

NUCLEAR TESTS

A Policy Statement by the Special Project Committee on Security Through Arms Control

I. THE URGENCY FOR REVISION OF U.S. NUCLEAR TEST POLICY

United States policy on nuclear tests is in urgent need of revision. Our government has taken the position that a suspension of test explosions is desirable, although it has heretofore linked it with other arms control measures. We believe that the proposal should now be separated from other issues and that the United States should take prompt initiative toward a world-wide test control program under suitable international machinery.

The issue has been adequately debated. Public consideration has been aided by Congressional hearings of the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy and the Disarmament Subcommittee of the Senate Foreign Relations Committee. Scientific, strategic and political factors have been debated. Popular interest is high. The Soviet Union, having just concluded a test series which produced a very large amount of radioactive fallout, has announced a test suspension of unspecified duration, without making any real commitment. It has also expressed a willingness to participate in a joint scientific inquiry into the inspection problem. This has put considerable political pressure on the U.S. and the Western Governments.

Irresolution or temporizing will weaken the position of the free world. The current opportunity to put Russian offers to the test might disappear. The entire arms control problem becomes more difficult as time goes on.

II. BASIC POINTS

After weighing all the complex factors involved, we believe the U.S. should have firmly in mind some basic points in dealing with the nuclear test issue.

1. Human Values. The U.S. position should be fully consistent with the ideals and values for which our country has been admired. We should not permit ourselves to become associated with disregard for human life or the rights of others.

2. Military Security. The enhancement of the security of the United States and of the world is a fundamental purpose, and the nuclear test issue is to be judged primarily in this context. But while the U.S. must not adopt any policy on nuclear tests which might result in over-all military inferiority to Russia, we need not pursue

military superiority in every category.

3. Security Through Arms Control. ^{arms race} The cannot be checked and reversed without effective controls. A start on inspection is vital to U.S. security. Inspection will also increase contacts and understanding. If successful, it will diminish fears and uncertainties, and generally accelerate evolution toward a more stable international order.

4. Explosions for Agreed Purposes. Certain types of nuclear explosions in the future may contribute to the well-being or security of mankind. There must be a mechanism whereby the world community, rather than individual nations, can judge the value of future nuclear explosions.

III. RECOMMENDATION.

The Committee believes that the United States government should act promptly in the matter of nuclear tests. It recommends that the following action be taken:

1. Call for the immediate establishment of an international agency to operate a monitoring system for the maximum practicable limitation of nuclear explosions. Offer to train personnel and provide equipment for such an agency and invite other countries to do likewise.

2. Propose a specific early date for a conference to reach international agreement for:

- A. planning, installing and proving the international monitoring grid;
- B. establishing international procedures for authorizing and supervising nuclear explosions for testing the grid, for developing "nuclear dynamite" for peaceful uses, and for other agreed purposes;
- C. prohibiting, except as so authorized, all nuclear explosions which could be reliably identified by the international system.

3. After the current U.S. test series, delay all U.S. nuclear tests for two years while negotiating a satisfactory control agreement and installing an effective monitoring system.

IV. FACTORS BEARING ON THE ISSUE

1. Relative Position of U.S. and U.S.S.R. in Bomb Technology. According to available evidence, the U.S. probably leads the U.S.S.R. in nuclear bomb know-how.

Many scientists, military leaders, government officials, and Congressmen, who have access to classified information on U.S. nuclear technology and to intelligence reports on Soviet technology, have made public statements to this effect. Furthermore, the U.S. has tested about twice as many times as the U.S.S.R., and the U.S. has been

working on nuclear bombs four years longer than Russia. Moreover, there is no public evidence that Russia has yet experimented with so-called "clean" thermonuclear bombs, which might indicate she is still concerned with less sophisticated designs.

Thus, an enforced freeze on testing now might well leave the U.S. in a position of some technological superiority.

Some argue that this current superiority will disappear unless testing continues. We fail to understand the logic of this argument. Beyond a given point of development and engineering, further improvements in a given scientific innovation are very marginal. Russia and the United States would then have essentially equivalent know-how. There is little evidence to support an assumption that the U.S. is more likely to make a radically new innovation in bomb technology than is Russia.

