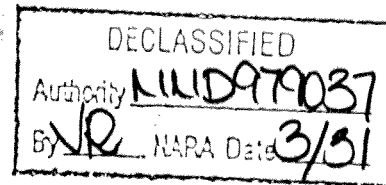




THE COUNSELOR
DEPARTMENT OF STATE
WASHINGTON*



June 4, 1974

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Mr. Secretary:

The attached memo updating the TTB situation for both your meeting with Dobrynin and this afternoon's VP was basically done by Jan Lodal's people. It raises valid verification and other problems about the Soviet position on a yield threshold and a quota within a proposed upper and lower threshold "sandwich." It also properly raises the PNE issue as it is now emerging by virtue of Soviet ambiguity as to whether PNE's would or would not be prohibited outside the threshold until there is a separate agreement.

Hyland and I, however, believe that you should not in the VP come down quite as hard against a yield threshold. Rather, we feel you should invite urgent new study of the verification issues involved and of the conditions we would need to attach to any agreement setting the threshold by yield.

You will also need to decide on how we instruct the delegation currently in Moscow. Unless they stay there for quite a while, we will have to authorize them fairly quickly to ask the Soviets specific questions on the verifiability of a yield TTB. Such instructions should be the result of the VP and the urgent study (two days at most), unless there is widespread agreement that a yield TTB cannot be accepted by us. (This is doubtful since there is support for it in DOD and AEC and in the weapons labs.)

With Dobrynin, Hyland and I feel the attached talking points should serve your needs; we do feel that we have got in your channel to clarify the PNE issue.

Helmut Sonnenfeldt *HS*

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By NR NARA Date 3/31

MEMORANDUM

Completely Outside the System

NATIONAL SECURITY COUNCIL

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ACTION
June 3, 1974

MEMORANDUM FOR SECRETARY KISSINGER

FROM: JAN M. LODAL *JML*
HELMUT SONNENFELDT *HS*

SUBJECT: Troublesome Developments in TTB
Experts Talks

The Soviets have taken several initiatives at the current threshold test ban (TTB) experts talks in Moscow. While some of the initiatives advance us to an agreement in principle on a TTB at the Summit, others can complicate progress to an agreement. These initiatives may also create some problems within the bureaucracy and are likely to be key topics of discussion at the VP meeting tomorrow. The Soviet experts have proposed that:

-- The threshold be defined in terms of explosive yield, rather than seismic magnitude, with "nuclear weapons explosions" being carried out at specified test sites to aid verification by national means; and that

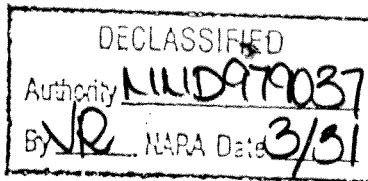
-- There be an annual quota on the number of tests that can be carried out, which would be smaller than the average annual number of tests in recent years (they have talked of 20-25). To permit verifying the quota, the Soviets propose a lower threshold (of some 5 KT), below which tests would not be prohibited. This results in a threshold "sandwich," with a quota of tests in the sandwich.

Another troublesome development is that the Soviet experts are assuming that peaceful nuclear explosive devices (PNEs) would not be covered by the TTB, which would apply only to "nuclear weapons explosions."

Soviet Motivation

The Soviet motivation for the above initiatives is most probably to take into account or compensate for three current asymmetries between the US and USSR nuclear test programs. The first asymmetry arises from

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the different hardness of terrain at current US and Soviet testing sites. The main testing areas for the Soviets (Semipalatinsk and Novaya Zemlya) are almost all hard rock. For a given explosive yield, testing in these areas would produce a much higher seismic magnitude than an identical test at the Nevada Test Site. Thus, by setting the threshold according to yield rather than seismic magnitude, the Soviets would eliminate this asymmetry. Of course, the Soviets could shift their test sites to softer terrain, which does exist in the USSR, but undoubtedly want to avoid the expense and inconvenience.

The second asymmetry arises from our relatively more vigorous underground test program. Since the Limited Test Ban Treaty we have carried out some 400 underground tests, versus about 140 for the Soviets. In recent years the Soviets have closed the gap: in 1972 we had 29 tests versus 21 for the Soviets; in 1973 the numbers were 25 for us and 15 for them. (However, the chief Soviet expert told Stoessel today that the US had not carried out more tests than the Soviets last year.) In any event, by setting a quota on the number of tests that could be carried out each year under the threshold, the Soviets would equalize the asymmetry in testing frequency. The Soviets argue that such a quota would increase the significance and value of a TTB.

The third asymmetry results from the much greater Soviet interest in PNEs, as opposed to our moribund Plowshare program.

