



21 March 1958

MEMORANDUM FOR THE CHAIRMAN, AD HOC PANEL ON NUCLEAR
TEST CESSATION

SUBJECT: The Effects of a Total Suspension or Cessation of Nuclear
Testing

Pursuant to NSC Action No. 1840, 6 January 1958, representa-
tives of the Department of Defense have participated in the discussions
of your Panel concerning the technical feasibility of monitoring a nuclear
weapons tests suspension and the predicted technological status of the
United States and the USSR with respect to the development of nuclear
weapons, assuming a total suspension of nuclear tests as of 1 September
1958. Documents prepared by the Atomic Energy Commission and the
Central Intelligence Agency portraying the predicted position of the
United States and the USSR, respectively, have been considered by the
Joint Chiefs of Staff and their views relative to the military impact of
cessation of testing are transmitted herewith.

The reports of the Atomic Energy Commission and the Central
Intelligence Agency are accepted as reasonable and satisfactory esti-
mates of the technological positions of the United States and the USSR,
with the understanding that events of the near future may necessitate
significant revisions of these estimates. Broadly stated, the estimates
indicate that at present and also as of the end of 1958, the United States
possesses an advantage in yield versus weight ratios, in flexibility of
applications, in the economy of use of special nuclear materials and
possibly in knowledge of weapons effects of a specialized nature.

It is reasonable to assume that with the continuation of testing the
gap will be narrowed and that both nations may be expected to attain the
practicable limits of nuclear weapon development as these limits can be
foreseen at this time. It is equally reasonable to assume that in the
absence of testing the gap will likewise be narrowed but at a slower
rate which will be governed by a number of factors over which the



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United States can exercise little or no control, such as stepped up espionage, ingenuity in devising partial substitutes for testing, and the extent to which the Soviets may be willing to accept the risks of clandestine testing as well as the risks of a lower probability of achieving desired performance characteristics. The achievement of technological parity as regards the practicable limits of nuclear weapons development as now foreseen with and without continuation of testing appears, therefore, to be a matter of time differential only, with the United States holding an advantage for an indeterminate period in either case.

Concerning developments in the nature of "break-throughs," that is, beyond presently foreseen practicable limits, both parties will be inhibited by a test cessation and the advantage will lie with the nation which is able to maintain the higher level of effort and interest in nuclear weapon research and development, the security with which it guards its findings, and the risk it is willing to accept in the conduct of clandestine test operations or its attitude toward the abrogation of treaties.

Relative technological status of nuclear weapons development at the moment and for the foreseeable future is not an adequate index of relative military posture. Consequently, an assumption that the further improvement of weapons designs and the knowledge of weapons effects to be gained from nuclear testing is more important to the Soviets than to the United States is untenable. Within the time available for the submission of the Defense Department's views on the subject matter set forth in NSC 1840, it has not been possible to prepare, on the basis of material submitted by the Atomic Energy Commission and the Central Intelligence Agency a system-by-system comparison which the Panel has indicated to be desirable in order to appraise the relative impact of test cessation on the military postures of the Free World and the Soviet Bloc. With the rapidly changing weapon development scene it is highly questionable whether such an appraisal would be valid even for a brief period.

As pointed out by the Joint Chiefs of Staff, cessation of testing as of the date under consideration will find a number of important U.S. research and development programs aborted or drastically limited:

-2-

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(a) The study of effects at ultra high altitudes essential to the design of effective anti-ICBM and other systems involving outer space, including the warheads, the delivery means, countermeasures and counter-countermeasures;

(b) Second generations of IREBMs, ICBMs and Fleet Ballistic Missiles designed to drastically reduce overall systems costs and reaction times;

(c) Economical designs of warheads for highly mobile systems for the support of battle groups and for air defense;

(d) Clean weapons in the middle and lower range yields;

(e) Weapons which combine absolute nuclear safing with safety from predetonation.

With respect to Items (a) and (b) above, the facts are:

(a) That the USSR possesses a recognized long range missile capability and that following the conclusion of the HARDTACK test program the United States will still not be fully assured of the design of an effective anti-ICBM system to include adequate knowledge of weapon effects at ultra high altitudes and the essential characteristics of the nuclear warheads required.

(b) Since the deterrent capability of U.S. long and medium range missile systems is compromised by the Soviets' ability to adopt the initiative, the retaliatory threat of these systems should be maintained at the highest feasible level through further warhead development, improved readiness and, if necessary, by greater dispersion and larger numbers.

It is the Department's view that until these two requirements are adequately and assuredly met through necessary test programs, the United States should not enter into a test cessation agreement unless it is a part of a broader agreement which offers very large compensating advantages.

In considering the inability of the United States to pursue Items (c), (d) and (e) as listed above, it appears necessary to give adequate weight

-3-

~~TOP SECRET~~



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~~TOP SECRET~~

to political, psychological and economic factors which are certainly not of equal importance to the United States and the USSR. While broadly speaking these factors are outside the area of direct military responsibility, they have a distinct and important bearing on the total Free World military posture. The problems of world wide dispersion of nuclear weapons for potential use by and support of friendly forces and the occupation of foreign bases by U. S. forces possessing a nuclear weapon capability affect not only quantitative requirements but also design features maximizing safety in handling and simplicity of maintenance. On a broader basis, concepts developed in the interests of political solidarity of the Free World which would place restrictions or restraints on the use of nuclear weapons by reason of geographical, psychological or moral considerations, may require the conduct of nuclear operations under conditions which the Department of Defense could not meet without the further developments indicated above. While the Department of Defense does not necessarily indorse limited war concepts which would place restraints on the types of nuclear weapons which may be used and the targets which may be attacked, it is my view that it would be a serious disadvantage for the United States to enter into a test cessation agreement which would block it from further tactical weapon developments of the type indicated by (c) and (d) above.



As regards the inability or time lag attributed to the Soviets in achieving a position equivalent to or approaching that of the United States, it should be obvious that as long as quantitative aspects of nuclear weapons and both quantitative and qualitative aspects of other weapons and delivery systems remain uncontrolled, efforts will be made by both sides to compensate for failures to attain practicable and desirable objectives in nuclear weapons designs by improving delivery systems, maintaining larger forces or by other means. For example: The Soviets' assumed inability by reason of a test suspension to achieve an ICBM warhead of yield equivalent to ours does not deny them the capability of an equally effective ICBM system through the development of larger payload capacity, improved accuracy of delivery and/or reliance on larger quantities.

It is in the light of the above considerations that I find myself in general agreement with the belief of the Joint Chiefs of Staff that in its overall long range effects a test cessation will operate to the distinct disadvantage of the United States. If such a test cessation

-4-

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is a positive and integral part of more comprehensive measures which deal with the stabilization and reduction of nuclear weapons stockpiles, the prevention of surprise attack and the regulation of armaments and armed forces, the military disadvantage of test cessation becomes acceptable in the light of these major objectives. In any case, the United States should not become a party to a test cessation agreement which would prohibit the conduct of tests of yields, in environments and under conditions which the agreed and implemented control system would be unable to monitor satisfactorily as to detection, identification and responsibility.

Donald A. Quarles

Inclosure:
Memo for SecDef from JCS,
13 Mar 58, w/Appendix



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-5-

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