Of course, if surreptitious testing were possible and if Russia chose to cheat, she could perhaps surpass the U.S. in bomb technology. We believe, therefore, that the reliability of the monitoring system is important, that it should be tested by actual explosions, and that the U.S. should not agree to prolonged suspension of weapons explosions which cannot be detected and identified by the system.

2. Deterrent Strategy and the Adequacy of Present Nuclear Weapons. The U.S. has a counter-force strategy vis-a-vis Russia as well as a retaliatory strategy. (In the event of war, we plan to knock out Russian striking and retaliatory forces in addition to cities.) While the counter-force element of our grand strategy has been valid for the 1950's, when Russia has had relatively few and vulnerable intercontinental weapons of mass destruction, it has serious disadvantages for the missile age:

A. It would demand an accelerated arms race, with the U.S. striving for overwhelming qualitative and quantitative superiority over Russia's numerous and increasingly invulnerable forces, particularly because the U.S. presumes Russia to be the potential aggressor.

B. It would demand an instant response and would therefore tempt pre-emptive action. Thus, it promotes tension, heightens the dangers of accidental war, and continuously risks world disaster.

C. Our will to use this deterrent force, if necessary, would be eroded through contemplation of the enormity of the resulting catastrophe. Thus, our deterrent might be dangerously weakened.

A purely retaliatory strategy against key Russian industrial complexes can by itself soon provide adequate protection, if based on essentially invulnerable retaliatory forces. A retaliatory strategy devoid of counter-force ambitions would offer significant

advantages:

A. Relatively small numbers of weapons systems can be required, because the targets are key Russian industrial centers, which are vulnerable and few in number compared with military targets.

B. Reaction can be delayed and yet our retaliatory capacity can still survive. This will provide time for identification of an accident or a fanatical act.

C. Hundreds of kilotons will probably suffice for each of these strategic weapons, making multimegaton explosions unnecessary, and thus minimizing radioactive debris. The delayed reaction will allow safe evacuation of populations. Thus, willingness to use deterrent forces when necessary, and also the credibility of the retaliatory deterrent can be maintained.

While it is impractical in this policy memorandum fully to explore these strategic factors, their significance to the nuclear test issue should not be overlooked. It should be noted that this discussion is confined to doctrines regarding strategic capability. A capability for defense against mass conventional attack and limited war situations should, of course, also be ^{fully} maintained.

The counterforce strategy is the doctrinal source of the arms race, demanding big bombs to make up for bombing errors and to kill with certainty small and elusive targets. It also demands smaller packaging to permit more accurate and swift delivery systems and requires virtually indefinite testing.

The Polaris and Minute Man rocket weapons now being developed will provide the U.S. with an adequately invulnerable retaliatory force. Are nuclear tests necessary for the development of these weapons systems?

Nuclear bombs do not need to be tested in the actual missile. But do we have warheads of hundreds of kiloton yield which can fit in these rocket weapons?

The Committee does not have information available to it which permits it to defend factually its position on this point. But our conclusion, based on public information on test activity to date, and particularly on the public statements of knowledgeable and responsible officials and scientists, is that adequately tested warheads are available, or will become available after the current test series.

Nonetheless, further limited testing might be desirable in the interest of sensible world security arrangements. Smaller packaging might render the retaliatory stand-off more invulnerable and therefore more stable; a retaliatory stand-off based on nuclear weapons with very small fallout might later be judged in the best interests of all the world's peoples, in the absence of more complete disarmament. The provision in our

recommendation for internationally authorized and supervised tests "for agreed purposes" accomodates this possible future judgment. But we are convinced that current U.S. bomb technology can provide an adequate retaliatory capability, and that other factors calling for a test suspension are now more important than any possible refinement in this capability.

There is one additional consideration of interest, and this is Russia's strategic calculations vis-a-vis the U.S. If Russia were intent on counter-force action against the U.S., it is hard to understand how she could possibly consent to be frozen in a position of inferiority in bomb know-how, or how she could so readily give up testing of smaller and smaller packages. This point, and a variety of other evidence, strongly suggest that Russia is trying to build an intercontinental retaliatory sufficiency and not a counter-force nuclear superiority.