Verification Problems

The proposals pose serious verification problems. In the case of the threshold based on yield, the verification problem is especially severe at lower yields. For example, a yield threshold at 5 KT would be verified by a seismic signal at magnitude 4.5, assuming the explosion was in hard rock. However, this same magnitude would correspond to a yield of some 50-70 KT in soft soils.

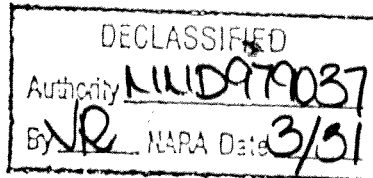
At higher yields, the depth needed to ensure against venting increases. This greater depth in turn decreases the opportunities for possible large discrepancies in yield corresponding to the same seismic magnitude. For example, a yield threshold at 150 KT would correspond to seismic magnitude 5.75, assuming the explosion was in hard rock.* In terms of impact on weapons development and proof testing, the difference between 150 and 300 KT is not as important as the difference between

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*In softer soils, 5.75 could correspond to explosions up to 200-300 KT.

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5 and 70 KT. The verification problem with the yield threshold could be further reduced by having strict collateral restraints on geographical locations of tests, e. g., limiting Soviet tests to areas we knew were hard rock. This would go beyond the collateral constraint the Soviets have offered, that of using only specified test sites.

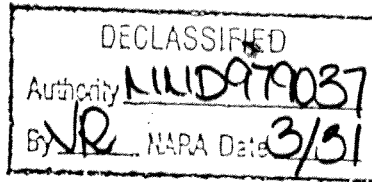
However, even in the Semipalatinsk area there are various different hardnesses. Thus, the parameter which is measurable by national technical means -- seismic magnitude -- could not be used with confidence to determine whether the agreement had been violated. As with SALT (e. g., limiting launchers rather than missiles), the limitation should be put on the verifiable parameter (i. e., seismic magnitude as opposed to explosive yield), even though the second parameter may be implied to some extent by the first.

The quota is basically unverifiable as each party could set off a fairly large number of low yield tests nearly simultaneously. Seismic verification techniques would count this as a single test below the threshold. Overhead photography would not necessarily help out in this event, as the multiple tests could be carried out in a single vertical drill hole (at different depths) or inside a mountain, access to which could easily be from only a single observable location. The Soviet proposal for a threshold "sandwich" reduces -- but does not eliminate -- verification difficulties with a quota. However, we may be willing to live with these difficulties and thus accept the political benefits of having limited tests in the "sandwich".

The Soviets are apparently less concerned than we are about verification, although their knowledge of our yields, depth of burial and multiple shots is not perfect, nor is it likely to be. We do announce many of these numbers, but typically some years after the test.

An exception for PNEs would create very serious verification problems. Safeguards against use of PNEs for weapons purposes would be of doubtful utility and negotiability. From Gromyko's comments to you in Geneva, it appeared that the Soviets proposed to ban PNEs above the threshold, barring a separate future arrangement on PNEs. We have instructed our experts to stick to the more inclusive term ("nuclear explosions" as opposed to "nuclear weapons explosions") and to attempt to decipher -- without explicit discussion -- how the Soviets would handle PNEs.

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Problems Within the Bureaucracy

The Soviet initiatives may create problems within our bureaucracy. Despite the inherent verification problems and the current asymmetry in test locations favoring the US, the AEC and some in DOD prefer that the threshold be defined in terms of yield. They will likely push at the VP for acceptance of the Soviet proposal. Their argument is that this will dispense with seismic nit-picking. Furthermore, their main concern is with limitations on US testing rather than with verification of limits on Soviet testing. The AEC apparently believes that a yield threshold would give them more flexibility in testing, as they could avoid any conservatism needed to stay below a seismic threshold. However, the actual yield of the nuclear device can be as much as 25% higher than the design yield. This uncertainty is much larger than the uncertainty in the seismic magnitude (typically 5%).

Unless the USG proponents of the yield threshold can come up with sound arguments on overcoming the verification problems inherent in using yield to define a threshold, and on the US motivation for this, we recommend that you not support a yield threshold. In any event, US opposition to a yield threshold at this stage would provide useful negotiating leverage for collateral constraints (e.g., strict geographical constraints) if we later decide to accept a threshold based on yield.

