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ACTION PLAN FOR IMPLEMENTING NSDM 235

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Outline

ACTION PLAN FOR IMPLEMENTING NATIONAL SECURITY DECISION MEMORANDUM 235

I. Introduction

This Action Program has been prepared by the Under Secretaries Committee in compliance with NSDM 235 dated October 4, 1973.* NSDM 235 reported that following his review of NSSM-150 (United States Policy on Transfer of Highly Enriched Uranium for Fueling Power Reactors), the President had directed that an action program (with options and argumentation, as appropriate) should be developed by the Committee. The program was to consider the diplomatic and other steps the U.S. might consider taking with other nations, and in particular other supplier nations, "with regard to the security, non-proliferation, political and economic aspects associated with the increasing growth and dissemination of nuclear power industries, with particular focus on potential problems associated with highly enriched uranium."

With regard to future exports by the U.S. of highly enriched uranium, the President also decided that the U.S. will:

-- Review any future requests for the supply of large quantities of highly enriched uranium abroad on a case-by-case basis without an

*See Appendix A.

a priori presumption of supply. (It is recognized, however, that the U.S. has informed the European Community that its requests for supply of highly enriched uranium will receive sympathetic consideration.)

-- Require that a recipient have acceptable physical security measures in effect.

-- Weigh the position of the recipient with respect to the Nuclear Non-Proliferation Treaty in reviewing and deciding on requests for supply.

-- Not require as an essential precondition of supply that fuel fabrication and reprocessing take place in the United States or in multi-nationally-owned facilities, but will consider this factor in reviewing and deciding on requests for supply.

II. The Key Issues Considered

While the specific decision already taken relates to supply of highly enriched uranium,* the NSDM makes it clear that the action plan is to take on a broader perspective.

*Highly enriched uranium, or HEU, is uranium containing 20% or more of the 235 isotope.

Primary among the related factors which should be considered are 1) that plutonium, rather than highly enriched uranium, is the weapon material that will become available in the near term to many nations in sizeable quantities, and 2) that wide distribution of enrichment capability could soon overshadow questions of U.S. supply of HEU. Accordingly, in preparing this proposed Action Program, the following four major questions have been considered:

1. How should the U.S. apply the new policy to future transfers of U.S. highly enriched uranium to other nations?

2. What action, if any, should the U.S. take in informing other existing or potential supplier nations of the more restrictive procedures that the U.S. now proposes to apply in exporting highly enriched uranium? The objective of any such consultations would be to encourage other potential suppliers to adopt policies comparable to our own.

3. Are these constraints also applicable in whole or in part to plutonium? If so, what initiatives, if any, should be taken with other countries to assure their adoption?

4. What, if anything, can be done to assure adequate physical security for plutonium and

HEU in foreign custody which is produced indigenously, and hence not subject to supplier constraints?

5. Should the U.S. seek common understandings with other advanced nations--based on the limitations set forth in NSDM 235--concerning possible constraints on international transfers of equipment and technology related to plutonium, uranium enrichment and fuel element reprocessing?

These last two questions were not addressed in the NSSM 150 study. However, in the context of potential consultations with other suppliers on the international availability of fissile material, consideration of these questions is highly desirable. This paper and its annexes provide the relevant background in these areas. U.S. policy on export of enrichment technology was exhaustively considered in the studies which led to the U.S. offer to share gaseous diffusion technology. In order to focus this study on consultations which could be undertaken in the short term, only consultations based on existing U.S. policy (including the NSDM 235 decisions) are discussed.

This would seem appropriate, since (1) U.S. control policy would form an acceptable basis for international control understandings, at least in the short term and (2) questions of the adequacy of U.S. controls in the longer term, in view of potential technical developments in uranium enrichment methods, are being considered in a separate study.

III. Conclusions and Recommendations

Four options for consultations are identified:

A. Consult with other suppliers on policy for supply of highly enriched uranium.

B. Consult also on supply policy for plutonium.

C. Promote the general international application of acceptable physical security on nuclear material.

D. Consult on restrictions on export of enrichment and reprocessing equipment and technology.

On balance, it is concluded that the options are not mutually exclusive but rather should constitute elements in an overall U.S. effort to ensure adequate control of nuclear weapons material. It is recommended that the U.S. undertake a series of coordinated diplomatic initiatives pointed at achieving agreements with other states in the areas covered by all the options.

The following are the main observations and objectives which lead to this recommendation:

-- the need for stimulating adequate physical security constraints throughout the world (and hopefully based on U.S. or, as a minimum, IAEA standards) is pressing, and should be made equally applicable to plutonium and highly enriched uranium;

-- generally, whether or not the recipient nation participates in the NPT should be a significant factor in Governmental decisions to supply important nuclear assistance, taking into account the actual status of its safeguards negotiations with the IAEA;

-- where opportunities present themselves efforts to establish multilateral reprocessing and fuel fabrication plants should be encouraged;

-- special efforts may have to be made to dissuade certain countries (the Republic of China being a good example) from accumulating quantities of plutonium in excess of their immediate needs. In these cases special efforts should be made to encourage the storage of excess plutonium in the U.S. or in multinational facilities. (In the case of the ROC, AEC has agreed to store in the U.S. the ROC-produced plutonium which will be separated in the British Nuclear Fuels Ltd. reprocessing plant in the U.K.)

-- it should be recognized that if for any reason we are seriously concerned about the recipient's continuing willingness and ability to honor agreements, the supply of sensitive material and technology should be avoided.

-- it is desirable for the U.S. to encourage other suppliers of technology to adopt regulatory constraints similar to its own 10 CFR Part 110 (see Appendix E). Moreover, agreement on special constraints in the field of transfers of enrichment technology as outlined in this paper are warranted.

The recommended consultations, from a tactical standpoint, would consist of three parallel but not necessarily separate sets of approaches, to be inaugurated over the next several months:

1. A series of consultations with other potential international suppliers of enriched uranium or plutonium on constraints governing supply, including desirable physical security measures. In the course of these consultations we would seek to generate a broad recognition of the necessity and importance of adequate physical

security measures and the fact that they should override commercial considerations. The recent AEC regulations would serve as the guidelines for these discussions, with the understanding that compliance with the IAEA guidelines on physical security should be the minimum standard.*

*The DOD feels that the AEC regulations should constitute the minimum acceptable standard. While the other agencies participating in this study agree that the U.S. regulations should serve as the strongly preferred point of departure in consultations, they note that (1) the IAEA standards were formulated by an international working group in which the U.S. participated, (2) some differences in national practices may be unavoidable, and (3) acceptance of IAEA standards as a minimum would be preferable to having no global improvement of physical security measures at all.

2. Talks with other states likely to possess weapons grade material, and with the IAEA, on the relative merits of concluding an international convention prescribing basic standards concerning physical protection of nuclear materials and facilities. Again our objective should be to gain acceptance of the U.S. standards to obtain greater assurance of security;

3. Talks with other suppliers of technology and equipment in the reprocessing and enrichment fields on desirable new constraints or guidelines that should be followed in these areas drawing on (a) U.S. experience in implementing Part 110 and (b) the specific recommendations appearing on pages 46 to 48 of this paper relating to limitations in the field of enrichment.

In general, the international constraints suggested in this study are extensions of existing U.S. constraints. Thus adoption of the action plan outlined here should have no major economic penalty for the U.S., and its success could prevent some potentially substantial losses of U.S. equipment or toll enrichment sales by equalizing terms among suppliers. It must be recognized, however, that in

some cases U.S. export sales can be lost if consumers consider our terms to be onerous or if failure to meet the criteria disqualifies certain states from receiving our products.

The precise timing scenario and content of the foregoing consultations would need to be carefully developed to minimize the possibility of overloading the circuit and producing hostile reactions at the NPT Review Conference to be held in the Spring of 1975. Moreover, the other countries consulted may vary with the subject matter.