The U.S. can test Russia's strategic intentions through prompt action on the nuclear test issue.

3. Self-defense and the Adequacy of Present Nuclear Bombs. The matter of nuclear defenses must be considered first in relation to a Russian nuclear strike, and second in relation to massed conventional attack.

The feasibility of any adequate air/space defense against nuclear rocket attack is in serious doubt. Apparently, the problems do not lie as much with the adequacy of present warheads or rocket engines as with the electronics of the system -- detection, identification, computation, guidance and interception in very short time.

The U.S. is frequently urged to continue nuclear testing in order to provide "clean" weapons of low yield for tactical use in the defense of free world territory against Communist bloc conventional aggression. In general, the U.S. already has low-yield weapons in a considerable variety of packages. As nearly as the Committee can ascertain, barring a radical innovation not now in sight, all nuclear explosions need some fission, there being a minimum amount of fission necessary in any bomb. Our impression is that the minimum might be a few kilotons.

This means that whereas megaton bombs could be 96% "clean", small bombs will remain 100% "dirty." The argument that tests are needed now to develop "clean" low-yield bombs would thus appear to be utterly fallacious.

Perhaps someday a means of starting nuclear explosions without fission may be conceived. In this eventuality, we believe the case for testing such bombs should be debated before the world and authorized internationally, as we have suggested.

Further testing of low-yield weapons might gain greater efficiency in the weapons, i.e., obtain the same yields in smaller or more specialized packages or by using smaller

amounts of fissionable material. But this does not appear sufficient to offset the major gains in security which might flow ultimately from test suspension.

In this regard, one should also note that our recommendation, if followed, would not prohibit tests of weapons smaller than the system could detect and verify. We doubt that any practical monitoring system will reach below one kiloton.

4. Nth Country Problem. An international agreement to suspend test detonations would be of great value because it would tend to prevent the spread of nuclear capability to new nations. In our earlier report, 1970 Without Arms Control¹, we pointed to the Nth country problem as one of the greatest dangers of an unrestricted arms race.

A major characteristic of our age is the rapid growth of industrialization and technology. Today, three nations possess nuclear military capabilities. It is likely that in 25 years, barring either catastrophe or agreement, many more nations will be in a position to wage nuclear war.

As each new nation learns the techniques of manufacturing nuclear armaments, the difficulties of achieving controls of any sort will multiply enormously. Risks of accidental or fanatically initiated nuclear wars will grow. As time passes, and as more and more nations achieve these capabilities, it will become increasingly difficult to identify the aggressor. The interests of both the United States and the Soviet Union are to slow down the rate of spread of nuclear-military technology in the world as much as possible.

It is, of course, true that most nations would seek to acquire nuclear weapons through importation, rather than national testing and production. A relatively crude bomb could be developed by a determined nation without testing. Controls on the production of nuclear materials will probably be more effective in dealing with the Nth country problem than will a test prohibition. Also, certain countries, such as Britain, France and Sweden, might test at least until agreement is negotiated, although we doubt if they would block agreement.

Nonetheless, a test prohibition can be one helpful measure in impeding the spread of nuclear bombs to many nations.

5. Health Hazards of Testing. The testing of nuclear weapons has produced a world-wide deposition of radioactive material known as fallout. These radioactive elements may constitute a health hazard to the world population. An evaluation of the

¹ 1970 Without Arms Control, National Planning Association PP 104, May 1958.

damage expected from present and future fallout must be part of any decision on nuclear testing.

Unfortunately, no precise and certain calculation of the damage can be made, principally because the biological effects of radiation are not yet fully known. Furthermore, any prediction of damage must be based on an assumed rate of testing. Widely divergent estimates of the damage have been published, which differ partly because of different estimates of the damage resulting per megaton released, but even more because of different assumptions as to the future rate of testing.

