

Implications of a Zero-Yield Nuclear Test Ban

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Mr. Chairman, Members of the Committee:

As the Senate considers the CTBT, it will be obliged to focus on one dominant, ineluctable result of its ratification: over the decades ahead, confidence in the reliability of our nuclear weapons and in the U.S. Deterrent would inevitably decline. The Stockpile Stewardship Program will unquestionably mitigate that decline to some extent. It is hoped that it may mitigate the decline to a substantial extent. But for the moment that remains only a hope. Mitigation is, of course, not the same as prevention. Over the decades, the erosion of confidence inevitably will be substantial.

A nuclear weapon is a complicated device--especially so the sophisticated weapons in the U.S. stockpile. Its numerous components must function together with split-second timing. There is scant margin for error. Moreover, a nuclear weapon must be able to endure highly stressful environments. On a ballistic missile, for example, a weapon must withstand the shock of sharp acceleration, the sub-zero temperatures of space, heat of reentry, deceleration, and possibly impact. Air-delivered weapons must undergo similar physical stress, though to a lesser degree. Once again, there is little tolerance for miscalculation. There has never been an adequate statistical basis for establishing weapon reliability. Nor have we been able adequately to measure the other phenomena that I have mentioned. Inevitably, there has always been a good deal of estimation and educated guesswork in estimating weapon reliability and overall system reliability. A permanent test ban would, of course, amplify those problems.

As a nuclear weapon ages, its individual components are subject to the effects of aging--corrosion, deterioration, unexpected as well as expected failure. The shelf-life of U.S. nuclear weapons was expected to be some twenty years. In the past, the constant process of replacement and testing of new designs gave some assurance that weapons would not be subjected to the effects of aging. But in the future, we shall be vulnerable to the effects of aging because we shall not be able to replace or to test weapons. In a decade or so, we will be beyond the expected shelf-life of the weapons in the stockpile.

It might be noted that a 1978 report to the Armed Services Committee stated: "the reliability of our nuclear weapons...has been assured by the continuous introduction of recently tested new designs and by a constant turnover of the stockpile made possible by the retirement of older weapons before they have begun to deteriorate." It may also be

noted that for Soviet--and now Russian--weapons, the expected shelf-life has been ten years. Unlike ourselves, the Russians continue to produce some thousands of weapons each year to replace aging weapons in their inventory. By contrast, despite an explicit policy commitment, the United States at this time lacks the capability either to fabricate or certify new warheads.

The Stockpile Stewardship Program will, among other things, disassemble nuclear weapons selected from the stockpile, subject the components to careful individual scrutiny, looking for signs of corrosion, decay, et. cetera. Individual components will be replaced if the judgment is reached that they have failed or are near failure. We will try to make those replacements as identical as possible to the earlier component. A problem exists that individual components go out of production, manufacturers go out of business, materials change, production processes change, certain chemicals previously used in production processes may have been forbidden under new environmental regulations, and so on. The upshot is that we can never be quite certain that these replacement components will work as did their predecessors.

The Department of Energy is to be applauded for its commitment meticulously to examine weapons in the stockpile. I trust that the Congress will not fail to provide the funds for the Stewardship Program. But one must also recognize that the reassurance, once available through the testing of weapons at least to the point of nuclear ignition, is no longer there. In addition, the Stewardship Program will create new facilities intended to reduce our still incomplete knowledge regarding what occurs in a nuclear explosion. It will provide funding for further enhancement of computation power. But these new facilities and enhancements will not be fully available for a decade and then the experimentation and the assessment of the results will require additional years. Moreover, even significantly enhanced computation power would still not be able to simulate a weapon three-dimensionally--and, of course, unlike a reliable weapon which can be simulated symmetrically, a weapon undergoing decay decays asymmetrically.

Once again, I trust that the Stewardship Program will be vigorously pursued and will be vigorously supported by the Congress. Nonetheless, it will be many years before the new facilities and new capabilities are put in place. It will be more years before the projected experiments can be completed and assessed. If the treaty is ratified, the Stewardship Program would be subjected to the usual budget pressures and to the possible erosion of support by the Administration or by the Congress. It will be many, many years before we can assess adequately the degree of success of the Stewardship Program and the degree to which it may mitigate the decline of confidence in the reliability of the stockpile.

We should bear in mind that DOE and laboratory personnel were never asked: what should we do to sustain or to maximize confidence in the reliability of our weapons? To that question the answer remains obvious--periodic testing at least at very low-yield remains desirable. Instead they have been asked a question--given an international commitment to eliminate nuclear testing, how can you best seek to sustain confidence in weapon reliability? To that rather different question the system has responded with a vigorous program for stewardship. But no one now has either the experience or the

knowledge to judge the degree of success of the Stewardship Program. When queried, DOE or laboratory officials will indicate that there is "a good chance" that through the program we shall be able to maintain "sufficient" confidence in the stockpile. They also know that it will be more than a decade before we can judge how successful the Stewardship Program will have been, and they recognize that never before have we depended on weapons as old as those steadily aging weapons in the stockpile. In assuring weapon reliability, there is no substitute for nuclear testing. How imperfect a substitute the Stewardship Program will prove to be remains to be seen.