Periodic reports on the progress of these efforts would be submitted by the Under Secretaries Committee to the President and the principals for their information, with any recommendations for further action.

IV. Discussion: Constraints on Supply of Material

A. Further Steps that U.S. Itself Needs to Take in Implementing the New Policy

The essence of the new policy announced in NSDM 235 is that the U.S. will be selective in transferring highly enriched uranium to other nations for power reactor use. Implicit in the new approach is the idea that requests might be discouraged or denied if we have a basis for believing a state is unable or unwilling to fulfill its peaceful guarantees or if supply would seriously detract from our non-proliferation objectives. Moreover, it is assumed that:

-- first preference in supply would be given to states that are parties to, or that have signed, the NPT;
-- where feasible, we would encourage, but not insist on, fabrication and reprocessing of the fuel in multinationally-owned facilities when such processing is done overseas.
-- we would use our opportunity to approve or disapprove re-exports in a manner that tends to reinforce the policies recommended herein.

Also, it has been generally felt that embarrassing situations can be avoided by establishing close consultations with the Gulf Corporation regarding potential future sales of high-temperature gas-cooled reactors (HTGR) for which Gulf is the sole supplier. The USAEC has informed Gulf of the new policy.

Insofar as the question of physical security is concerned, the U.S. needs to promptly define: (a) acceptable recipient physical security measures, (b) how the understandings regarding such measures might best be set forth in agreements with the other nations, and (c) what rights, if any, the U.S. would like to have to verify the understandings agreed to.

A clear distinction must be made at the outset between (a) physical security measures which might be required to be taken by a recipient country against theft or sabotage by individuals or groups not associated with the government (i.e., subnational level diversion), and (b) physical security measures taken by an entity external to the recipient country, such as the U.S. Government, the IAEA, or a UN police force, against diversion by the government of the recipient country (i.e., national level diversion). It is assumed that the former objective is the only realistic one in the context of the decision in NSDM 235 and that IAEA's NPT safeguards, where applicable, and national intelligence efforts will have to suffice with regard to concerns about national level diversion.

It also should be noted that the detailed IAEA-NPT safeguards procedures are silent on matters of physical security other than to charge the state with the responsibility for establishing a materials accountability and control system. Accordingly, although the IAEA has issued physical security guidelines, it does not now have the right to impose these measures on member states or to verify compliance.

In general, the safeguards developed to date for use by the IAEA have been designed to detect losses and

possible diversions of material through inventory taking and checking of material balances. While such procedures have the important advantage of being quantitative in nature, they of necessity constitute a post facto mechanism. Thus the improvement and elaboration of adequate physical security measures on a global scale is extremely important as a supplement to the IAEA safeguards and control procedures. Strong physical constraints are necessary in preventing overt acts of sabotage or theft and in minimizing the threats of diversion that could occur while materials are in transit.

It is recommended that the U.S. should attempt to make the supply of highly enriched uranium conditional on the recipient having a physical security system in effect that is at least as effective overall as the measures that the U.S. adheres to domestically in its peaceful nuclear power program, recognizing there may be variances in national practice.

The USAEC has recently significantly upgraded its domestic regulations covering the physical protection of nuclear plants and materials including those in transit.

Under the new regulations, the operator of a power reactor or fuel fabrication or reprocessing plant, must prepare a physical security plan and submit it to the USAEC for approval. Operators of fuel reprocessing plants and other licensees, such as operators of fuel fabrication plants, who possess five or more kilograms of highly

enriched uranium (uranium enriched to 20% or more in the U-235 isotope) and two or more kilograms of uranium-233, or plutonium (or in combinations exceeding 5000 grams using a weighting factor of 2-1/2 for Pu and U-233) are required to abide by the following conditions:

Maintain a physical security organization, including armed guards, to protect his facility against industrial sabotage and the special nuclear material in his possession against theft. (At least one supervisor of the security organization must be onsite at all times. The licensee must establish, maintain, and follow written security procedures which document the structure of the security organization and which details the duties of guards, watchmen, and other individuals responsible for security. All guards or watchmen must be properly trained, equipped and qualified.)

Special nuclear material must be stored and processed within a protected and controlled area designated as a "material access area". (Material access areas must be located within a larger protected area which is surrounded by a physical barrier. An isolation zone is required around the outer physical barrier and it must be kept clear of obstructions, illuminated and monitored to detect the presence of individuals or vehicles attempting to gain entry to the protected area.)

Personnel and vehicle access into a protected area, or material access area must be controlled. (A picture badge identification system must be used and visitors must be registered and escorted. Individuals and packages entering the protected area are required to be searched. Admittance to a material access area must be controlled and

access limited to those persons who require such access to perform their duties. Methods to observe individuals within a material access area to assure that special nuclear material is not being diverted must be provided and used on a continuing basis. All individuals, packages, or vehicles are searched for concealed nuclear material before exiting from a material access area. Keys, locks, combinations and related equipment are required to be controlled to minimize the possibility of compromise.)

All emergency exits in the protected area, vital areas and material access areas must be alarmed. (Each unoccupied material access area must be locked and alarmed. All alarms must annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station. All alarms must be self checking and tamper indicating and inspected and tested for operability and required functional performance at specified intervals not to exceed 7 days.)

Each guard or watchman on duty must be capable of maintaining continuous communications with an individual in a continuously manned central alarm station within the protected area, who is capable of calling for assistance from other guards and from local law enforcement authorities. (To provide the capability of continuous communication with local law enforcement authorities, two-way radio voice communications must be established in addition to conventional telephone service. All communications equipment must remain operable from independent power sources in the event of loss of primary power, and must be tested for operability and performance not less frequently than once at the beginning of each security personnel work shift.)

Licensees must establish liaison with local law enforcement authorities. (In developing security plans, licensees must take into account the probable size and response time of the local

law enforcement assistance. The security force must be prepared to take immediate action to neutralize threats to the facility, either by appropriate direct action or by calling for assistance from local law enforcement authorities on both.)

Recognizing the unique vulnerability of the transportation phase, new regulations have been applied to licensees who ship five kilograms or more of uranium-235 (contained in uranium enriched to 20 percent or more in the U-235 isotope) and two kilograms or more of plutonium or uranium-233 (or in combinations which exceed 5000 grams using a weighting factor of 2-1/2 for Pu and U-233).

Under the terms of these new conditions, the licensee must submit a plan to the AEC for review and approval outlining the methods to be used for the protection of special nuclear material in transit.

The plan must demonstrate the means to be used in meeting the following requirements:

(1) If a common or contract carrier is used, the special nuclear material must be transported under the established procedures of the carrier which provides a system for the physical protection of valuable material in transit and requires a hand-to-hand receipt at origin and destination and at all points en route where there is a transfer of custody. Transit times of all shipments must be minimized and routes selected to avoid areas of natural disaster or civil disorders. Special nuclear material must be shipped in containers

which are sealed by tamper-indicating type seals. The outer container or vehicle is required to be locked and sealed. No container weighing 500 lbs. or less may be shipped on open vehicles, such as open trucks or railway flatcars.

(2) All shipments by road must be made without any scheduled intermediate stops to transfer special nuclear material or other cargo between the point of origin and destination. All motor vehicles are required to be equipped with a radiotelephone. Calls must be made at predetermined intervals normally not to exceed two hours and if calls are not received when planned, the licensee or his agent must immediately notify an appropriate law enforcement authority and the AEC. Shipments by road must be accompanied by at least two people in the transport vehicle. If the transport vehicle is not specially designed with penetration resistant and immobilization features, the vehicle is required to be protected by an armed escort consisting of at least two guards in a separate escort vehicle. In addition, transport vehicles are required to be marked on top, sides, and rear with identifying letters or numbers.

(3) Shipments of special nuclear material in quantities exceeding 20 grams or 20 curies, whichever is less, of plutonium or uranium-233 and in excess of 350 grams of uranium-235 are prohibited on passenger aircraft. Shipments on cargo aircraft are required to be arranged so as to minimize the number of scheduled transfers and these must be monitored by armed guards..

