

S/AE:IGotzlinger/rp

(Drafting Office and Officer)

Approved by S

5/25/60

Approved by U

5/17/60

M-759

(57)

DEPARTMENT OF STATE

Memorandum of Conversation

DATE: May 10, 1960

SUBJECT: Nuclear Test Negotiations - Meeting of Principals

This document consists of 8 pages
Number 1 of 4 copies, Serial 5705
700.5611/5-1060
741.5611
397.5611-GE
700.56311

PARTICIPANTS: See attached list. (Tab A)

Copy No(s) 15-16-17

MAY 27 1960

COPIES TO:	S/S - 1	Name	EUR - 9	US Del, Geneva - Ambassador Wadsworth
	G - 2		IO - 1.0	
	C - 3		H - 11	
	S/P - 4		L - 1.2	
	S/B - 5		INR - 1.3	
	S/AE - 4 (1cc: 4A) - 6-8			

Destroyed in RM/R Date 1/9/61

14

15-17

Secretary Herter began with a discussion of the Atomic Energy Commission paper, as amended, on safeguards concerning use of nuclear explosions in the seismic improvement program, which had been distributed at the Meeting of Principals of May 5 (TAB.B). The "black box" principle is a controversial one, but there are arguments in favor of it, the Secretary said. It will assure that the research program is not used by the original parties as a means of carrying out weapons development. It will obviate the necessity of declassifying devices which might have served to increase the nuclear capability of other States. Mr. McCone pointed out that the devices which we might be free to declassify would be uneconomic ones requiring tremendous amounts of material. Furthermore, a coordinated program involving detonation of devices previously deposited in "black boxes" would get around legal problems. Under present law, for example, any nuclear device transported into the United States automatically becomes the property of the United States and receives a "restricted classification". These provisions of law would also be likely to preclude a possible exchange with the Soviets of devices contained in "black boxes", as suggested by Mr. Herter. Transportation and handling within the United States of foreign devices of unknown design would also involve an unconscionable safety risk.

Mr. Herter requested suggestions on making the "black box" approach more acceptable to the Soviets. Dr. Kistiakowsky reported that Sir William Penney had told him about some ancient U.K. devices which perhaps might be declassified for use in the research program. He asked about any legal problems which import of such devices into the United States could cause. Mr. McCone replied that, under the law, the devices will become the property of the United States. He offered to initiate immediate

SECRET

FILED

consultation

MAY 31 1960

DECLASSIFIED

Authority NND 449501

By NARA Date 4/2/85

(66)

consultation as to use of the U.K. devices between General Starbird, now in London, and the British. Mr. Herter expressed approval of this idea. It was agreed that the AEC position on safeguards be adopted.

Turning to the problem of high altitude detection, Mr. Herter briefly reviewed the report on capabilities which had been presented by ARPA at the May 5th Meeting of Principals. Mr. Gates commented that the report showed a violator would find it increasingly difficult to test, as successive components of the 1.3 billion dollar system are installed, but that he might, with sufficient expenditure, have the capability for doing so, even with all components in operation. He would be able to obtain valuable information on yield even from a distance of many millions of miles in space. Mr. Herter asked whether the Midas satellite would contain equipment useful for detection. Mr. Gates replied that Midas could not be expected to do the work of ten or more satellites as envisioned in the ARPA report. Dr. Kistiakowsky referred to the Report of the High Altitude Experts of July 1959 which found that it is technically feasible by means of a system of optical detectors installed at ground control posts to detect a one-kiloton explosion up to 100,000 KM during the day, and 300,000 KM at night. Use of fluorescence, electromagnetic and radiation equipment installed in ground posts, supplemented by the Argus satellite, would afford capability up to 100,000 KM. We have the knowledge to set up a system effective to 100,000 KM now. Above that, a more elaborate system would, of course, be needed. But the Department of Defense position that we cannot now provide a reliable system of control above the sensible atmosphere is to be questioned. Mr. Dillon commented that, in view of the ability of a ground-based system to detect events in the 50,000 to 100,000 mile range, we might be able to suggest a high altitude detection system effective to that range, combined with a plan for pre-launch inspection of orbital and sustained space flight missiles. Radar would be employed for detecting any clandestine launchings. If a party has launched a missile above a prescribed altitude without having subjected it to inspection, it would be assumed that a weapons test has been conducted. Mr. Herter expressed concern that the Soviets would state that introduction of an alternate concept is a repudiation of the high altitude experts' report. Mr. Dillon replied that the tremendous costs, which still would fail to produce a completely reliable system, constitute a good argument for seeking an alternative. Dr. Kistiakowsky reaffirmed that the full network of 180 control posts equipped in accordance with the experts' agreement would give coverage up to 100,000 KM.