More recently these differences have decreased. The AEC Advisory Committee on Biology and Medicine estimates that a continuation of testing at 10 megatons per year will result in an average strontium-90 accumulation of 1/30 microcuries per man, whereas 1/10 microcuries is considered the maximum permissible dose. (It says that this equilibrium would be reached in 100 years if the rate of testing is held down to 10 megatons per year.) This rate has already been exceeded for a number of years. With additional nations testing nuclear devices, the rate will be considerably increased and this level will probably be reached during the next generation. Further, it estimates that the cost of this rate of testing will be 2,500 to 13,000 genetically defective children per year. The Radiation Hazards Committee of the British Atomic Scientists Association estimates that 1,000 bone cancers will be induced per megaton detonated.

The Atomic Energy Commission committee report also touches upon another aspect.

Estimates of the number of individuals in the world's population who may show some damage in the course of time...are large in absolute terms. Whether they are considered to be small in comparison to the unavoidable damage caused by spontaneous mutations and the presently accepted hazards of life, depends on the ethical and emotional makeup of the individual and, therefore, there can be honest differences of opinion.¹

Relative to other causes of death and misfortune to mankind, the misery caused by testing is small; relative to a nuclear war, damage from testing is virtually nothing. Yet leprosy is not left untreated because it is a relatively unusual cause of death.

The hazards of testing are accepted partly because they are difficult to single out meaningfully. Public opinion surely would not tolerate testing if each test series killed or injured the inhabitants of a small town -- an obvious loss, which would be no less than the sum of the known and unknown risks which arise from test contamination.

However, test damage has been accepted basically because it is justified for national or world security. After all, the value judgment of the U.S. is that freedom

¹ Statement of AEC Committee on Biology and Medicine, October 19, 1957.

was worth the sacrifice of millions of lives in World Wars I, II and Korea. The U.S. has felt that security against war, and the consequent saving in human life that might be lost in another general war, outweigh the relatively small human cost of testing. But as we have pointed out in section IV, 2 and 3, above, dealing with strategic considerations, an alternative to present security concepts exists which can provide adequate security without further testing, together with other enormous advantages. Perhaps some minor number of tests at some future date would strengthen the world's security arrangements, and refinements are always, of course, possible. But in view of the alternative approach, we believe the need for testing to provide adequate security no longer outweighs other factors, such as the health hazard.

6. Test Detectability. A test agreement makes sense only if it assures all parties' performance.

Nuclear tests are detectable. By a conservative estimate, general location, size and identification of explosions over 5-kilotons TNT equivalent can be determined from fixed stations several hundred miles distant.

At the present time, there exist over 100 seismic stations in the U.S.S.R. and a corresponding number in the U.S. Such a number, if properly located and provided with special instruments, would more than suffice to inspect these countries for test detection purposes.

A. Identification of above-ground, tropospheric (low-altitude) tests of 1 kiloton or more can be done by air sampling, fallout, seismic shock, air blast and other scientific techniques.

B. Beyond the atmosphere, very high altitude tests hundreds of miles up could be detected by the direct light emitted, or by the light emitted when the radiation strikes the top of the earth's atmosphere.

C. Underground tests of above 5 kilotons are identifiable by seismic stations located as suggested, and parts of the present Soviet and U. S. systems of seismic stations are probably suited to this purpose.

D. Underwater explosions of more than 5 kilotons could probably be detected by hydrophones on islands or on ships, spaced thousands of miles apart.

E. Experience from installation and testing of the international detection network will probably make smaller and smaller yield weapons detectable as time goes on.

These same land and sea inspection stations with additional instruments, could detect missiles as soon as they rise to an altitude of over 10 miles. Once an effective inspection system for a test suspension has been installed, only slight technological

additions would be required to police a control agreement on rocket testing. These stations will also be useful, but not adequate in themselves, to warn of surprise attack.

Because we cannot vouch for the efficiency of detection and identification processes operating over greater distances than several hundred miles, we feel that the Chinese mainland must be subject to inspection. Otherwise, Russia might, as it has already done, conduct certain tests in that vast territory. Our own national security, if dependent on an effective agreement, requires that the government which controls the Chinese mainland be a party to an agreement to suspend bomb tests and that mainland China, no less than Russia, be subject to inspection. Russia might, by similar reasoning, make similar demands for the inclusion of countries of the free world, and these demands should be recognized as legitimate.