(4) Rail shipments must be escorted by two armed guards in the shipment car or in an escort car. Continuous on-board radiotelephone communications capability must be provided with conventional telephone backup. Periodic calls are required to the licensee or his agent.

(5) Shipments by sea must be made on vessels making the minimum ports of call. Transfer at domestic ports from other modes of transportation

must be monitored by an armed guard. Shipments must be placed in a secure compartment which is locked and sealed. Export shipments must be escorted by an authorized individual who may be a crew member, from the last port in the U.S. until it is unloaded in a foreign port. Ship-to-shore communications must be made every twenty-four hours to relay position information and the status of the shipment as determined by daily inspections.

(6) All transfers of SNM shall be monitored by an armed guard. Material in storage shall be kept under continuous visual surveillance and storage time shall not exceed twenty-four hours.

(7) A licensee who makes a shipment must notify the consignee of the shipment schedule and details, including the estimated time of arrival of the shipment. A licensee who receives a shipment must immediately notify the shipper. Shipments which fail to arrive at the destination on time must be traced and the AEC must be notified.

The recently adopted USAEC regulations were the product of extensive study and analysis and would appear to be a desirable basis for determining whether the potential recipient of U.S. highly enriched uranium has an adequate security system. It can be anticipated, however, that some of our customers, either for political, constitutional, or legal reasons may resist or be unable to adopt, in toto, the U.S. procedures. Since the IAEA also has issued physical security guidelines, other nations might consider them a more appropriate standard. They might find it awkward to publicly acknowledge that they have

agreed to accept conditions laid down by the U.S. rather than those recommended by an international body. Also, published doubts as to the effectiveness of past U.S. practices could make discussion on the basis of those standards somewhat awkward.

However, the principal reason for favoring the recent AEC regulations as a point of departure over the IAEA guidelines is the substantially greater degree of specificity of the former over the latter. Moreover, the AEC regulations were prepared after the IAEA guidelines and reflect latest U.S. attempts to cope with current diversion threats (e.g., including the need for armed guards in some cases). The IAEA guidelines contain, nevertheless, many useful features that should be taken into account in the negotiations.

These factors suggest that any stipulations of U.S. physical security requirements covering transfers of highly enriched uranium may have to be the product of case by case negotiation with the other governments involved and may have to be based in some respects on the guidelines issued by the IAEA. Moreover, where the agreed-upon standards or procedures explicitly go beyond the procedures called for by the IAEA, the recipient government may desire that the understandings be set forth in a confidential exchange of notes with the U.S.

It is anticipated that our understandings would be fully negotiated prior to the time of execution of the fuel supply contract and would come into force at the same time. Moreover, the notes that would be exchanged would afford the U.S. the opportunity, through periodic visits, to observe that the mutually agreed physical security system is being implemented by the consumer.

It also must be recognized that some states may be resistant to our new conditions on the grounds that they go beyond the terms of our agreements for cooperation. Our agreements normally stipulate that uranium enriched to greater than 20% in the isotope U-235 may be provided when there is a technical and economic justification for such a transfer. Thus other countries may view these criteria as the only two explicit preconditions to the receipt of such material that they have accepted.

It is proposed that any formal rejections of applications to export HEU would be reported to members of the USC sufficiently in advance to permit opportunity for comment.

B. Consultations with Other Suppliers

Having delineated the kinds of undertakings that the U.S. might seek bilaterally as a supplier, this section discusses the range of consultations and diplomatic steps we might take to encourage other suppliers to abide by policies comparable to our own. A range of subjects, including transfers of plutonium, transfers of enrichment and reprocessing equipment or technology, and general international measures on physical security, is considered.

1. Should our consultations be limited to transfers of highly enriched uranium?

The U.S. presently is the only near-term (between now and 1981-85) supplier of highly enriched uranium for power reactor use since the UK, France and PRC evidently do not have sufficient capacity to export significant amounts of this material. Also, the USSR, while evidently possessing excess gaseous diffusion capacity, appears disposed to offer only toll enrichment services for reactors employing low (up to 5%) enriched uranium. Moreover, no country other than the U.S. (through the Gulf Corporation) is now actively offering

for export* a power reactor, like the HTGR, that requires highly enriched uranium fuel, although interest in this type reactor is high abroad, and commercial offerings by other suppliers are probable in Europe and Japan. Consultations limited to the problem of highly enriched uranium might seem premature at a time when the U.S. is the only supplier of substantial quantities of this material; such limited consultations might also be distorted and exploited by foreign reactor competitors by calling attention to the special constraints attached to the HTGR. Moreover, many of the considerations** that relate to export of highly enriched uranium and HTGR systems also apply to possible future international transfers of plutonium or more broadly to assistance for plutonium-producing reactors. For all of the foregoing reasons, it

*The countries considered likely customers for the HTGR are France, the UK, the FRG, Brazil and Japan. Gulf Energy and Environmental Systems has an agreement with Brown Bovari of FRG to have their (Gulf's) HTGR system technology marketed in Western Europe. This provides an alternate source of technology.

**The nature of the safeguards problems presented by the rapid growth of nuclear power throughout the world and the nature of the safeguards measures which are now being taken were also extensively treated in the NSSM 150 and 120 reports.

becomes desirable to examine whether consultations on the problem of highly enriched uranium should not be broadened to include other aspects of the spread of nuclear weapons materials.

2. Suitability of also Discussing Desirable Constraints to Apply to Plutonium

While consultations with other potential enrichment suppliers may be desirable, it might be more desirable to orient our consultations to include plutonium as well as highly enriched uranium. The question arises, however, as to whether the two cases are fully comparable. One difference which would arise is in the manner of implementing the constraints. So long as the AEC is the producer of highly enriched uranium, it is in a position to decline to sell. Pu on the other hand is likely to be primarily in private hands, and refusals to supply would have to be implemented through the regulatory and licensing procedures of the United States. As a point of departure, the constraints stipulated in NSDM 235 are used as a basis for analysis:

Constraint

a. Supply only on a case-by-case basis "without an a priori presumption of supply."

At the present time, and as a general rule, plutonium is not being supplied on any large-scale basis to other

nations. Neither does the U.S. have any plans or aspirations to be a large-scale exporter of this material. With the advent, however, of plutonium recycle technology and the development and use of breeder reactors, plutonium is likely to become a common commodity in international commerce. Accordingly, there would appear to be considerable merit in our encouraging potential international suppliers of plutonium to adopt at least the same type of case-by-case selectivity in agreeing to transfers as the U.S. now deems appropriate for highly enriched uranium. It is recommended that the U.S. adopt such an approach when it inaugurates its consultations with other suppliers.

There also would be merit in discussing both plutonium and highly enriched uranium transfers on the same occasions. To place this matter in perspective, it must be recognized that the bulk of the plutonium* that will become available to other nations will be indigenously produced. Accordingly, effective controls over foreign plutonium will have to rely more on other factors in constraining proliferation or triggering safeguards than on the leverage occasioned by international transfers of plutonium itself.

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* See footnote on following page.

Footnote from preceding page

The following summarizes the different types of threats posed by diversions of nuclear materials. In brief, if nuclear materials were acquired by diversion, overt theft or capture, or black market operations, between 6 and 16 kgs. of uranium enriched to higher than 90 percent U-235, or 6 to 18 kgs. of U-233 would be adequate for the construction of a relatively inefficient nuclear explosive that might yield as high as tens of kilotons. It also is worth noting that a workable weapon could be designed by technologists with no prior weapons experience. Moreover, with less material and less technical sophistication, terrorists or dissident groups could use Pu and perhaps U-233 as a radiological contaminant. Highly radioactive nuclear waste materials could also be used as a radiological contaminant. However, since they are much more difficult to handle than Pu, they would be less desirable materials to steal for subsequent use as a contamination threat.

