

~~SECRET~~

UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY 1a

This document consists of 13 pages  
No. 71 of 75 Copies, Series A.

SANITIZED  
E.O. 12958, Sec. 3.6  
NLJ 01-292  
By           , NARA, Date 1-23-83

October 18, 1965

A CUTOFF OF PRODUCTION OF FISSIONABLE MATERIALS FOR WEAPONS  
USE WITH DEMONSTRATED DESTRUCTION OF NUCLEAR WEAPONS AND  
TRANSFER OF FISSIONABLE MATERIAL THEREFROM TO NON-WEAPONS USES

I. THE PROBLEM

This paper sets forth the U.S. position on the cutoff of production of fissionable materials for use in weapons and transfer of sizable quantities of these materials to non-weapons uses together with the demonstrated destruction of the nuclear weapons from which the fissionable materials would be obtained.

II. THE U.S. POSITION

A. The U.S. has proposed in the past and remains willing for the time being to agree to a verified halt in the production of fissionable materials for weapons by the U.S., U.K., and USSR. This measure is believed to be in the net interest of the U.S. but will not remain so indefinitely if the production of fissionable material by the Soviet Union continues to expand while U.S. production is undergoing reductions, or if Chinese production becomes significant.

~~RESTRICTED DATA~~

~~This document contains restricted data as defined in the Atomic Energy Act of 1958. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.~~

~~SECRET~~

GROUP 1  
Excluded from  
automatic down-  
grading and  
declassification

~~SECRET~~

-2-

B. Production of fissionable materials by all parties under the cutoff would be permitted for purposes other than use in weapons, i.e., for uses such as power and propulsion reactors and explosions for peaceful uses. Similarly, facilities such as chemical separation plants would remain in operation to the extent necessary to support allowed production and use.

C. The U.S. offer remains open to transfer 60,000 kilograms of U235 to non-weapons uses provided the USSR similarly transfers 40,000 kilograms of U235, such fissionable material to be placed under IAEA or similar safeguards.

D. The U.S. is willing to agree to the demonstrated destruction of several thousand nuclear weapons of its own choosing from its stockpiles to obtain the fissionable material referred to in paragraph C for transfer to non-weapons uses, provided the USSR will likewise agree to the demonstrated destruction of the nuclear weapons of its choosing from Soviet stockpiles in order to obtain the fissionable material it transfers to non-weapons uses.

E. The U.S. is willing to agree with the USSR that the plutonium associated with the weapons destroyed by each side

~~SECRET~~

~~SECRET~~

-3-

also be transferred by each party to non-weapons uses. The amounts of plutonium thus transferred should be in agreed quantities or ratios and should be verified.

F. The U.S. position is that the verified cutoff of production of fissionable materials is the basic measure and can stand alone as a separable arms control proposal. However, the transfer is linked to a cutoff, and the demonstrated destruction is linked to both a transfer and cutoff.

G. Verification of the production cutoff must be capable of precluding the possibility of violations that would significantly alter the stockpiles of fissionable materials of the nations involved. Such verification would involve inspection of declared facilities such as diffusion plants, chemical separation plants, and production reactors and IAEA or similar controls on power reactors. A small quota of inspections should be provided to verify that suspect undeclared facilities are not used in violation of the agreement.

H. The U.S. is willing to consider any reasonable proposals for procedures to demonstrate destruction of nuclear weapons for the purposes of this agreement that do not compromise or contribute to the dissemination of sensitive weapon design information.

~~SECRET~~

~~SECRET~~

-4-

I. Tritium is not a fissionable material and its production would continue under this proposed agreement in the amount necessary to compensate for the radio-active decay of the tritium in the weapons stockpile at the time of the cutoff and for non-weapon uses. The production of tritium would be affected only in that the reactors used would be capable of plutonium production and thus be subject to some inspection associated with verification procedures.

J. Acceptable procedures for weapon destruction would permit removal of gaseous tritium prior to submitting weapons for destruction.

### III. DISCUSSION

There are three major areas in which the foregoing proposals interact with the national security. They are (a) relative effect on the U.S. and USSR of the cutoff and transfer on military capabilities, present and future, (b) possibility of significant evasions of the production cutoff, and (c) possibility of compromise of sensitive weapon design data in connection with demonstrated destruction of weapons. These areas are treated below in sequence.

