49-14)UES/JA2 and AT(49-14)UES/JA6 and Export License Number \_\_\_\_\_.

SPECIFIED MATERIAL

(Fill in where applicable)

<u>Fuel Type</u>	<u>Number</u>	<u>Total U or Pu</u> <u>(in Grams)</u>	<u>U-233, U235</u> <u>(in Grams)</u>	<u>Isotopic Percent</u> <u>U233, U235 or</u> <u>Pu (%)</u>
Mixture of Uranium and Plutonium Oxides, PWR Type	8 Assemblies	U 3,439,377 Pu 255,086	9,879	About 6.96

The specified material, in the form of unirradiated MOX fuel assemblies, now located at Takahama Nuclear Power Station Unit No.4, Japan is being returned to the United Kingdom as it can not be utilised in the Nuclear Power Station as originally intended due to problems with the quality control data. It will upon approval hereby by the United States Department of Energy be transferred in the course of April through December 2002 for use at British Nuclear



## JAPAN WANTS U.S. OKAY TO SEND TAINTED FUEL BACK TO U.K.; STUDY OUTLINES FUTURE MOX USE

The Japanese government is seeking U.S. approval to return tainted mixed-oxide (MOX) fuel to the U.K. where it had been produced in a small pilot facility. The U.S. approval is being sought because the plutonium in the MOX arose from U.S.-origin uranium. The MOX is unlikely to be shipped until at least next spring.

Under the terms of the U.S.-Japan nuclear cooperation agreement, the return of the MOX fuel will require a "subsequent arrangement." The agreement provides programmatic consent for shipment of Japanese spent fuel to Europe for reprocessing—as well as for fabrication into MOX and return to Japan in that form—but not for shipment of MOX from Japan. Chris Kessler, a State Department official who was involved in the negotiations on the U.S.-Japan agreement, said that nobody had considered the possibility of a situation in which Japan would be returning unused material. Kessler reported that Japan had submitted the request for a subsequent arrangement earlier this month.

Separately, the British public received details about the contracting future market for MOX in Europe as it is consulted on whether the U.K. government should give a go-ahead to full operation of the commercial-scale Sellafield MOX Plant. The government wants to be certain SMP's operation is economically justified. Comments need to be submitted by Aug. 24.

A report by consultant Arthur D. Little Ltd. (ADL) is being used as the basis for the consultation. Although it describes how European countries have been moving away from recycling spent fuel to storage and ultimate disposal, it underscores European utilities' desire to keep recycling plutonium that is already separated, or shortly to be separated, under "baseload" reprocessing contracts with France's Cogema and BNFL.

In Switzerland, for example, political opposition to reprocessing has grown and a law could come before parliament next year to limit its future application, said ADL. Yet the country is still committed to MOX use to mop up the plutonium from its baseload contracts. Sweden operates an interim spent fuel storage facility, yet Swedish utility OKG is committed to converting baseload reprocessed spent fuel to MOX at BNFL's SMP. Germany is committed to direct final storage from July 1, 2005, yet, in the meantime, is still shipping spent fuel out to France and the U.K. which will result in more MOX fabrication.

ADL's analysis shows there are no real economic alternatives for European utilities to deal with their plutonium until sufficient spent fuel storage capacity has been created. Indeed, says ADL, utilities are still "generally encouraged" by various national and regulatory policies to recycle baseload-produced plutonium into MOX.

A "benchmark" used by ADL to illustrate demand for MOX fabrication is a December 1999 report showing that the Belgian Dessel MOX fabrication facility had its capacity fully booked until 2005 with German, Japanese, Swiss and Belgian contracts. As of Jan. 1, 2000, 418 tons of MOX fuel had been fabricated there since 1986.

Nuclear Fuel - August 20, 2001

Belgonucleaire, which owns the 35 metric tons of heavy metal per year (MTHM/yr) Dessel plant, wanted to extend the facility by adding two new production lines with a capacity of 60 MTHM/yr, said ADL. "However, it is now widely believed that the Dessel plant will be closed by 2010."

Dessel is operated in tandem with Cogema's Cadarache (40 MTHM/yr) and Melox (100 MTHM/yr) MOX plants in a so-called Cogema Group MOX Platform of the three plants, whose production is marketed by joint venture Commo, noted ADL. Belgonucleaire also markets MOX separately from Cogema.

Although Cogema wants to close its older Cadarache facility and extend the Melox capacity to 195-200 MTHM/yr, said ADL, the French coalition government's Green Party ministers "would be likely to be ill-disposed toward the Melox extension." The Green Party currently views MOX extension as a reason that would cause it to quit the Socialist-led coalition (NF, 30 April, 7).

ADL reported independent interviews with customers representing 95% of SMP's "target volumes" and said "all strongly expressed their intent...for MOX fuel."