The threat also exists that large areas might be deliberately contaminated with special nuclear materials (especially plutonium) or other radioactive materials by sabotage of nuclear facilities rather than by stealing and dispersing the material. The consequences of such acts would depend on a number of factors.

Generally, if nuclear materials were to be diverted or stolen for weapons or contamination purposes, the key targets for a potential thief would be unirradiated, highly enriched uranium at any point in the cycle, and plutonium from reprocessing plants while in storage, transit, or conversion and fabrication processes; i.e., until mixed with uranium oxide and contained in fabricated fuel elements. The transportation phase is generally considered to be the most vulnerable to overt theft.

Constraint

b. Require that a "recipient" have acceptable physical security measures in effect.

The desirable physical security measures that would help prevent diversion (including thefts or sabotage by dissident groups) of plutonium appear technically indistinguishable from those applicable to highly enriched uranium. Moreover, as already noted, plutonium is the weapons grade material that will become rapidly available on a global basis. (Appendix B provides data on the estimated quantities of Pu that are now available and that are expected to become available to foreign nations by 1980.) This suggests that the U.S. should inaugurate a vigorous, systematic diplomatic effort to encourage the application of the same kind of physical security measures to plutonium as it will hereafter require for highly enriched uranium, and that preferably the desirable physical protective measures for both materials should be discussed at the same time in our consultations with other suppliers and consumers.

There is substantial evidence, however, as gathered in the IAEA, that many nations regard the question of physical security measures, as they apply to their own nuclear activities, as essentially a national regulatory

or police prerogative. Hence, strong resistance can be foreseen towards any U.S. efforts to induce other suppliers to impose U.S.-type physical security standards on their customers. The consumers of such material also may be especially resistant to terms that are imposed bilaterally, although they may be more amenable to abiding by guidelines established by an international body (IAEA). On the other hand, we should seek to make clear the compelling importance of adopting adequate physical security measures in preventing diversions, thefts, and sabotages. The principal safeguards procedures developed to date for use by the IAEA have been designed to detect losses of material through inventory taking and checking of material balances. While such procedures have the advantage of being quantitative in nature, they of necessity constitute a post facto mechanism whereas physical constraints are more immediate and preventative.

As already noted, the plutonium to be supplied internationally probably will represent only a small fraction of that produced and, therefore, the internally produced plutonium should be the real target of any new physical security regime. Accordingly, while we might begin our

consultations with potential suppliers of uranium or plutonium, it is advisable that after preliminary soundings these consultations be broadened to include all states which produce their own Pu, with the view of framing some new multilateral restraints in this area. A prompt study is needed within the U.S. Government of the merits of framing a proposed international convention based on the IAEA guidelines and U.S. standards, covering desirable national practice in the field of nuclear physical security. Once this draft is suitably developed, the U.S. should then informally seek to ascertain its acceptability to other nations and to the IAEA. Although, as pointed out above, this is an area of substantial sensitivity, the effort should be undertaken to establish these physical security standards prior to the coming rapid growth of national nuclear power industries.

Constraint

c. Weigh the position of the recipient with respect to the Nuclear Non-Proliferation Treaty in Deciding on Requests for Supply.

In principle, a nation's attitude towards the NPT and proliferation should be weighed when exports of highly enriched uranium or plutonium are considered. While NPT adherence should not necessarily be a precondition for

obtaining any type of assistance, whether or not the recipient nation participates in NPT will be a significant weighting factor in evaluating each case. There appears to be substantial merit as we approach the time of the NPT Review Conference to our making such an attitude more publicly visible internationally. Such a policy might help to assure that the activity being supported would be under NPT safeguards and might provide some incentive for NPT adherence by recipients.

It is recommended that we express views along these lines in our future consultations with other potential suppliers of highly enriched uranium, plutonium, and other forms of assistance. As noted below, the U.S. already has moved significantly in this direction in its own national regulations covering nuclear technology transfer to other countries, but little has been done to advocate this policy among Western supplier nations.

Constraint

d. Consider whether the fuel fabrication and reprocessing take place in the U.S. or in multilaterally-owned facilities.

From a non-proliferation standpoint, U.S. interests would best be served if plutonium, supplied or produced through U.S. assistance, as well as highly enriched uranium supplied, were fabricated and reprocessed in the U.S. or

in multilateral facilities overseas that are subject to IAEA safeguards. (Similar considerations also would apply to arrangements for the storage of plutonium that is not actively being utilized in civilian programs.) Several of the considerations leading to these conclusions were outlined in the NSSM 150 report. However, neither alternative is achievable or totally practicable. The difficulty is that many industrialized nations are acquiring or can be expected to acquire, their own facilities. A partial list of facilities already existing or planned appears in Appendix C. Most nations also can be expected to be resistant to any constraints that they do not deem to be in their best interests from an economic standpoint. If they are NPT parties, they may argue that any limitations in these areas would be incompatible with Article IV of the NPT. That Article sets forth provisions regarding a Party's engaging in civilian nuclear development. Thus, initiatives pointed at new limitations in these areas could prove particularly troublesome if our proposals were the subject of attack at the forthcoming NPT Review Conference. Also, while the U.S. may temporarily enjoy a monopoly position in supplying highly enriched uranium, the same situation obviously does not apply for plutonium, and we can expect to encounter the

strong argument from NPT parties that if the materials involved are subject to NPT safeguards, this should be entirely sufficient from a proliferation standpoint.

Accordingly, while the general proposition of encouraging the establishment of multinational fuel fabrication or reprocessing plants remains attractive (for plutonium as well as highly enriched uranium), it remains questionable as to what degree other suppliers will agree to make this a factor in supply. Nevertheless, a dialogue with other suppliers on the pros and cons of establishing regional or multilateral facilities of this character would have merit.

On balance, this study concludes that all of the constraints set out in NSDM 235 should be equally applicable to international transfers of both plutonium and highly enriched uranium. However, in view of the limited role of direct supply of plutonium, it appears that efforts to encourage universally adequate physical security for plutonium will be more important than consultations on conditions of supply, per se. Also, in considering consultations with suppliers, we should decide the relative urgency and priority of the supply questions. In that context, constraints on the supply of equipment and technology should be considered.

3. Intelligence and Recovery Coordination

It must be recognized that physical security considerations alone may not be adequate protection against a determined, organized, domestic or international group which seeks to acquire highly enriched uranium or plutonium for criminal or political reasons. Consideration must be given to ways of facilitating: (a) advanced warnings of thefts being planned by such groups, and (b) the pursuit and recovery of the fissionable material in the event of a theft. The establishment of a mechanism or the adaptation of existing mechanisms for the timely and orderly exchange of intelligence and counterintelligence information among the various departments and agencies of the U.S. Government as well as the utilization of the existing positive and counterintelligence liaison channels with foreign governments are deemed necessary to cope with this problem of theft. The same channels could prove useful in coordinating pursuit and recovery efforts in case of international movement of stolen material.

V. Constraints on Supply of Equipment or Technology

In discussions with other states of the appropriate conditions for international handling of weapons-useable nuclear material, the need to put the problem in perspective will arise. In particular, the spread of production capabilities will come to dominate the problem. Reprocessing capability will be, for many states, the last required step to indigenous production of plutonium. In addition to the growth of indigenously produced plutonium, a major factor is the potential spread of uranium enrichment capabilities. As indicated below, the existing (Zangger Committee) understandings, while useful, are confined to the relatively narrow question of specific obligations under the NPT, and do not adequately cover this area.

It would be advantageous to be prepared, in consultations, to outline US policy for control of the relevant reprocessing and enrichment technologies and to discuss the general types of supplier policies which would be appropriate. This section will outline the relevant background and consider the context and content of possible consultations on this subject.