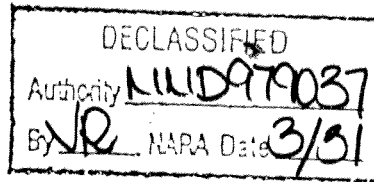
DOD and AEC are also pressing for a small quota of tests above the threshold to enable us to carry out some stockpile proof tests and weapons development tests above the threshold. This direction is the opposite of that in which the Soviets are heading, as the Soviet experts argue that their quota would be an additional inhibition to make the TTB more meaningful. Despite this essential difference in thrust, DOD and AEC may push at the VP meeting to accept the quota concept in principle. We recommend that you have a fairly open discussion of the quota-in-the-"sandwich" concept. We could probably live with such a quota.

The Soviet experts have asked for the US side's views on both the yield threshold and the quota. We have instructed our experts to avoid any commitment on these subjects, continue presenting our seismic threshold approach, but ask the Soviets how they would propose to verify the yield threshold and the quota.

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At the VP meeting the AEC may push for favorable consideration of PNEs above the threshold, with or without a quota, and argue that we should follow up any Soviet hints at allowing this. We recommend that you oppose allowing PNEs above the threshold, based on verification problems.

We have revised your talking points for the VP meeting to reflect the above developments. These talking points are in your meeting book.

Your Meeting With Dobrynin

We believe you should take up with Dobrynin the above troublesome developments to try to get the Soviets to realize the difficulties they pose for our ability to reach agreement at the Summit. Attached are updated talking points, which reflect this concern, for your meeting tomorrow with Dobrynin (Tab A).

Bill Hyland concurs.

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June 3, 1974^{AM}

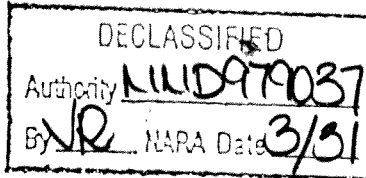
Talking Points on TTB
for Meeting with Dobrynin

-- I want to reaffirm our interest in reaching agreement at the Summit on the question of a threshold test ban.

-- We are proceeding on the basis that neither side will condition a threshold ban on a joint appeal to third countries or to make participation by certain third countries a condition for a threshold ban. Such conditions are unacceptable to us as they would only serve to embarrass third countries or to prevent a ban, since such third countries will not accede to a threshold ban.

-- The technical experts talks in Moscow appear to have gotten off to a fairly good start. Because of the bureaucratic situation in the USG, we were not able to authorize these experts to negotiate a threshold level. We appreciate your understanding of this.

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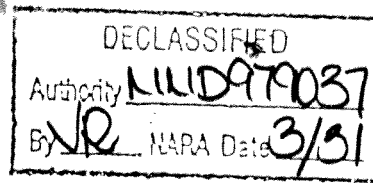
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-- However, several potential problems have arisen in the experts talks:

- First, the Soviet side has proposed that the threshold be expressed in terms of explosive yield rather than seismic magnitude. I must tell you frankly that there are some in Washington who like this approach. However, they have ease of testing and not arms control uppermost in their minds. The problem we have with the yield threshold is that there could be serious verification uncertainties involved. These uncertainties would depend, for example, on the precise terrain in which a test was carried out. The quantity measured directly by national means -- seismic magnitude -- does not pose these problems and would be a much more straightforward approach to defining the threshold.
- In this connection, I would like to ask you what upper yield threshold you have in mind for a TTB.
- The second problem is hopefully just a semantic misunderstanding. Your experts have been talking in terms which imply that tests of peaceful nuclear explosive devices would be exempt from the limitations of a TTB. They have talked in terms

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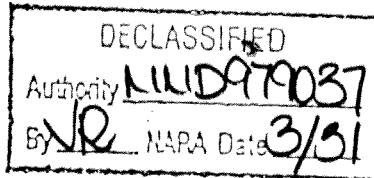
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of banning "nuclear weapons explosions." Allowing PNEs above the (upper) threshold (or in addition to a possible quota) would create massive verification problems. As I agreed with Minister Gromyko in Geneva, we should leave PNEs for the future -- both in the context of the Limited Test Ban and of a TTB. A TTB must not prejudge how PNEs are to be handled in a future PNE agreement, but it must also not leave a gigantic loophole by exempting PNEs.

- The Soviet experts have also proposed an annual quota on "nuclear weapon explosions" [in a "sandwich" between lower and upper yield thresholds. There would be no limitation on tests below the lower threshold]. Until we know more about how the verification issues are to be resolved -- such as how the threshold is to be defined and monitored, and how PNEs are to be handled -- we are dubious that a quota would be worth pursuing. The quota itself would have verification problems, arising from the possibility of multiple simultaneous explosions.

-- If it appears unlikely that a final agreement will be reached before the President's visit, the experts should define common areas of

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understanding to the extent possible. This would serve as the basis
for a Summit agreement to continue talks and to complete a US-Soviet
threshold test ban this year, assuming the problems raised by the
Soviet experts are resolved.

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