# July 30, 1977

# Memorandum from Ambassador-at-Large and Special Representative for Non-Proliferation Matters Gerard C. Smith, Assistant Secretary of State for East Asian and Pacific Affairs Richard Holbrooke, and Deputy Under Secretary of State for Security Assistan

## Citation:

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## Summary:

The memorandum describes President Carter's comrpomise with Japanese Prime Miniter Fukusa on starting up the Tokai Mura  reprocessing plant under one of the State Department's three options.

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ACTION MEMORANDUM

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July 30, 1977

TO: The Secretary

THROUGH: T - Lucy Wilson Benson

FROM: S/AS - Gerard Smith
EA - Richard Holbrooke
T/D - Joseph Nye JSN by GS

Options Paper to the President on the Japanese Nuclear Reprocessing Facility

Issue to Resolve

As you know, a US-Japanese technical group met in Japan from June 27 to July 11 to explore ways of operating the prototype Japanese nuclear reprocessing facility at Tokai-mura consistent with mutually shared non-proliferation interests.

In response to the message from Ambassador Mansfield identifying this as the most critical issue between the US and Japan, the President instructed Mansfield to inform Prime Minister Fukuda that he would be personally involved in achieving a satisfactory compromise.

Of the three options outlined in the paper, all offices support option two. This option fulfills the President's message to Prime Minister Fukuda that he will personally expedite a compromise decision on this issue, and of the three most adequately balances our non-proliferation concerns. Option one, while also likely to be accepted by the Japanese, provides no long-term alternative to conventional reprocessing. Option three would most likely be unacceptable to the Japanese, but is included because the President instructed US negotiators in the June 2-6 formal discussions to explore operation with a modified process that does not produce pure separated plutonium.

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Other than this, the options paper does not explore possible alternative methods of operating Tokai that involve significant time delays or excessive additional incremental costs.

We will circulate the options paper to other agencies to permit them to forward their official views directly to the NSC.

Recommendations:

We recommend that you approve the transmittal of the options paper at Tab 1 to the President.

Approve_____ Disapprove_____

Secondly, we recommend that the Department support option two. A memo supporting this position is at Tab two for your signature.

Approve_____ Disapprove_____

Attachments:

Tab 1. Options Paper.
Tab 2. Memorandum for the President.

Clearances: PM - RBartholomew EA
OES/NET - LNosenzo EA
S/P - ALake EA

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# THE JAPANESE REPROCESSING PLANT: POLICY OPTIONS

## Background

The Tokai nuclear reprocessing plant issue has reached a critical stage. Ambassador Mansfield has identified Tokai as the major political issue between the US and Japan; he suggests that unless a compromise, which balances non-proliferation concerns against energy needs, is achieved, there will be profoundly adverse effects on the future of US-Japan relations.

Prime Minister Fukuda, who has publicly called this a "life and death" issue for Japan, has raised Tokai with the President twice. Mansfield has already conveyed to Fukuda the President's message that he will personally expedite a compromise decision on this issue, and Fukuda has expressed his appreciation.

Japanese negotiators (a) point out that the reprocessing issue is extremely important to Japan in the context of their long-range energy program because of their extraordinary energy dependence; (b) underline Japan's commitment to peaceful uses of nuclear energy; and (c) stress the discrimination against Japan vis-a-vis Western European nations.

Resolution of the Tokai issue also has important implications for the future success of our non-proliferation efforts. The decision on Tokai should (a) support US efforts to discourage reprocessing for recycle in light water reactors, (b) avoid premature reprocessing and plutonium stockpiling for future commercial breeders, (c) contribute to the International Fuel Cycle Evaluation Program, and (d) help improve international safeguards.

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Team Visit

Our instructions to US negotiators in the most recent round of formal discussions (June 2-6) were to explore with the Japanese the possibility of operating the Tokai plant with a modified process only that does not produce pure separated plutonium.

A joint US-Japanese expert group met in Japan from June 27 to July 11 to explore different ways of operating Tokai that would be consistent with mutually shared non-proliferation interests and Japan's nuclear energy program. Fourteen technical alternatives were evaluated against such criteria as technological feasibility, non-proliferation advantages, safety and regulatory features, and implications for the Japanese research and development program. The report of the group is attached.