7. Popular Concern and American Initiative. The question of whether nations should test nuclear weapons has become one of the great symbolic issues of our time. It has stirred emotions and engendered convictions. The issue has lent itself to oversimplification, and many who have no concern with the broad and complex problems of security and arms control sense a present danger from air contamination by tests.

This Committee feels that the United States should use its unparalleled resources wisely and generously in an effort to win the struggle for the minds. It would not, however, suggest that any position on disarmament be shaped by propaganda considerations. It is important that the entire world know that we speak here from earnest conviction. In the long run, the most effective propaganda is a sound and constructive effort to achieve genuine, workable, arms control and security arrangements to diminish dangers from war. A sound test suspension agreement would be a promising first step toward such an agreement.

For the time being, we have lost the initiative. The Russian position on the test issue is clear and easily understood. It has won the support of large and active non-communist segments of public opinion in many countries. In opposing it, we have been forced to argue that contamination from tests is exaggerated, which has put us in the ungainly posture of saying that a little noxious contamination of another's property is all right.

The issuance of a call for an international conference to adopt a world position on the test issue will fulfill the role of leadership which other nations expect the U.S. to play, and which the United States played so well in the creation of the International Atomic Energy Agency. It will also place in the hands of the world community, where it belongs, the right to authorize nuclear tests, which affect all humanity.

There will, in the future, be valid world purposes for test explosions. The development of "nuclear dynamite" for peaceful purposes holds promise for civil construction, mining and other needs. Certain additional weapons tests may have value for the creation of a more stable and less dangerous world security system. These security needs must be judged in terms of world, rather than purely national, security arrangements.

8. Progress Toward More Comprehensive Controls. The United States should continue to stress that a test agreement must be followed by broader and more comprehensive arms controls. It should maintain steady diplomatic pressure in this direction, perhaps by making it clear from the outset that, while a nuclear test suspension is valuable in itself, tests for the development of new nuclear weapons might well be resumed under international regulation if progress is not made toward the adoption of broader disarmament plans. This factor also argues for the "agreed purposes" provision in Section 3 C of our suggested proposal. It must be an "agreed purpose" that unless other arms control measures follow in a reasonable time, testing may have to be resumed, although under international regulation to control the rate and manner of testing to hold fallout to an agreed world minimum.

The United States, at the London Conference of the U.N. Disarmament Subcommittee in August 1957, made an unseparable package proposal, which joined a two-year test suspension with a cut-off of production of nuclear materials, force reduction, aerial inspection and several other proposals.

In many ways, it was a meritorious proposal. But a proper test suspension in itself would aid both world and national security, and for this reason it would be unduly rigid to continue insisting upon the entire package on an all-or-nothing basis. The United States has recently taken one step in abandoning the package approach by offering a separate agreement for aerial inspection in the Arctic Circle.

Perhaps the most important event which took place at the London Conference was the Russian concession regarding a system of inspection on Soviet territory to monitor a test suspension agreement. Since the unwillingness of the Russians to admit international inspection teams has, for ten years, been one of the major roadblocks to disarmament agreement, this Russian concession was one which should be diligently pursued as a possible major breakthrough in arms control. The breakthrough on inspection is by no means a tangential one: it is central to the cessation of the arms race, as a means of preventing surprise attack and as a means of allaying the suspicions and tensions, which are in themselves so dangerous. A degree of mutual inspection for bomb tests may well prove to be the beginning of a meaningful inspection for other arms control measures, and may

result eventually in the opening up of Russia to freer contact with foreign nations.

A cessation of the weapons race will not end the determined contest between the free world and the Russian rulers. It will only transfer it to other areas of competition. We have full confidence, however, that the resources of the United States, spiritual, intellectual, political, human and economic, can win such a contest for mankind's future. We will be aided in this if we exercise leadership toward safe and controlled security arrangements.

For all these reasons, the Committee urges the United States to enter into international negotiations for a test suspension, as a first step toward more comprehensive arms control, not as a reluctant power, but as a nation whose record in pursuing peace is second to none.