Dr. Northrup commented that, in connection with project Vela, he had received a time and cost estimate from United Electrodynamic Corporation for installation of the 22 control posts in the area of the Soviet Union. If there are 100 arrays at each station, the time estimate is five years; the estimated cost, one to five billion dollars. The group expressed astonishment at these estimates. Mr. McGone quoted Dr. Bethe as estimating the cost of 600 unmanned augmenting stations as only sixty million dollars. Dr. Northrup replied that no realistic estimate had yet been made as to cost of unmanned stations. He recommended a study of costs and of problems involved in installing element arrays at remote stations. The "housekeeping" costs after establishment of a control post are also a large factor. Mr. Gates suggested that the U.S. Delegation stress all these uncertainties and mention the need for a year of joint and unilateral research on the problems of time and cost of installations and on imperfections. He stressed the need for expert advice on costs. Mr. Herter agreed that research is badly needed.

SECRET

Dr. Northrup

DECLASSIFIED

Authority NND 949501

By ATB NARA Date 4/2/85

Dr. Northrup replied that an engineering study of the proposed 22 stations in the USSR has laid the groundwork for a more careful estimate than the one he had cited. It would be possible to extrapolate the results to the 180 stations planned all over the world. Mr. McCone suggested that a paper be prepared for the President. Gen. Rodenhauser stated that decision to have 30 arrays at each station rather than 100 would cause a revision in the cost estimates. An estimate as to savings and as to changes in capability resulting from such a decision could be given to the President. He stressed the expense of connecting up arrays. Dr. Northrup promised a more realistic estimate than "one to five billion dollars" within two days. Mr. Gates commented that a more exact estimate as to time is just as necessary. Dr. Northrup described "five years" as a "thumb sketch" estimate. The problems of constructing, for example, air fields in the Arctic should not be underestimated. A better estimate will be ready soon. Mr. McCone raised the possibility of the organization's requiring a private communications system. Dr. Northrup commented that the cost of such a system has not been specifically estimated, but it was taken into consideration when the total estimate was made.

Returning to the specific subject of high altitude, Mr. Gates suggested we could talk about a goal: no further tests which might cause fall-out. That would be well within 100,000 KM. General Betts estimated the necessary distance at 15,000 KM. He pointed out a problem in connection with a high altitude threshold; the uncertainty in determination of distance of a missile firing. It would, for instance, be difficult to prove that a ban on tests up to 25,000 KM had or had not been violated by a missile which travelled to 24,000 or 26,000 KM. Mr. McCone recommended that, in view of so many uncertainties, main reliance must be placed on a system of pre-launch inspection of missiles. Even though there are problems in connection with Soviet inspection of our missiles on our territory, he could see no better way of dealing with the high altitude problem. Dr. Kistiakowsky and Mr. McCone assured Mr. Herter that it would be possible to inspect adequately a missile to determine whether it contains fissionable materials. Mr. Irwin pointed out the other problem: to detect a clandestine missile launching. Mr. Sullivan stated that technical discussions would probably have to follow a United States proposal of an alternate high altitude detection system. Mr. Dillon restated the two principal problems: (1) How to conduct a pre-launch inspection of missiles; and (2) How to ensure, by means of a Midas satellite or radar, or other means, that any clandestine launching is discovered. Mr. Irwin expressed the belief that the Midas satellite would be able to detect a missile launching anywhere in the world. Defense is now spending a considerable amount to attempt to assure the success of the Midas. Mr. McCone promised an immediate AEC study of the problem of pre-launch inspection. Mr. Sullivan urged that the alternate high altitude proposal be tabled as soon as possible, if it is to be offered. Since a departure from the experts' report is involved, it is up to the United States to make the move. The group agreed that, pending completion of necessary studies, the United States position remains simply as stated in the threshold proposal of February 11, i.e., that all tests up to the greatest heights, to which effective controls can now be agreed, should be banned.

Turning to the subject of quotas, Mr. Herter reviewed the paper presented by AEC at the Meeting of Principals of May 5. (TAB E) Mr. McCone proposed that we continue to insist on 20 or 21 annual inspections of events above 4.75 magnitude, based on a technical determination. As for events below the threshold, there should be 50 inspections based on a political determination. The figure 50 just happens to be