For many years, the Congress has received repeated and persistent testimony from officials at the DOE and its predecessor,,or agencies, from laboratory directors and scientists, from the Chiefs, and from the relevant CINC's that nuclear testing was essential. Suddenly that testimony has changed, and now we have a somewhat ambiguous response. Senators will, no doubt, want to satisfy themselves to what extent things have really changed.

We must also contemplate what is implied by the permanent cessation of nuclear testing. As one senior official has confided--none of us can comprehend what that means. Some thirty-six years ago. President Kennedy decided to resume nuclear testing after the Soviet Union broke the Moratorium. Consider what it would mean to have an equal period in the future without weapons testing. We would then be dependent upon the judgement of engineers who are being hired today--that is dependent on the judgment of personnel who will have no personal experience either in designing or in testing nuclear weapon. In place of a learning curve, we would experience an extended unlearning-curve. In brief, we are embarked on a voyage into the unknown.

Mr. Chairman, let me now turn away from technical issues to the political and strategic issues. Does a decline in confidence in the stockpile, to a degree which cannot now be predicted, matter all that much? Quite clearly in the current circumstances, it matters far less than it would have at the height of the Cold War. The collapse of the Soviet Union and the Warsaw Pact has substantially reduced the dependence of the United States (and its allies) on nuclear weapons. The challenge of holding a nuclear umbrella over our allies in Western Europe and elsewhere has been substantially alleviated. Moreover, the requirement to initiate the use of nuclear weapons in response to an overwhelming conventional attack has been eliminated. Indeed, any need for such a nuclear response to a conventional attack has, at least for this period, happily disappeared.

Given these altered circumstances, does a decline in confidence in the stockpile reliability matter at all? If the United States were just another country and its nuclear posture were designed simply to deter attack on its own territories, such a decline would probably have only limited significance.

The United States is, however, not just another country. Its geopolitical role on the current world scene is unique. It has both acquired and has had thrust upon it international responsibilities. It is still pledged to hold a nuclear umbrella over its NATO allies and Japan. It has a semi-commitment also to hold an umbrella over other states,

possibly including those non-nuclear weapon states that have signed the NPT. Its forces are stationed in many countries. Though it has abandoned chemical and biological weapons, it has threatened to retaliate with nuclear weapons to such an attack. In the Gulf War such a threat apparently was sufficient to intimidate Saddam Hussein from employing chemical weapons.

In addition, the United States has a very ambitious foreign policy agenda. At this time, it is engaged in expansion of NATO. Our most senior officials, have additionally indicated that NATO membership should be open to any democratic country in Europe. If, for example, NATO is expanded to include the Baltic states, no conventional defense would be possible. Under such circumstances, if we were to fulfill a commitment to provide protection, we would be driven back to threatening a nuclear response to a conventional attack--a commitment from which we have only escaped recently. Given the nature of our foreign policy agenda and given the unique geopolitical role of the United States, a decline in the confidence in U.S. nuclear weapons cannot therefore be viewed with equanimity.

Over the years, much of the pressure for a complete cessation of nuclear testing has been based upon a belief that such cessation would help to prevent nuclear proliferation. I believe that such a view is exaggerated at best. The motivation for the so-called rogue nations--Iraq, Iran, Libya, North Korea--to acquire nuclear weapons surely will not be affected by whether or not the United States tests. Similarly, the possession of nuclear capabilities by the so-called nuclear threshold states--India, Pakistan, Israel--depend upon regional circumstances and are scarcely affected by whether or not the United States tests. Indeed, the incentives might actually point in the opposite direction. If confidence in the reliability of the U.S. nuclear deterrent were to decline, other nations that have been content to rely on American protection might feel impelled to seek their own nuclear protection.

The ambitious nature of the U.S. foreign policy agenda implies that a decline in confidence in the reliability of U.S. nuclear weapons and in the U.S. nuclear deterrent could not be viewed with equanimity. To be sure, we might be prepared to limit our foreign policy agenda, as confidence in the reliability of the stockpile declines. At the moment however, there is little inclination to move in that direction, and even less realization that such a price might have to be paid.

The geopolitical role of the United States remains unique. Cessation of nuclear testing would have consequences--and those consequences will grow as the decades pass. As members of the Senate consider ratification of the proposed CTBT, and the effectiveness of the Stockpile Stewardship Program to slow down the decline in the confidence in stockpile reliability, they will, I believe, want to carefully examine the risks as well as the benefits of the proposed treaty.