A. The Nature of Constraints that Should be Applied to the Export of Equipment (Experience of the Zangger Committee).

For several years, the U.S. has endeavored to formulate common agreement with other suppliers concerning those items of equipment that should, when exported, trigger the application of safeguards. Most recently, such consultations have been held through the auspices of the so-called Zangger Committee, an ad hoc group of representatives of fifteen states* which are present or potential exporters of special equipment or materials for use in nuclear processes. A principal objective of the Committee's deliberations has been to establish guidelines on exports of materials and equipment to non-nuclear weapons states (NNWS) which are not party to the NPT. These guidelines would specify those exports which should be made only on the condition that safeguards pursuant to an IAEA agreement will be applied to nuclear material involved. The emphasis has been on the NPT and such guidelines are intended to (a) help translate into practice the undertaking in Article III.2.

*Australia, Austria, Belgium, Canada, Denmark, Federal Republic of Germany, Italy, Japan, the Netherlands, Norway, South Africa, Sweden, Switzerland, United Kingdom and the United States.

of the NPT, especially for those suppliers who are or expect to become NPT parties. The objective has been to frame a common minimum export control policy, so that those suppliers who might otherwise be more lax in requiring safeguards will not thereby obtain a competitive advantage over those who are more conscientious.

As a result of three years of hard bargaining and negotiations, a minimum trigger list (see Appendix D) of nine reactor items,* plus complete fuel fabrication plants and chemical reprocessing and isotope separation plants and equipment, has been agreed upon. The export of any of these items to a NNWS would trigger IAEA safeguards. The negotiations, however, have not covered transfers of technology, per se, inasmuch as Article III.2. of the NPT does not call for safeguards when only technology is involved. Neither have other constraints that appear to go beyond the NPT been discussed in the Zangger Committee.

Although the Soviet Union has not become a member of the Committee, it has agreed to comply with the list. Several Committee members have also indicated that

*Reactors, pressure vessels, fuel charging and discharging machines, control rods, pressure tubes, zirconium tubes, primary coolant pumps, heavy water, and nuclear grade graphite.

their final acceptance of the list is contingent on acceptance of the list by France, which is not an adherent to the NPT, but has declared in the past that it would behave exactly as states adhering to the Treaty.

The French are not members of the Zangger Committee, and have not indicated whether they will abide by the recommendations. They have, however, been kept aware of the Committee's progress. It is considered important that the French in some way accept or indicate that they will conform with the Committee's recommendation for two reasons: First, suppliers may not adhere to the Committee's recommendations if there is serious concern that France will undercut them by selling Trigger List items, without safeguards, to NNWS's not party to the NPT. Second, the obligation of the European Community (EC) countries under the Community Treaties not to restrict trade within the Community apparently raises a possible legal problem whether the EC countries may require that nuclear exports to France be conditioned on a French pledge not to re-export to NNWS.

It is hoped that France will, in some acceptable fashion, endorse the Committee's recommendations.*

*If the French problem is resolved, it is contemplated that the eight members of the Committee who have ratified the NPT will inform the IAEA Director, Dr. Eklund, of the

If it does not, the bases for carrying out the Committee's recommendations will have to be re-examined to determine whether some other common system could be agreed upon. At the worst, the entire arrangement could collapse, and adherence to the trigger list developed by the Committee eroded by commercial considerations.

Overall, although the Zangger Committee has been extremely useful in achieving agreement on a "trigger list," it would not appear to be a useful forum for discussing new constraints on exports of equipment or materials that appear to be beyond the strict requirements of NPT. These preferably should be handled in a series of bilateral consultations with other suppliers.

* (Cont'd) list and their intention of requiring IAEA safeguards in relation thereto. Seven of the fifteen Committee members (Belgium, FRG, Italy, Japan, the Netherlands, South Africa, and Switzerland) have not as yet ratified the NPT and will not be in a position to inform the IAEA of their agreement to the list, although they have indicated that, in the meantime, they would plan to abide by the Committee's recommendations, would exchange with other participants annual reports on exports of Trigger List items, and participate in a review of the list in September 1974.

B. Controls Over the Export of Nuclear Technology

1. General Policy of the U.S.

In many respects, the export of nuclear technology may be more important than the control of materials or equipment especially when the technology allows the foreign country to mass produce materials or equipment (Pu, U-235, centrifuges, etc.) for domestic or export purposes without safeguards. Control of nuclear technology within the U.S. is based upon provisions of the Atomic Energy Act. Restricted Data can be communicated to other countries only under stipulated conditions. An Agreement for Cooperation is required and such agreements require Presidential approval and must be submitted to Congress.

The principal restriction on the dissemination of U.S. unclassified information is set forth in Section 57.b. of the Act,* which states it shall be unlawful for any U.S. citizen to directly or indirectly engage in the production of any special nuclear material outside of the United States except (1) under an Agreement for

*There also are some items of equipment and materials useful in nuclear facilities that are controlled by the Department of Commerce and some of these items can be exported under general authorizations. Those items requiring a specific Commerce license are referred to the AEC for recommendations.

Cooperation, or (2) upon authorization by the USAEC after a determination that such activity will not be inimical to the U.S. interest. The Atomic Energy Act, however, also provides for "...a program of international cooperation, as widely as expanding technology and considerations of the common defense and security will permit." (Section 3e)

In keeping with the 1954 Act and the "Atoms for Peace" program, the Commission published a regulation, 10 CFR, Part 110, which provided a general authorization for U.S. citizens to engage in unclassified activities in foreign, non-Sino Soviet bloc atomic energy programs. Also, essentially all of the U.S. data on civilian nuclear power plants and on the processing of fuels from such plants were declassified and remain unclassified. For several years the foreign activities in which U.S. citizens participated under this broad authorization presented no significant problems. However, an increase in the extent of certain types of cooperative activities involving U.S. companies and other countries caused the AEC to reassess its policy. For example, India requested U.S. companies to help in the design and construction of a heavy water plant and nuclear reactor, but proved unwilling to accept international safeguards on these

facilities. Also, there were numerous requests for assistance in enrichment and chemical processing which raised national security and international safeguards issues.

Accordingly, and because of U.S. interest in the NPT, the AEC in 1972 amended its regulations (see Appendix F) to require specific authorization for any person under the jurisdiction of the United States to directly or indirectly engage in certain activities outside of the U.S. in the fields of uranium enrichment, chemical processing and heavy water production.

On the occasion of this regulatory change, the AEC announced that it did not intend to prevent by this change the transfer of standard off-the-shelf items or the communication of information which is available to the public in published form. The regulations also prescribe that the AEC will give special attention to the extent that the proposed assistance is significant or substantial and will consider the following factors: (1) Whether the U.S. has an agreement for cooperation with the country in which the proposed activity will be conducted; (2) Whether the other country involved is a party to the NPT and has concluded a safeguards agreement with the IAEA covering

its peaceful nuclear activities; (3) Whether the country in which the proposed activity will be conducted, if not a party to the NPT, will accept IAEA safeguards with respect to the project; (4) The relative significance of the proposed activity and availability of comparable assistance from other sources; and (5) Any other fact which may bear upon the political, economic, or security interest of the U.S.

The U.S. regulatory framework for controlling the export of nuclear technology as outlined above would appear to be and is recommended as a desirable point of departure for use in encouraging other countries to adopt suitable controls over the export of nuclear technology, including cooperation in the field of chemical reprocessing. However, there is ample evidence that several other suppliers (if not the majority) may be more lax in their regulations, more disposed to assist others regardless of whether adequate safeguards apply, and thus probably resistant to our efforts. Again, this suggests that the problem may have to be approached through a series of bilateral consultations.

2. Constraints on the proliferation of uranium enrichment equipment or technology

The necessities of large scale operation and of very large power inputs severely limit the

nuclear weapons proliferation potential of the gaseous diffusion enrichment technology. This technology has been employed by all the present nuclear powers, and is the only commercially-applied uranium enrichment method to date.