SECRET

DECLASSIFIED

Authority AWD 449501By ATB NARA Date 4/2/85

to be ten percent of estimated events. In view of the number of years which will elapse before a complete system is installed--perhaps 5 1/2 years--there is a real problem involved in applying the quota during the interim period. Perhaps some seismic stations can quickly be set up; perhaps the AFTAC complex of stations can give notice of suspicious events. Mr. Dillon also stressed the importance of making it plain that the quota above the threshold and that below the threshold are based on entirely different considerations. Mr. Herter suggested no inspections take place below the threshold. If there are such, it might prejudice the cut-off on the moratorium after two years, since everyone will have become accustomed to the prescribed inspection arrangement as constituting adequate controls over events below the threshold. Mr. McCone expressed preference for having some inspections. At the end of two years of research, he said it will be possible to exercise better judgment as to whether it may be possible to control a comprehensive treaty or whether the threshold can be reduced to, say, 4.25 or whether, in view of decoupling possibilities, the present threshold is the minimum which can effectively be controlled. Mr. Irwin asked whether seismologists ever expect to be able to identify a nuclear event positively. Dr. Northrup answered in the negative; the best that can be expected is a substantial reduction in unidentified events. At this time, it is also not possible to distinguish a nuclear explosion from a chemical explosion. Mr. Irwin advocated taking a firm position on what still remains to be done to improve the detection and identification system as far as feasible. We should agree to a moratorium of two years. At the end of that time, a threshold should be set at a magnitude which is then considered subject to effective control. Mr. McCone agreed. He recalled that at the 1958 beginning of the negotiations we had agreed to a comprehensive test ban based on an experts' report which only envisioned 90 percent identification capability at the 5 KT level. He had agreed to this only upon being persuaded that the Soviets would prefer a threshold to a comprehensive ban, when the great number of on-site inspections necessary to control the comprehensive ban would be revealed. But matters had turned out differently. Mr. Herter pointed out that the threshold now proposed is at the 20 KT level. It might be said that our attitude has stiffened, rather than weakened. Mr. McCone urged that we notify the U.K. and our delegation that the moratorium and concurrent research program are aimed at making a final choice as to a threshold. He stated his impression that the Soviets and the U.K. have a different concept, neither envisioning that there will be any further tests under any circumstances. He wanted it understood that, if there are no improvements in detection capabilities, the threshold will be 4.75. Mr. Herter expressed belief that everyone agrees to this. If research does not lead to improvements within two years, the Government would certainly not submit to the Senate a treaty providing for a comprehensive ban. Mr. McCone asked whether Selwyn Lloyd understands our approach. Mr. Irwin stated the belief that Selwyn Lloyd understands but does not agree. Mr. Dillon commented that the U.K. perhaps hopes to persuade us to its viewpoint. Mr. Irwin urged that, on remaining issues of substance, no more concessions be offered to the Soviets just for the sake of a successful conclusion to the negotiations. Mr. Herter remarked that our discussions with the U.K. have never departed from the principles expressed by this group.

Dr. Latter then briefed the group on the Rand study of possibilities for increasing the effectiveness of control posts in identifying seismic events. About 100 earthquakes above 4.75 magnitude occur annually in the Soviet Union, Dr. Latter said. All of them can be detected by the net of 21 control posts as now arranged to be

DECLASSIFIED

Authority NND 949501
By ATB NARA Date 4/2/85

SECRET

established

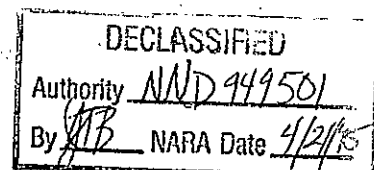
established on the land territory of the Soviet Union. Through a study of the nature of the first motion and specifically based upon identification of four clearly recorded first motions, the Geneva experts believed it possible to identify 40 earthquakes, leaving 60 which could be suspected of being nuclear events.

In the course of the Rand study, it was first of all discovered that the criteria of the Geneva experts could not be fully justified. Fuzzy signals, emanating from a distance of 2500 to 3500 KM, might result in identification of a nuclear explosion as an earthquake. It was then discovered that relocation of control posts, so as to supply some concentration in that 5 percent of the land area of the Soviet Union in which 80 to 90 percent of earthquakes occur, would not only remove the disability mentioned above but would substantially increase the effectiveness of the system in identifying earthquakes. If the number of control posts set by the experts--21-- were to be redistributed so that it would not be likely to be necessary to consider data emanating from a distance of more than 1100 KM, all but 12 to 15 percent of earthquakes could be positively identified as such. It will be necessary to identify only two motions instead of four. Of course, such a redistribution might result in losses of detection capability for methods of detection other than the seismic. The Rand study also encompassed the probable effects of adding stations to the Geneva net. An addition of four stations, placed near seismic areas, would result in identification of all but 20 percent of detected earthquakes; an addition of nine stations would result in identification of all but 10 percent.

