THE COMPREHENSIVE NUCLEAR TEST BAN TREATY
And
THE ISSUE OF NUCLEAR TESTING

Los Alamos National Laboratory

Thomas Graham, Jr.

May 5, 2003

Stemming the proliferation of nuclear weapons is unquestionably the greatest challenge facing the world community now and for the foreseeable future. As President Jacques Chirac of France, and Prime Minister Tony Blair of the United Kingdom and Chancellor Gerhard Schroeder of Germany noted in their October 1999 *New York Times* op-ed supporting CTBT ratification: "As we look to the next century, our greatest concern is proliferation of weapons of mass destruction , and chiefly nuclear proliferation. We have to face the stark truth that nuclear proliferation remains the major threat to world safety." The costs and benefits of the Comprehensive Nuclear Test Ban Treaty (CTBT) and the related issue of the nuclear test moratorium should thus be weighed in the context of this overarching international security objective—preventing nuclear proliferation. And in this presentation, I will address primarily the issue of the CTBT rather than, the moratorium which, of course, should be seen as an interim not a permanent measure.

The most immediate effect on the Nuclear Non-Proliferation Treaty (NPT), the centerpiece of world-wide efforts to prevent nuclear proliferation, of the Senate's refusal to give advice and consent to the CTBT in 1999 was to slow agreement by many NPT countries to the new tougher International Atomic Energy Agency (IAEA) inspections for all non-nuclear-weapon NPT parties. After the first Gulf War, as a result of Iraq's

success in hiding its clandestine nuclear-weapon activities, the U.S. helped lead an effort at the IAEA to strengthen NPT safeguards to detect clandestine activities in the territory of non-nuclear-weapon NPT parties. The more intrusive safeguards were finally adopted as policy by the IAEA Board of Governors and General Conference in 1997 in the form of an Additional Model Protocol, but each NPT Party had to sign and then ratify this amendment to its safeguards agreement with the IAEA to make the more intrusive safeguards applicable to itself. The Director General of the IAEA at this time said, "The Senate vote against the ban on nuclear tests was a devastating blow to our efforts to gain acceptance of more intrusive inspections of nuclear facilities around the world." While not all were expected to – especially those like North Korea that are suspect, some 60 countries signed the agreement after the 1997 IAEA decision. Following the Senate's vote on the CTBT, the ratification process of this Additional Protocol proceeded very slowly and as of the end of 2002, only 18 NPT Parties had ratified it.

If the United States Senate is unwilling to approve the CTBT in the years ahead, what could happen? Unquestionably, the NPT would be substantially weakened. This would be seriously detrimental to both United States and international security, as the NPT has been critical both in constraining the spread of nuclear weapons to new nations and in rolling back proliferation in nuclear weapon capable countries such as Belarus, Kazakhstan, South Africa, Argentina, Brazil, and Ukraine. And what likely would follow would be made more likely and accelerated if the U.S. not only failed to ratify the CTBT, but proceeded ahead to break the testing moratorium.

Of course, if the U.S. does not ratify then the CTBT will not go into effect for any country because the United States is a necessary party. Eventually, India and Pakistan

may well resume nuclear testing. If India tests, China may use that, and the failure of the United States to ratify, as reasons for it to resume testing. China may want to produce smaller nuclear warheads to enhance the capability of its missiles to carry multiple warheads and decoys to confuse and overwhelm interceptor missiles from the U.S. national missile defense system. If China tests, and North Korea proceeds ahead with an overt nuclear weapon program as its recent behavior suggests, what would Japan and South Korea do? I want to emphasize this is analysis not prediction.

Japan has been a leader in trying to bring the CTBT into force at the earliest possible date. But if India, Pakistan, and China resume testing, if North Korea is moving toward acquisition of nuclear weapons and if the CTBT cannot go into effect because of the U.S. Senate rejection, how long might it be before some future Japanese government could consider a secret program to build nuclear weapons to protect itself? Japan felt threatened in 1998 by the combination of the Indian-Pakistan nuclear tests in May and a North Korean Taepo Dong rocket that flew over Japan a few months later. A parliamentary vice minister for defense in Japan was forced to resign in 1999 when he suggested that Japan build nuclear weapons after these events. Although officially Japan remains steadfastly against becoming a nuclear-weapon state, he was certainly not the only one in Japan with this view. Japan, like other NPT States Parties, has the right to withdraw from the NPT on three-months notice "if it decides that extraordinary events, related to the subject matter of this treaty, have jeopardized the supreme interests of its country."