In a strictly commercial sense, and in the near term, no enrichment technology would be considered significant from the standpoint of widespread use unless it were competitive with the U.S. diffusion technique. However, these economic considerations would not be as relevant for states which desire weapons programs, since they may decide to endure some price disadvantages to achieve an indigenous enrichment capability. Therefore, enrichment technologies which are more expensive or less proven than diffusion can still be significant.

The gas centrifuge method shows considerable promise of being less costly than diffusion. Also, the characteristics of this technology (versatile cascade arrangement, low power, viable small plants) are much more conducive to clandestine use than is diffusion technology. The gas centrifuge method is now being developed by the U.S., the USSR, the Tripartite (Dutch, FRG, UK) group, and Japan and small

R&D programs are underway in Italy and Australia. The U.S. and tripartite developments are quite advanced, and that of the Soviets probably is also. Japan's effort has been relatively small, but is growing.

Another potential enrichment technology is the jet nozzle process, which is under development in Germany. This process uses high power, and is probably not competitive with diffusion. It apparently does not have the proliferation potential of the centrifuge method.

Finally, other enrichment methods may be possible. The South Africans are developing a method which they claim is competitive with gaseous diffusion. Technical details on the method are not available. The use of lasers for enrichment is under study, at least in the U.S. and perhaps elsewhere. In general, the possibility of new developments should be taken into account, to the extent possible, in formulating controls on the spread of enrichment technology. The implications of these potential developments are being considered in a separate study.

With the exception of France and the PRC, the major potential suppliers of enrichment technology or equipment have either signed or ratified the NPT, and France has stated that it will behave exactly as parties to the Treaty. Thus, most potential suppliers would

appear committed in principle to demand the application of safeguards in conjunction with any exports of enrichment technology or equipment to other states, although based on experience the prospective French posture is a continued source of concern.

The Soviet Union is very unlikely to be the source of technology spread due to its strong anti-proliferation interests, its inclination to closely protect its technology, and its interest in selling enrichment services. The PRC is also very unlikely to spread enrichment capability, and in any case, the level of its diffusion technology is probably well behind the other weapons states.

The long-term prospects for spread of the Tripartite centrifuge technology are less clear.* On the one hand, the U.S. has an understanding with the Tripartite group to classify and protect centrifuge technology. The agreement establishing the Tripartite group includes several commitments to assure that adequate measures are taken to ensure that the technology does not contribute to nuclear weapons proliferation. On the other hand, we have no recent discussions with the group as to conditions under which they would export either enrichment equipment or technology.

*See Appendix F.

Given the early status of its program, Japan probably has not formulated a precise policy on export of centrifuge or other enrichment technology or equipment.

The dominant aspects of South African thought with regard to enrichment technology protection are the somewhat conflicting desires to keep their process secret, and to interest potential investors in the process. However, recent reports suggest that South Africa would be prepared to have the enriched product subject to IAEA safeguards.

On November 23, 1973, the French Government announced its intent to proceed immediately with construction of a 9 million SWU gaseous diffusion plant to come into operation in 1979. The French commitment is independent of multinational support, although Italy, Belgium and several other nations are believed to be interested. It is not known what policy France will adopt with regard to providing foreign investors with access to French diffusion technology.

Based on the substantial amount of activity now underway, there would appear to be merit to promptly inaugurating consultations with other potential suppliers of enrichment services or enrichment equipment pointed at the development of commonly agreed constraints on exports of technology.

By way of cautions, however, we would not wish our approach to be viewed as a harassment of the West European or other ventures, and we should keep in mind that others may interpret our actions as being incompatible with Article IV of the NPT.

With these caveats our approach to other potential suppliers might have the following elements:

(i) We could note that the inability of IAEA safeguards to cover technology per se requires some particular restraint on supply of technologies, such as enrichment technology, which are especially sensitive from a proliferation standpoint. Furthermore, we might note that the export of technology may not in general be separable from exports of equipment since a substantial degree of reverse engineering may be possible.

(ii) As a basic point of departure we might offer the following constraints in the discussions. Sensitive enrichment technology (notably that uniquely applicable to the process): (1) Would preferably not be internationally transferred except for use in multinational plants; (2) Preferably would only be transferred to states that have signed NPT. (However, we obviously could not stipulate NPT signature

as an absolute precondition in our consultations with France or South Africa since neither has signed the NPT), and (3) Would not be transferred except under specific agreements. These agreements would (a) prohibit technology retransfer except as authorized by the party supplying the data, (b) provide that the materials involved would be subject to IAEA safeguards, (c) call for maintenance of classification on sensitive details of the process and where feasible prohibit the production of highly enriched uranium, and (d) call for controls over unclassified assistance rendered to third countries. (Some of these constraints might be argued to be inconsistent with NPT Article IV, but they could be defended, especially since in many respects they coincide with the limitations the Tripartite countries already have agreed to.

(iii) We would describe our postulated constraints as being compatible with the NPT. We would avoid interpreting the NPT to specifically require further restrictions and we would seek to avoid a debate over language and interpretations of the Treaty.

(iv) Our approach would be put in the context of general understandings among as many potential suppliers as possible, and in particular would stress U.S. willingness to agree to the proposed restraints, and U.S. willingness to try to get as many other suppliers as possible to agree. This would avoid the appearance of an attempt to foreclose a specific potential deal (such as the reported willingness of the FRG to export centrifuge technology in conjunction with a German reactor sale).

(v) We would initiate our discussions bilaterally or in small groups with other potential suppliers starting with the Tripartite Centrifuge Group and fanning out to France, South Africa, Japan and possibly ultimately the USSR. Since essentially all the potential proliferation problem countries are outside the Sino-Soviet bloc, there is little reason to pursue restrictions through COCOM. Likewise, and for the reasons already given, the Zangger Committee is not appropriate for further initiatives on control of enrichment or reprocessing technology (in contrast to equipment).

3. Special Considerations Relative to the Export of Enrichment Equipment

In many cases the export of enrichment equipment would serve to disclose technology, and under the scenario discussed would be subject to the proposed restraints discussed in the previous section. That is, we should resist the view that inclusion of enrichment equipment on the Zangger Committee list constitutes agreement that, when covered by IAEA safeguards, sale of such equipment is automatically acceptable. There may, however, be circumstances where exports of enrichment equipment will take place under terms that limit the consumer's capability for generating further equipment. For example, if the exporter provided all replacement equipment, if the exporter participated as a partner or operating contractor, or if fabrication of the equipment was extremely complex, the recipient would not necessarily obtain an independent capability. In such cases, IAEA safeguards could constitute acceptable assurance against weapons production.

A further option for restraints on supply of enrichment equipment should be considered: the U.S. could adopt the position that, due to high potential for conflict and abrogation of agreements in certain areas, there should be no supply of enrichment equipment, even if safeguarded, to those areas.

These areas would not represent a large potential market for enrichment equipment, so abstaining from such sales should not be a major economic issue. Discussions of this restraint if pursued at all with other suppliers should be on a confidential level, particularly since some excluded states might be NPT parties (e.g., the ROC or some Arab states) and arguments on non-compliance with NPT Article IV thus could be voiced by the target countries.

4. Constraints on Reprocessing

As noted, U.S. technology on reprocessing has been unclassified for some time and largely transferred to the private sector. The same situation applies to other countries. Accordingly, the U.S. has felt that the most effective control that it can exercise in this area is to regulate the association its citizens have with foreign reprocessing ventures. This has been the established AEC policy since the Part 110 regulations were amended in 1972.

This Action Plan contemplates that we would commend a similar regulatory framework to nations engaged in assisting others in the reprocessing field, that where feasible we would encourage the establishment of multilateral reprocessing facilities, and that there may be instances where we might wish to work in concert with other suppliers of technology in discouraging the establishment of reprocessing capabilities in some nations--the ROC being a notable example.