It concluded that the U.K. could derive an overall financial benefit of 216-million pounds (U.S.\$308-million) from letting BNFL operate SMP until 2012. To cancel SMP would mean a loss of 58-million pounds (\$83-million), said ADL, indicating that it would be cheaper to give SMP the go-ahead. ADL treated the roughly 470-million pounds (\$670-million) spent on constructing the facility as a "sunk" cost that did not need to be factored into the equation.

ADL was commissioned by the U.K. government in April to evaluate SMP's economic case, given that the uncertainty about the future MOX market has been exacerbated over the past couple of years by the 1999 MOX quality control (QC) data falsification scandal.

The resulting Japanese public outcry when the eight MOX fuel assemblies Japan's Kansai Electric Power Co. is now anxious to return, were found to have faulty QC data, reverberated around the world.

Utilities in Germany, Sweden and Switzerland temporarily suspended some of their business with BNFL. Germany's Preussen-Elektra AG had to pull four QC-affected MOX assemblies from its Unterweser PWR. But since then, European confidence in BNFL has slowly returned.

However, ADL's economic case for SMP depends on Thorp's baseload contracts with Japanese customers as well as those in Germany, Switzerland and Sweden. The Japanese also have contracts with BNFL's B205 magnox reprocessing plant.

### Five Conditions

As a result of the MOX QC data falsifications, Japan's MOX loading program is delayed until at least next year, noted ADL. If loading of Belgonucleaire's MOX fuel gets started in Japan in spring 2002, it said, and BNFL is able to meet the "five conditions" imposed by the Japanese, then

BNFL MOX fuel could start being delivered to Japan in late 2004/early 2005.

This is approximately 18 months later than BNFL anticipated, said ADL. It bases its reasons, it said, "on a combination of customers' views and the outcome of the recent Kariwa village referendum" in Japan's Niigata prefecture, in which almost 54% of voters were against plans to load Belgonucleaire-fabricated MOX fuel in Tokyo Electric Power Co.'s Kashiwazaki-Kariwa-3.

ADL believes that by the time SMP's MOX deliveries start being made to Japan, "there will be pressure to step up MOX supply so the publicly announced (Japanese) target of loading 16 to 18 reactors using MOX by 2010 can be met."

ADL said Japan's own MOX fuel fabrication plant, the planned 100 MTHM/yr-plus Rokkasho-mura facility, is not expected to begin operation until at least 2008/09 and "industry consensus is there are likely to be delays to this schedule."

The five conditions imposed on BNFL by the Japanese basically cover U.K. government approval of SMP, satisfactory quality assurance and quality control reforms, sufficient restoration of public confidence in BNFL in Japan, assurance that SMP's MOX will pass inspections by Japanese regulators, and the return of the Kansai fuel to the U.K.—the latter being "the most visible indication of progress," said ADL.

BNFL agreed to Kansai's demands in July 2000 to take back the MOX, which was delivered to Japan for Kansai's Takahama-4 at the start of October 1999. Shortly thereafter, BNFL was forced to admit the QC falsifications. The fuel has been kept in a cooling pond at the Takahama site.

In BNFL's settlement with Kansai, the company agreed to bear the costs of the MOX fuel's return and to pay compensation of 40-million pounds (\$57-million). Half was payable immediately in cash, with much of the rest agreed to be paid "in kind" by BNFL's provision of replacement MOX. If Kansai decided it did not want a replacement supply, both sides agreed the rest could be paid "in cash at a suitable later date."

This month's Japanese request for U.S. consent is the first of a number of intergovernment approvals and other organizational issues that have to be carried out before the transport can begin. ADL believes the return of the fuel will occur sometime between spring 2002 and mid-2003. BNFL said the transport costs are expected to amount to "several million pounds."—*Pearl Marshall, London*

**ATTACHMENT 3**

Ms. Trisha Dedik, Director  
International Policy and Analysis  
for Arms Control and Nonproliferation  
Office of Defense Nuclear Nonproliferation  
National Nuclear Security Administration  
Department of Energy  
Washington, D.C. 20585

SUBJECT: SUBSEQUENT ARRANGEMENT/ RETRANSFER OF U.S.-ORIGIN URANIUM AND  
PLUTONIUM IN MIXED OXIDE (MOX) FUEL ASSEMBLIES FROM JAPAN TO THE  
UNITED KINGDOM

Dear Ms. Dedik:

The Nuclear Regulatory Commission has reviewed and does not object to the proposed subsequent arrangement to retransfer 3,439.377 kilograms of U.S.-origin uranium and 255.086 kilograms of plutonium from Japan to the Euratom Supply Agency. We understand that the transfer of this material will be subject to the same conditions as in the original transfer of the material from Euratom to Japan, including the shipment by sea pursuant to the Security Plan prepared by the UK and Japanese authorities and approved by the U.S. Government.

Sincerely,

Ronald D. Hauber, Deputy Director  
Office of International Programs