If Japan withdrew from the NPT, would South Korea be far behind? Korea has been invaded by both China and Japan in this past. It could well feel threatened by

events in North Korea, if China had resumed testing, and if Japan had withdrawn from the NPT. South Korea had a nuclear-weapon program in the 1970s but was dissuaded from pursuing it by the United States. If it withdrew from the NPT, it could produce nuclear weapons in a short time. Taiwan also had an incipient nuclear weapon capable program in the 1970s. Thus, a dangerous nuclear weapons spiral could be created in Northeast Asia.

Might results comparable to these take place in other parts of the world, the Middle East for example? Of the states in the region essential for entry into force, Egypt and Iran are likely to wait on Israel before ratifying to CTBT, and Israel is likely to wait on the United States. But Iran is acquiring a nuclear power reactor and enrichment facilities, and both Egypt and Iran have trained nuclear experts. Failure to bring the CTBT into force with a resultant collapse of the NPT in the North East Asia could contribute to the potential spread of nuclear weapons to several countries in the Middle East as well as elsewhere in the world, leading to the general dissolution of the NPT.

At the 1995 NPT Extension Conference, the United States and the other four NPT nuclear-weapon parties agreed that they would complete negotiation of a CTBT by 1996. This was probably the single most important promise made to gain wide support from non-nuclear weapons states for making the treaty permanent. For many nations, carrying out this promise was a test of the sincerity of the United States and the other NPT nuclear-weapon states with respect to their NPT obligation to "negotiate in good faith" to halt the nuclear arms race and reduce their nuclear weapons. This obligation is what many non-nuclear-weapon parties have long relied upon to reduce what they perceived as

discrimination against them authorized by the NPT. "Nuclear apartheid" to quote the Indian Foreign Minister.

But a CTBT is overwhelmingly in the security interests of the United States. In my opinion, it is verifiable, and the reliability and effectiveness of the U.S. nuclear stockpile will not be diminished under a CTBT. The United States currently has a significant advantage over Russia and China, and indeed the rest of the world, in terms of the sophistication of its nuclear arsenal and the depth of knowledge related to nuclear-weapon technology possessed by its nuclear scientists. This advantage was developed by the conduct of well over 1,000 nuclear explosive tests—greater than the combined total of nuclear tests conducted by the rest of the world—and translates into a United States nuclear deterrent of unmatched effectiveness.

Modern nuclear weapons, with thousands of individual parts, are complex as I need not tell this audience. There is no substitute for a nuclear explosive testing program involving full-scale tests to provide confidence in the reliability of a new design of a second-generation thermonuclear weapon. No responsible political leadership, no competent modern military authority, and no nation depending on nuclear weapons for a credible deterrent could be expected to deploy a modern lightweight two-stage, thermonuclear weapon without a full-scale test program. For its part, my understanding is that the United States typically used on average six explosive tests before certifying its new weapon designs. France reportedly used as many as 22 tests. Thus, the CTBT would keep new designs for advanced weapons out of the stockpiles of Russia, China, and the United States as well as the other states with nuclear weapons. Thus under a CTBT, the U.S. arsenal would continue to consist of the world's most advanced weapons.

In addition, no nation is better prepared to maintain the reliability of nuclear weapons, in a non-testing environment, than the United States. The information gathered by U.S. scientists through the nation's extensive nuclear testing program contributes to the effectiveness of the Stockpile Stewardship Program (SSP) which, if properly funded I am persuaded, will be able to ensure that the safety and reliability of the U.S. nuclear arsenal will not erode over time. The leadership of the United States in the realm of supercomputer development, which is essential to the success of the SSP, further ensures this advantage. In effect, under a CTBT, no other nation will be more capable than the United States of maintaining its arsenal without testing.

In general terms, the United States now relies on an expanded program of stockpile stewardship to ensure that:

- the enduring arsenal remains reliable, effective and safe into the indefinite future without nuclear explosive testing;
- it maintains competence in nuclear weapons; and
- it retains the technical capability and manufacturing infrastructure in order to respond, as required for U.S. security, to changed strategic circumstances.