~~SECRET~~

~~SECRET~~

-5-

3.4  
(b)(1)

A. Current intelligence estimates place Soviet stockpiles of [REDACTED] with projections indicating that the USSR could catch up with the U.S. during the 1970's. The uncertainties in these estimates have made it prudent to propose transfers of fissionable materials in a ratio of 3 to 2 which is a ratio lying between the ratios corresponding to the best estimate and the upper limit of Soviet cumulative production. Therefore, the present fissionable material balance is believed to be in the favor of the U.S., although the allocations of these materials to the various military missions in support of U.S. goals and commitments would appear to justify a greater U.S. requirement for such materials than is the case for the USSR. Nevertheless, for the period of the future during which the U.S. stockpiles are clearly superior, the vital security interests of the U.S. would not be placed in jeopardy provided allocation of U.S. stockpiles is reviewed and altered as may become necessary in the light of possible changes in Soviet allocations.

B. Technological breakthroughs accompanied by reallocation of nuclear materials that would upset the military balance cannot be precluded with certainty even with a

~~SECRET~~

~~SECRET~~

-6-

concerted effort to maintain our own technological progress. This risk is faced with or without a cutoff of production. On the other hand, the chance that the cutoff itself could be violated with similar effect can be effectively minimized with inspection for verification of compliance. The verification concepts the U.S. has advanced in the past (see Working Paper ENDC/134, dated 25 June 1964) would apply inspection to declared facilities and provided for a quota of inspections at undeclared facilities thought capable of producing fissionable materials in evasion of the proposed agreement.

Facilities that would be declared and subject to inspection are of three types, isotope separation plants, reactors, and chemical separation plants. First, isotope separation plants would be either shut down or permitted to produce for peaceful applications. In the former case, monitoring of the plant itself (with access to perimeter fences) and the power input to the plant can verify that no significant production is taking place. When plants are in production for non-weapons uses, again perimeter inspection, access to feed and tails of the uranium compounds supplied to the plant, and accounting of the output product is proposed.

~~SECRET~~

~~SECRET~~

-7-

Deviations from stated production exceeding 10 percent of the declared rates are thought to be detectable although this capability has not been established. Since allowed production rates in the early stages of a cutoff should be a small fraction of total capacity, rather small cumulative deviations could occur during the first few years of a cutoff. The AEC has a study underway at Oak Ridge of perimeter verification that will help refine these estimates and present test concepts to attempt to validate them.

Reactors also would be in shut-down and operating categories. Methods have been worked out by the AEC's Hanford plant to ensure that a shut-down reactor remains so between visits of inspectors. However, many reactors will be operating for power production and some for the production of tritium. IAEA or similar inspection would be applied to all non-military power reactors, starting with those rated above 100 MW thermal. Perimeter inspection and monitoring of the plant activity and power flow as well as the thermal anomaly in the area can help to verify whether the remaining reactors are operating approximately at the declared levels. In addition, inspection of chemical separation plants would permit the verification of amounts of plutonium produced in power reactors as well as in

~~SECRET~~

~~SECRET~~

-8-

production reactors declared as being devoted to tritium production. As an added check on the latter, tritium production levels can be justified by turning in the helium-3 that results when tritium decays. Studies conducted by AEC contractors have, according to preliminary results, determined that the only practical source of helium-3 in significant quantities is the decay of tritium.

As an alternative to complete access to and inspection of chemical separation plants, material of the same type, not previously under international safeguards, in an amount at least equal to that contained in material submitted to the plant for processing, could be placed under international safeguards. Under this alternative, the inspectors would have the right to make independent assays of all material submitted for chemical processing.

The present U.S. positions cited in the ENDC working paper No. 134 states that controls would initially be required only on power reactors of 100 thermal megawatts and higher capacity as far as nuclear powers are concerned. Smaller plants would be capable of producing no more than a few kilograms of plutonium each per year, if optimized for the production of plutonium, and even this material would be

~~SECRET~~

COPY LBJ LIBRARY



~~SECRET~~

-9-

subject to inspection as it passed through the chemical separation plants. Thus, for the next few years until the application of nuclear power becomes widespread, relatively small cumulative evasions are possible, but even these are vulnerable to disclosure.