Three general ways of operating the facility were explored: those that would avoid the production of pure plutonium by producing a mixed product of uranium and plutonium; those that would avoid pure plutonium while also producing products designed to provide a high level of penetrating radiation; and, for comparative purposes, various modes of operating the plant conventionally, including blending of the final product. The joint team concluded that there are some ways to run Tokai that appear technically achievable and that will avoid the production of pure plutonium. A number of them would have substantial effects on the Japanese nuclear fuel cycle and entail significant cost penalties and added delays.

Based on analysis of the impact on the total fuel cycle, and assuming (a) no ready alternative sources of plutonium for Japan's needs and (b) the need to defer start-up of Tokai, the joint team estimated that costs for the options could range from roughly $240 million to $2.2 billion. If one considers only the more "plausible" options presented hereafter in this memorandum, this range is from about $15 million (for only installing advanced safeguards instrumentation) to $400 million. These costs, calculated in undiscounted dollars, are incurred by the

required modifications themselves, and they include debt and interest repayment on subsequently idled facilities. Excluding debt and interest, some of these costs can be substantially reduced. Moreover, to the extent that modification of Tokai would entail actual incremental shortfalls of plutonium, the above costs could be reduced further if assured access to plutonium from other sources were made available. However, we are still talking about incremental costs in the millions and the extent to which Japan could tap these other plutonium sources, and what prices it might have to pay for the opportunity, is unclear at the moment. Regardless of cost or complexity, none of the alternatives considered would offer a foolproof technical solution to the problem of potential diversion, or be one that we would recommend as model for other cases.

The Japanese representatives, who stressed the central role of Tokai in their nuclear development program, argued that it is essential to start Tokai in its designed mode in order to (a) verify plant design and safety; (b) protect contractual warranties with the French contractor; (c) acquire necessary operating experience; and (d) produce plutonium necessary for Japan's fast breeder and advanced power reactor development program.

General Considerations

To meet our commitment to Prime Minister Fukuda to find a compromise that will accommodate both our interests, any solution should avoid protracted delay in operating Tokai or unreasonably large costs for modification. A solution should also permit availability of plutonium for advanced reactor research and development programs, in order to avoid prejudicing long-term energy options. Thus, alternatives entailing (a) production of products contaminated with penetrating radioactivity, (b) major and costly modifications, or (c) protracted delays in plant start-up have been ruled out.

Before start-up of Tokai, there should be a mutual understanding with Japan that Tokai operate in an experimental mode for a defined period after which there would be further evaluation. This would help us argue that Tokai is not a precedent.

Furthermore, the Japanese should also be called upon to provide the following non-proliferation assurances: (a) to agree publicly that recycling in LWRs is premature and that any general decisions on recycle should be deferred at least through the period of the fuel cycle evaluation program; (b) to support actively the INFCE and the objective of identifying fuel cycles that are as proliferation-resistant as the "once-through" fuel cycle; (c) to conduct any operation of Tokai involving plutonium separation on a schedule commensurate with actual plutonium needs for necessary advanced reactor development, which would be the only purpose for which recovered plutonium would be used; (d) to defer any major moves towards the proposed follow-on 1500 ton reprocessing plant during the evaluation period; (e) to consult with us about INFCE results and the appropriateness of multinational alternatives as well as spent fuel storage possibilities before taking any future reprocessing decisions; and (f) to afford the IAEA maximum opportunity, including continuous inspection, to apply safeguards during the experimental operation of Tokai.

A decision permitting operation of Tokai could have global significance, be opposed domestically or could lead to industrial domestic pressure to treat Barnwell in a comparable fashion. We believe there are persuasive reasons for distinguishing Tokai from other reprocessing plants. First, Barnwell is more than six times the size of Tokai in potential capacity and generally is regarded as a commercial scale facility. Second, the operation of Barnwell is not critical to the US for the production of plutonium for the on-going US reactor development program. Third, the US has a history of reprocessing R&D and does not need it as a test bed. The Japanese, on the other hand, can claim that Tokai's operation is essential to satisfy a good fraction of their needs and that they lack technological experience in plutonium handling.

With respect to other facilities Tokai also has unique features which can be adduced as a rationale for its operation in a carefully drawn framework: it is an already completed pilot plant built by an NPT party and would be linked to INFCE so as the plant product would be used only for experimental purposes in an already established advanced

reactor development program and would entail at most only a limited amount of conventional reprocessing during the evaluation period.