The Rand Study also encompassed earthquakes exceeding magnitude 4.4 (5 kilotons Rainier coupling). There are 220 of these annually in the Soviet Union, of which 150 would remain unidentified after application of present criteria. Relocation of 21 control posts would result in identification of all but 45 earthquakes. Addition of four control posts would result in identification of all but 75; addition of 9 stations, all but 35. The principal earthquake areas in the Soviet Union are the Pamir Mountains, Kamchatka, Sakhalin and the Urals. Dr. Latter concluded that the principle of unrestricted location and relocation of control posts is a very important one.

In answer to Mr. Herter's question, Dr. Latter replied that it would be possible to determine the size of an event. He also explained that the study was based on the Nevada-type nuclear detonation in tuff. In his best judgment, an explosion in salt produces a signal reduced by a factor of two or three. Mr. Herter said, nevertheless, this study points to possibilities for tremendous advances in identification. Mr. McCone remarked that it points to possibilities for bargaining a reduction in on-site inspections against an increase and/or free relocation of control posts. Dr. Northrup commented that the proposed Rand system would also result in location of an event within a smaller area than the 50 to 200 square miles on which the Geneva experts based their recommendations.

SECRET



Participants of Meeting of Principals on Nuclear Test Negotiationson May 10, 1960Department of State:

Secretary Herter
Under Secretary Dillon
S/AE - Mr. Farley, Mr. Sullivan, Mr. Spiers, Mr. Baker, Mr. Gotzlinger
S/S - Mr. Mau
SOV - Mr. Dubs

White House:

Dr. Kistiakowsky, Mr. Gray, Mr. Bechler

AEC:

Mr. McCone, Dr. English

CIA:

Mr. Dulles, Dr. Scoville

DOD:

Secretary Gates
Mr. Irwin, Gen. Dabney, Gen. Betts, Gen. Rodenhauser, Dr. Northrup, Mr. Lanier,
Col. Brundage, Dr. Latter, Dr. Karzas, Ledr. Chandler

SECRET

DECLASSIFIED	
Authority	NND 949501
By	ATB NARA Date 4/2/95

Primary U.S. Position on Safeguards Concerning Use
of Nuclear Explosions in the Seismic
Improvement Program

It is necessary to avoid a situation where the Soviets could use the seismic improvement program as a means of carrying out continuous weapon development or a situation where our own intentions could be misunderstood. After weighing all courses, we believe the best way to meet this problem is for the U.S. and the U.K. to propose at the earliest possible time that the three powers agree that any devices used by them for this program will be deposited as "black boxes" within an agreed very short period of time, and that these and only these devices will be used for this program. Specifically, we believe that the U.S.-U.K. proposal should call for agreement by the three powers on the following restrictions:

- a. The parties to announce they will use only proven designs for the program;
- b. The "black boxes" will be deposited by each party, within the shortest possible time (say by August 15) in storage within its own territory but under such surveillance by the others (or by an international group) as is required to prevent modification or substitution;
- c. Observation of all aspects of the firing and its instrumentation, except the internals of the devices, will be permitted to the other parties; and
- d. No diagnostic instrumentation will be permitted at the zero point, except specified yield measurements.

SECRET

DECLASSIFIED

Authority NND 949501By ATB NARA Date 4/2/95

SECRET

Tab C

U. S. Position on the Quota

1. With regard to events of over 4.75, the U.S. should hold to the annual level of inspections already proposed, namely 20 percent of all events located or 30 percent of all events unidentified by U.S. criteria, either of which is estimated to be about 20 inspections a year in the USSR. The Treaty should make clear that both the initial and the periodically revised annual number of inspections are a technical determination and will bear an agreed relationship to scientific facts and the capability of the system.
2. The allowable number of inspections for events under the 4.75 quota must be a number politically taken. We believe that the U.S. should insist on approximately 50 if the Geneva network is that to be installed. Based on recent estimates, this would approximate 10 percent of the annual number of natural events under 4.75 which occur annually in the USSR.
3. As a matter of principle, if there is to be a lesser number of inspections accepted by the U.S., it should be only upon reaching an agreement that comparable improvement of the system initially called for is agreed by the Soviets. This gain could come through:
 - a. Increasing somewhat the number of stations above the 21 to 30 now contemplated by the U.S.-U.K. for the USSR; and
 - b. Permitting the U.S.-U.K. to make locations in the most favorable areas.
4. So that the system can be most effective, even in the short term, we should insist also on the following:
 - a. The right of the U.S.-U.K. to install, as quickly as possible, temporary stations in the USSR with the USSR having comparable rights for territory we control; and
 - b. The U.S.-U.K. to have the right to inspect, within the quota, any event detected by the temporary system until such time as the permanent system has such capability as to allow the permanent criteria to apply.

SECRET

DECLASSIFIED	
Authority	NWD 949501
By	ATB NARA Date 4/2/85