Clandestine production facilities could conceivably include gaseous diffusion plants, reactors, and possibly gas centrifuge or electromagnetic plants for isotope separation. These facilities would probably have to be of very significant size to produce enough material to seriously alter the relative stockpile ratios of the U.S. and USSR. Such plants would, over a period of time be subject to discovery by national intelligence assets. Investigation, even from remote distances, using any of several techniques such as monitoring for a thermal anomaly, should help in identifying any such plant capable of significant production. Clandestine chemical separation plants, on the other hand, may be inherently less visible. For this reason, the U.S. should continue to press for redundant verification systems that offer an opportunity to detect clandestine plutonium production at more than one point in the production sequence.

~~SECRET~~

COPY LBJ LIBRARY

~~SECRET~~

-10-

Because of the changing situation likely to develop over the next decade or so, the verification procedures must be subject to periodic review and possible updating and it is necessary that an agreement for a cutoff of production provide for such a review. One prime reason for this is the strong likelihood that neither France nor Communist China would become parties to a cutoff agreement. Thus both the U.S. and USSR would probably wish such a review each few years. Even if abrogated after several years, such a cutoff would have significantly reduced the total fissionable material available for weapons, and U.S. and USSR stockpile levels during this period would have remained larger than those either France or China could amass.

Another reason for the need for a periodic review is that production of enriched uranium (possibly including some of weapons grade) will continue for non-weapons purposes. Plutonium will be produced in power reactors. As peaceful applications grow, these production rates will become large enough that the deviations from declarations that are possible over a period of years will become significant unless all states recognize and implement tighter verification procedures.

~~SECRET~~

~~SECRET~~

-11-

C. Procedures connected with the demonstrated destruction of weapons are not demanding. In fact, the term "demonstrated" is used rather than "verified" to emphasize this fact. Although the U.S. is willing to consider any suggestions the USSR may advance for the demonstration procedures, tentative concepts are presently under consideration that are believed to provide a basis for such demonstrated destruction, and these concepts will be refined and field tested to provide a fund of knowledge useful in negotiating agreed procedures. The essence of the U.S. concepts is as follows:

A facility for demonstrated destruction would consist of a receiving compound, buildings for weapons disassembly enclosed in a security fence, and an assay laboratory for verifying the actual amounts of fissionable material yielded by the destruction process.

Prior to the introduction of a batch of weapons for processing, adversary inspectors would make a walk-through tour of the complete facility to insure that no weapon components or materials were inside. A batch of weapons would be moved into the receiving compound and inspectors would be permitted access to the external characteristics affording an opportunity to count the weapons.

~~SECRET~~

COPY LBJ LIBRARY

~~SECRET~~

-12-

At this point, inspectors would be excluded from the facility, having continual access to the perimeter fence and an opportunity to check movements into and out of the external fences. Following the disassembly and destruction process, fissionable material would be delivered to the assay laboratory where it would be carefully weighed, its isotope composition determined, and then turned over to international accounting controls. Non-nuclear components would be reduced to a state that would protect classified information and would be shipped out of the facility for final disposal, for example by deep ocean burial.

At the conclusion of the processing of a batch of weapons, inspectors would again be granted access inside the facility to determine that no materials had been withheld.

It is expected that to prevent the disclosure of sensitive weapon design data some precautionary measures would be required. Among these would be removal of gaseous tritium before submitting the weapons for the destruction process, and installing covers over openings into the warhead spaces to prevent visual access where such access would compromise classified matter. Studies are currently in progress within the Government to determine the precise nature of the procedures which are adequate to protect the design of U.S. weapons

~~SECRET~~

~~SECRET~~

-13-

Such procedures do not preclude the possibility of introducing phony weapon shapes into the process. However, the delivery of specified quantities of fissionable materials to be placed under international safeguards which can be verified provides the necessary protection of U.S. security interests.

The safeguards described in these paragraphs, both of a unilateral nature and those that comprise a part of the U.S. negotiating position are believed to satisfy the requirements to protect the vital interests of the United States while seeking lower levels of nuclear forces.

~~SECRET~~