In the context of the situation posed by Tokai, we have identified three basic approaches to resolving the problem. One approach would be to meet Japanese desires by agreeing to an early start-up of Tokai in the conventional mode, but under institutional arrangements designed to reduce the perceived proliferation consequences. The second approach would permit start-up in the conventional mode on the condition that the Japanese move as soon as practicable to experimental operation of Tokai with more proliferation-resistant technologies. The third approach would permit operation of Tokai after some delay, only upon a basis that avoids production of pure plutonium.

We have developed decision options corresponding to each of these basic approaches, indicating the advantages and disadvantages of each. As indicated under each option, the basic approach might be supplemented with additional elements to enhance its negotiability or its consistency with US non-proliferation policy.

All of the options have the following characteristics: they are experimental in nature and limited in duration, thus leaving need for future decision on the use of US-origin fuel in Tokai; they assume that there will be maximum opportunity for the IAEA to apply its safeguards system including continuous inspection; they are designed to take advantage of the unique Tokai characteristics and to not establish undesirable precedents; and they relate to the fuel cycle evaluation program. On the other hand, each contributes in only a limited manner to our non-proliferation objectives and each raises the question of whether and to what extent they exacerbate long-term plutonium requirements for the Japanese advanced reactor R&D program. Finally, in view of the fact that our bilateral agreement with Japan calls for a joint determination that safeguards can be effectively applied to US material processed in Tokai, and that we are unprepared to make such a finding with respect to full scale operation of the plant in the scheduled mode, we would propose to make a limited determination for a limited amount of fuel under specified circumstances, reserving judgment on any broader finding until a later time.

Option 1: Permit use of Tokai as a test-bed for an IAEA advanced safeguards program in which the plant would operate experimentally with a limited amount of US-origin fuel. This option would permit exploration of various safeguards techniques, such as advanced instrumentation, that could then be employed at any future reprocessing plants if any are built, following the evaluation program. It could entail incremental costs of about $15 million and delay plant start up as long as 6 months. This option would be consistent with our fundamental rights which relate exclusively to judging safeguards effectiveness at Tokai. It would be conducted on the explicit premise that even technically perfect safeguards cannot fully meet the problems posed by reprocessing because of the risk of safeguards termination or abrogation; that additional measures would have to be defined and evaluated before conclusive judgment could be reached on the long-term safeguardability of such plants; and, therefore, that the results would in no way legitimize reprocessing. The operations would be of limited duration and would entail a limited amount of US-origin fuel.

The Japanese might be amenable to such a solution, if the additional cost and delay were judged not to be excessive. The throughput during the experimental period would be limited but adequate to verify plant design and safety and to perform warranty checks. It would thereby help meet Japanese political objectives, and near-term program needs and to some extent reduce their concern regarding discriminatory treatment vis-a-vis the European states. It would provide information on the potential effectiveness of advanced safeguards instrumentation which could be applied to any future reprocessing plants.

This option has the deficiency of not going beyond conventional reprocessing and it involves the use of US-origin fuel in the face of a contrary policy, thereby risking creation of a bad precedent even if billed as experimental. Consequently, it could legitimize pressures for early national reprocessing or for parity treatment from countries such as Brazil, Pakistan, or India. Running the plant conventionally would also lead to storage of pure plutonium, which in general creates a security concern.

It's almost "blended"!

(This concern conceivably could be reduced if the Japanese were prepared to blend all or a significant fraction of the produced plutonium with uranium.) Furthermore, the plant would be tied up for only a limited period of time and, having treated irradiated fuels, would be less amenable to later major plant modifications for testing alternative technologies. (This could be handled if the Japanese would agree to include a coprocessing R&D program along the lines of the central element of Option 2.)

Option 2: Approve start-up of the Tokai facility for reprocessing in the scheduled mode but with a limited amount of irradiated fuel, coupled with Japanese agreement to undertake a mutually acceptable major coprocessing experiment subsequently. This option would enable the Japanese to operate Tokai according to the scheduled mode in order to demonstrate operability, verify plant design and safety and thus protect their contractual warranties. Conventional reprocessing would be limited to about 70 tons of irradiated fuel estimated to be necessary both to prove out the plant and to provide modest additional experience in the installed technology. Concurrent with conventional operation, preliminary R&D work would be undertaken in the operational test laboratory (OTL), to test one or more coprocessing variations for the plant. The US team has identified several explicit coprocessing formulations that appear technically feasible.