V. Options

To briefly recapitulate, the following major substantive options appear feasible.

A. Limit the current plan to place constraints only on highly enriched uranium (HEU) and only consult on this basis. In this case, the physical security constraints would either:

1. Conform to the AEC regulations--most technically desirable but possibly the most difficult to negotiate.

2. Conform as a minimum to the IAEA guideline (easier to negotiate but less rigorous and precise).

3. Possibly be a negotiated variant between the foregoing.

Pro: Option A would confine our consultations to a subject in which the U.S. has the predominant interest and to which others might defer.

Con: Limiting action in this area would ignore more important areas and would tend to place U.S. exports of the HTGR in an unfavorable light competitively.

B. Apply the same constraints to future international transfers of highly enriched uranium and plutonium and consult with others on this basis. The proposed physical security constraints would include the same options as those outlined above.

Pros: (1) Recognizes that as a logical and technical consideration the constraints to be applied to HEU are equally applicable to Pu;

(2) Avoids placing the HTGR in a uniquely unfavorable light;

(3) Tends to deal with a broader range of subject matter of

direct relevance to non-proliferation and terrorism.

Cons: (1) Fails to address the more fundamental problem related to the adequate control of the Pu that will be indigenously produced by many nations;

(2) Incomplete in that it does not deal with transfers of technology and equipment.

C. Attempt to impose new limitations on the potential abilities of other nations to produce their own highly enriched uranium or plutonium. Here we would seek new restrictions along the lines of those described in this paper on the exports of technology and specialized equipment in the fields of enrichment and reprocessing.

Pros: Treats the most fundamental aspect of the problem of weapons materials availability from the long-term standpoint.

Cons: Also the most difficult to deal with since both supplier and consumers may be particularly resistant to accepting new restraints in these areas for commercial reasons or on grounds of alleged

incompatibility with the NPT. Also as our postulated constraints become generalized to cover more and more subjects the need for compromise will be enhanced.

D. Attempt to gain wide agreement (perhaps through an international convention) that some minimal level of physical security will be applied to all weapons-usable nuclear material.

Pros: This would potentially cover the majority of plutonium which will not be subject to supplier constraints. Theft or seizure of such material will eventually pose a severe international threat. (Of course, many states might not subscribe.) Also, a freely taken commitment to physical security may be more palatable to some states than a requirement by suppliers.

Cons: Sensititivity in this area would require a rather lengthy negotiation of the details, if the convention were not to be extremely general. And negotiation might produce a uselessly weak product.

As noted in Section III (Conclusions and Recommendations) Options B, C and D above are not mutually exclusive but rather could constitute elements in an overall U.S. strategy.

Appendix A

DEPARTMENT OF STATE

Washington, D.C. 20520

NSC UNDER SECRETARIES COMMITTEE

SECRET
NSC-U/SM 141

October 12, 1973

TO: The Deputy Secretary of Defense
The Assistant to the President for National Security Affairs
The Director of Central Intelligence
The Chairman of the Joint Chiefs of Staff
The Chairman, Atomic Energy Commission
The Director, Arms Control and Disarmament Agency

SUBJECT: United States Policy on Transfer of Highly Enriched Uranium for Fueling Power Reactors

In NSDM 235 of October 4, 1973, which is attached, the President directed the NSC Under Secretaries Committee to develop an action program (with options and argumentation as appropriate) for diplomatic and other steps the US can consider taking with other nations, and in particular other supplier nations, with regard to the security, non-proliferation, political, and economic aspects associated with the increasing growth and dissemination of nuclear power industries, with particular focus on potential problems associated with highly enriched uranium.

This study will be conducted under the Chairmanship of the Department of State, with representatives of the addressees participating. The study and a covering memorandum to the President should be completed no later than November 30, 1973* for circulation to the membership.

Addressees are requested to designate their representative as soon as possible to Mr. Robert T.

* Deadline changed to January 31, 1974 by NSC-U/N-105.

SECRET - GDS

Webber, Director of the Office of Atomic Energy Affairs, Department of State, whose telephone number is 632-2432.

Brandon Grove, Jr.
Staff Director

Attachment:

NSDM 235 dated Oct. 4, 1973

7318504

NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

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SECRET

October 4, 1973

National Security Decision Memorandum 235

TO: The Secretary of State
The Secretary of Defense
The Director of Central Intelligence
The Chairman, Atomic Energy Commission
The Director, Arms Control and Disarmament Agency

SUBJECT: NSSM 150, United States Policy on Transfer of Highly Enriched Uranium for Fueling Power Reactors

The President has reviewed the interagency study in response to NSSM 150 and has considered the views of the interested agencies.

The President has decided that the United States will:

-- Review any future requests for the supply of large quantities of highly enriched uranium abroad on a case-by-case basis without an a priori presumption of supply.

-- Require that a recipient has acceptable physical security measures in effect.

-- Weigh the position of the recipient with respect to the Nuclear Non-Proliferation Treaty in reviewing and deciding on requests for supply.

-- Not require as an essential precondition of supply that fuel fabrication and reprocessing take place in the United States or in multinationally-owned facilities, but will consider this factor in reviewing and deciding on requests for supply.

In addition, the President has directed that:

-- The Chairman of the Atomic Energy Commission should obtain the views of the Secretary of State prior to making any informal or formal commitments and contracts regarding the supply of large quantities of highly enriched uranium, and any proposal to make a supply commitment should be referred to the President for his

ation. (It is recognized, however, that the U.S. has informed the European Community that its requests for supply of highly enriched uranium will receive sympathetic consideration.)

-- The Chairman of the Atomic Energy Commission, after consultations with the Secretary of State, should advise interested U.S. parties, including producers of equipment, of these more selective and restrictive procedures, as compared to our policy on supplying slightly enriched uranium, and the rationale behind them.

-- Although diplomatic representations need not now be made on the decisions contained herein, an action program (with options and argumentation as appropriate) should be developed by the NSC Under Secretaries Committee for diplomatic and other steps the U.S. can consider taking with other nations, and in particular other supplier nations, with regard to the security, non-proliferation, political, and economic aspects associated with the increasing growth and dissemination of nuclear power industries, with particular focus on potential problems associated with highly enriched uranium.

Brent Scowcroft for
Henry A. Kissinger

cc: Chairman, NSC Under Secretaries Committee

Appendix B

PLUTONIUM AVAILABILITY[1] 1973-1985, METRIC TONS

Year	FOREIGN[2]				UNITED STATES			
	Pu Not Recycled		Pu Recycled[3]		Pu Not Recycled		Pu Recycled[3]	
	Annual	Cumulated	Annual	Cumul.	Annual	Cumulated	Annual	Cumul.
1973	4.7	6.8	4.7	6.8	0	0	0	0
1974	5.3	12.1	5.3	12.1	.8	.8	.8	.8
1975	6.8	18.9	6.8	18.9	2.3	3.1	2.3	3.1
1976	7.5	26.5	7.5	26.5	4.3	7.4	4.3	7.4
1977	8.2	34.6	8.2	34.6	7.3	14.7	7.3	14.7
1978	10.5	45.1	10.5	45.1	10.0	24.7	10.0	24.7
1979	13.9	59.0	13.9	59.0	11.4	36.1	11.4	36.1
1980	17.0	76.0	17.0	76.0	13.5	49.6	13.5	49.6
1981	21.0	97.0	21.1	97.1	15.7	65.3	16.1	65.6
1982	24.8	121.8	25.2	122.2	19.3	84.6	21.1	86.7
1983	31.9	153.8	32.8	155.1	22.8	107.4	26.0	112.8
1984	36.2	190.0	38.1	193.2	27.3	134.7	31.6	144.3
1985	41.6	231.6	44.2	237.4	31.1	165.8	35.2	179.5

[1] Based on 1972 AEC Most Likely Forecast - Assumes Low HTGR, 86 LMFBR

[2] Excluding Communist Bloc

[3] Assumes Pu Recycle in Light Water Reactors Effective 1977.