The Japanese probably would find this alternative acceptable if the costs and time delays were not excessive. This option would permit early start-up of the Tokai plant, enable them to prove out plant design, minimize the perceived discriminatory treatment of Japan vis-a-vis West Germany and other EC countries, and permit their advanced reactor R&D program to continue uninterrupted. The imposition of a limited throughput of US-origin fuel for conventional reprocessing in a completed and licensed facility for experimental purposes only would help avoid the problem of setting precedents or legitimizing conventional reprocessing. This thrust would be reinforced if Japan were to disavow commercial recycling in thermal reactors for now and agree to defer further action on a larger reprocessing facility. The subsequent carrying out of coprocessing experiments at Tokai would contribute to the Fuel Cycle Evaluation Program.

However, adoption of this alternative would entail approval of plutonium separation for a limited period of time. Furthermore, coprocessing per se is not widely regarded as a significant additive proliferation-resistant step. The non-proliferation value of this option would be enhanced if the Japanese were prepared to expedite development of additional storage capacity to accommodate a blended product and to commence blending as soon as practicable.

Depending on the ratio of plutonium to uranium selected, the cost of this option could be as high as $241 to $380 million, if debt and interest costs are included, and as low as $87 to $168 million if such costs were excluded. Furthermore, if the Japanese had ready access to an attractive plutonium source, these costs could be as low as $49 to $85 million. The precise impacts, however, would have to be evaluated in further discussions.

This option would be further enhanced if before plant start up, advanced safeguards instrumentation were installed so as to permit a comparative experiment in safeguarding reprocessing and coprocessing. This would reduce the precedential implications of this option, since the need for a similar safeguards experiment in another country could not be persuasively argued. It would, however, add the incremental cost ($15 million) and delay (up to 6 months) of Option 1.

If this option is chosen the negotiator would seek these additional elements but would not present them as essential requirements and would be prepared to withdraw them if Japanese acceptability of the basic option is thereby jeopardized.

Option 3: Permit the use of US-origin fuel in Tokai only for experimental coprocessing. This option would require that Tokai not operate until it had been modified to perform only experimental work on coprocessing. This condition is consistent with the objective of avoiding the further spread of "conventional" reprocessing that only produces pure plutonium, yet its experimental nature would not establish a precedent for coprocessing which some judge to be only marginally useful from a non-proliferation point of view.

Of the three options presented herein, this alternative may be the most consistent with current US non-proliferation directions; however, it contains serious liabilities in the context of US-Japanese relations. It could involve a significant delay in plant start-up, with associated added costs to the Japanese nuclear program, and could be perceived as Japanese submission to US political pressure. The Japanese would argue that it is essential for them to start up Tokai in the conventional mode to verify reliability. In the absence of approval of modifications by the French contractor, the warranties could be nullified, at risk of considerable financial loss to Japan. US insistence on such an approach would almost certainly be portrayed as unwarranted interference and as discriminatory, since we are not obliging the Europeans to coprocess nor have we coprocessed ourselves. In addition, our requirements under this option would go far beyond the intent of the safeguardability determination called for by our bilateral agreement.

Depending on the ratio of plutonium to uranium selected, the cost of this option could be as high as $243 to $400 million if debt and interest costs are included, and as low as $95 to $177 million if such costs were excluded. If the Japanese had ready access to an attractive plutonium source, these costs could be as low as $57 to $100 million. The precise impacts, however, would have to be evaluated in further discussions.

Environmental Aspects

If any of these options is chosen there is some likelihood that we may be challenged in the courts by the National Environmental Defense Council (NRDC) for having failed to comply with NEPA. The NRDC essentially has taken a position in opposition to Tokai start-up and has argued that an environmental impact statement should be prepared prior to decision. The law is not clear as to the extent to which NEPA applies outside US jurisdiction and there is an exception for Presidential actions. However, there is some precedent suggesting that we need to assess those foreign activities that are likely to affect the US environment or the global commons, such as the atmosphere or the oceans.

Without conceding on the issue as to whether NEPA need apply to this case, we have analyzed the foregoing options and have concluded that in any event, implementation of any one of them would not constitute a major Federal action requiring an impact statement. The arguments in support of this conclusion (see Annex B) are that (a) the specific environmental effects will be confined to Japan and (b) none of these experimental options should have a broad precedential implication. While we think this posture is defensible, it may be open to some challenge in the courts.