Appendix C

REV. 11/26/73

FOREIGN COMMERCIAL REPROCESSING FACILITIES [1]

Plant	Owner	Country	Capacity Tons/Yr.[3]	Equivalent Pu Produced Kg/Yr.[4]
Eurochemic[6]	Eurochemic	Belgium	100	600
Cap De La Hague	CEA	France	900[2]	1,800
Marcoule	CEA	France	500	1,000
WAK	GWK	Fed. Rep. Germany	50	300
Windscale	BNFL	United Kingdom	2,500	6,600
Tokai	PNC	Japan	200[5]	1,200

[1] Excluding Communist Bloc Countries

[2] Scheduled to reach full capacity operation for oxide fuel reprocessing by 1975.

[3] For both metallic and UO_2 fuels.

[4] Based on typical fuel discharged from LWR's (in case of WAK, Tokai and Eurochemic) and GCR's (in all other cases).

[5] Scheduled operation Jan. 1975.

[6] Operation presently being phased out.

APPENDIX D

ZC(72)/25 Mod.2

CONFIDENTIAL

ZANGGER COMMITTEE

"EXPURGATED" VERSION OF THE GROUP'S MEMORANDUM ON EQUIPMENT

Note by the Secretary

1. As foreshadowed in paragraph 4 of ZC(73)/8, an up to date, expurgated version of the "Trigger List" has been prepared.

2. In circulating this, opportunity has been taken to reissue the whole of Annex A to ZC(72)/25, so that it may be seen where the "Trigger List", and the clarifications thereof, would be placed in the full document.

3. It will be recalled that the "expurgated" versions of the memoranda are designed for transmission to the Director General of the IAEA, and for publication in due course.

4. It has been necessary to make a number of minor amendments to the "clarifications" (Annex I to ZC(73)/6), in order to make them suitable for publication and to remove from them any indications of multilateral agreement. Hence, for example, the removal of the phrase "it is the understanding of the Committee that" in a number of places, and the amendment of the references, in Sections A and D, to paragraph 7 of the memorandum. "Would" has also been replaced by "will" where appropriate.

5. In a separate document (ZC(73)/11), draft letters designed to transmit the memoranda to the Director General are being submitted to the Committee.

27 September 1973

CONFIDENTIAL

ANNEX A

CONFIDENTIAL

1 The Government of ..... has had under consideration procedures in relation to exports of certain categories of equipment and material [, in the light of its commitment not to provide equipment or material] especially designed or prepared for the processing, use or production of special fissionable material to any non-nuclear weapon State for peaceful purposes [, unless the source or special fissionable material produced, processed or used in the equipment or material in question is subject to safeguards under an agreement with the IAEA].

/2

THE DESIGNATION OF EQUIPMENT OR MATERIAL ESPECIALLY DESIGNED OR PREPARED FOR THE PROCESSING, USE OR PRODUCTION OF SPECIAL FISSIONABLE MATERIAL

2 The designation of items of equipment or material especially designed or prepared for the processing, use or production of special fissionable material (hereinafter referred to as the "Trigger List") adopted by the Government of ..... is as follows (quantities below the indicated levels being regarded as insignificant for practical purposes);

2.1 Reactors and Equipment therefor

2.1.1 Nuclear reactors capable of operation so as to maintain a controlled self-sustaining fission chain reaction, excluding zero energy reactors, the latter being defined as reactors with a designed maximum rate of production of plutonium not exceeding 100 grams per year.

2.1.2 Reactor Pressure Vessels:

Metal vessels, as complete units or as major shop-fabricated parts therefor, which are especially designed or prepared to contain the core of a nuclear reactor as defined in para 2.1.1 above and are capable of withstanding the operating pressure of the primary coolant.

2.1.3 Reactor Fuel Charging and Discharging Machines:
Manipulative equipment especially designed or prepared for inserting or removing fuel in a nuclear reactor as defined in para 2.1.1 above capable of on-load operation or employing technically sophisticated positioning or alignment features to allow complex off-load fuelling operations such as those in which direct viewing of or access to the fuel is not normally available.

2.1.4 Reactor Control Rods:
Rods especially designed or prepared for the control of the reaction rate in a nuclear reactor as defined in para 2.1.1 above.

2.1.5 Reactor Pressure Tubes:
Tubes which are especially designed or prepared to contain fuel elements and the primary coolant in a reactor as defined in para 2.1.1 above at an operating pressure in excess of 50 atmospheres.

2.1.6 Zirconium Tubes:
Zirconium metal and alloys in the form of tubes or assemblies of tubes, and in quantities exceeding 500 kg, especially designed or prepared for use in a reactor as defined in

/paragraph

paragraph 2.1.1 above and in which the relationship of hafnium to zirconium is less than 1:500 parts by weight.

2.1.7 Primary Coolant Pumps:

Pumps especially designed or prepared for circulating liquid metal as primary coolant for nuclear reactors as defined in paragraph 2.1.1 above.

2.2 Non-Nuclear Materials for Reactors

2.2.1 Deuterium and Heavy Water:

Deuterium and any deuterium compound in which the ratio of deuterium to hydrogen exceeds 1:5,000 for use in a nuclear reactor as defined in para 2.1.1 above in quantities exceeding 200 kgs of deuterium atoms for any one recipient country in any period of 12 months.

2.2.2 Nuclear grade Graphite:

Graphite having a purity level better than 5 p.p.m. boron equivalent and with a density greater than 1.50 grams per cubic centimetre in quantities exceeding 30 metric tons for any one recipient country in any period of 12 months.

2.3.1	Plants for the reprocessing of irradiated fuel elements, and equipment especially designed or prepared therefor.
2.4.1	Plants for the fabrication of fuel elements.
2.5.1	Equipment, other than analytical instruments, especially designed or prepared for the separation of isotopes of uranium.

Clarifications of certain of the items on the above list are annexed.

THE APPLICATION OF SAFEGUARDS

3 The Government of ..... is solely concerned with ensuring, where relevant, the application of safeguards in non-nuclear weapon States not party to the NPT with a view to preventing diversion of the safeguarded nuclear material from peaceful purposes to nuclear weapons or other nuclear explosive devices. If the Government of ..... wishes to supply "Trigger List" items for peaceful purposes to such a State, it will:-

/(a)

(a) specify to the recipient State, as a condition of supply, that the source or special fissionable material produced, processed or used in the facility for which the item is supplied shall not be diverted to nuclear weapons or other nuclear explosive devices, and

(b) satisfy itself that safeguards to that end, under an agreement with the IAEA and in accordance with its safeguards system, will be applied to the source or special fissionable material in question.

4 The understanding that safeguarded nuclear material is not to be used for any nuclear explosive device will either:-

(a) be included in the formal safeguards agreement with the IAEA, or

(b) be specified by the Government of ..... as a condition of supply.

In case (b), the Government of ..... will inform the IAEA of the understanding on this matter and request that safeguards in relation to the nuclear material in question reflect that understanding.

DIRECT EXPORTS

5 In the case of direct exports to non-nuclear weapon States not party to the NPT, the Government of ..... will satisfy itself, before authorising the export of the equipment or material in question, that such equipment or material will fall under a safeguards agreement with the Agency.

/RETRANSFERS

RETRANSFERS

6 The Government of ....., when exporting "Trigger List" items, will require satisfactory assurances that the items will not be re-exported to a non-nuclear weapon State not party to the NPT without the consent of the Government of ....., it being understood that such consent would not be given unless arrangements corresponding to those referred to above were made for the acceptance of safeguards by the State receiving such re-export.

MISCELLANEOUS

7 The Government of ..... reserves to itself [discretion as to interpretation and implementation of its commitment referred to in paragraph 1 above and] the right to require, if it wishes, safeguards as above in relation to items it exports in addition to those items specified in paragraph 2 above.