Today, the nuclear weapons that are designed to remain in the enduring stockpile are, and should remain for the foreseeable future, effective, safe, and reliable. Confidence in today's stockpile is based on understanding gained from almost 50 years of stockpile surveillance, and the experience and analyses of a very large number of nuclear tests, including a significant number of nuclear tests of modern weapon types over the past 25-30 years.

My understanding is that the overwhelming majority of U.S. nuclear tests during the Cold War were devoted to developing for deployment new and more advanced warheads and weapons systems. Only a very small percentage, well under 10% of the underground nuclear explosive tests of modern weapons from 1972 to the end of testing in 1992 by the U.S., were stockpile confidence tests; i.e., tests conducted on currently deployed weapons to confirm confidence in them. That is well less than one test per year for the whole arsenal of many thousands of weapons.

The CTBT in no way limits most of the testing and analysis work that goes on in connection with maintaining the U.S. deterrent. This includes testing the performance of the warhead, including the high explosives that initiate the implosion in the primary leading up to the ignition of the fission stage itself. Flight tests of the missiles and their guidance systems will continue. All of the approximately 6,000 parts of the nuclear warhead, other than the nuclear package, will continue to be tested under the SSP as they have been for more than 40 years. Statistically significant numbers of such experiments have been carried out and provide meaningful measures of high confidence in the U.S. systems. Functional testing of the non-nuclear components of a nuclear warhead and flight-testing of the weapons system are not—and will not be—restricted by a CTBT.

The current testing moratorium by the five recognized nuclear-weapon states—which for the United States has been in effect since 1992—is at present, only a political commitment. When the CTBT comes into force, it would make this political commitment legally binding and thereby legitimize a range of actions by the international community in support of the ban and, if necessary, in response to a possible nuclear test by any nuclear-weapon capable nation. Pursuant to the Vienna Convention on the Law

of Treaties, which is reflective of customary international law, all signatories to the CTBT are legally bound not to conduct nuclear explosive tests, unless they formally withdraw their signature. And at the NPT Review Conference in 2000, there was agreement of all NPT parties, including the United States, to a testing moratorium pending entry into force of the CTBT. This would make the unilateral resumption of testing by a NPT Party a violation of an NPT-related commitment.

With regard to verification concerns, the CTBT will ensure that all parties will have considerably more information about what is happening at United States, Russian, and Chinese tests sites. The International Monitoring System (IMS) established pursuant to the CTBT will enhance efforts to monitor international nuclear explosive test activities. The new system will consist of 321 monitoring stations around the world some 47 percent of which is now complete, including a significant number in Russia and China, augmenting existing capabilities that exist in the United States and elsewhere. It will also establish a regime for on-site inspection as well as the first truly high-tech arms control treaty verification regime relying on seismic monitoring, radionuclide sensing, a hydroacoustic network, and an infrasound network.

There remains, nevertheless, concern among opponents of the test ban in the United States that nations will be able to hide nuclear explosive tests in environments that will "decouple" their seismic signatures or otherwise prevent their detection However, only nations with advanced nuclear testing programs and extensive underground testing experience are likely to be able to conduct such deceptive tests whose preparation and yields would have to be carefully controlled. This rules out India, Pakistan, and Israel as well as the so-called "states of proliferation concern." The United Kingdom cannot

conduct any tests as long as the U.S. test site is closed. France has not tested on its European territory and has closed its test facilities in the South Pacific. As a result, decoupling is a concern for the United States that can realistically only be directed toward Russia and China. Whatever the shortcomings of the IMS in this regard may be, the United States will be better able to monitor suspicious activities at the Lop Nor and Novaya Zemlya test sites and elsewhere in these countries with the CTBT and its IMS in force than without.

This is not to say that detecting deceptive tests of sub-kiloton yields will be easy. Since it is assumed that the United States as a open society would not be able to do such tests, this could be translated into a strategic disadvantage for the United States. As the 1995 JASON Report in the United States makes clear, however while testing at one-half kiloton could confer some marginal benefits, it would only be meaningful if testing went undetected over a long period of time. Russia and China might be able to conduct a few low-yield tests and evade detection, but an extended series, which is the only way any benefits could be derived from such tests, would not be possible to hide. Six IMS stations detected the Kara Sea seismic event near Novaya Zemlya in 1997 with a magnitude 3.5 on the Richter scale, which corresponds to a nuclear explosion with a yield of less than 1 kiloton. This is a good indication that the IMS, which has been significantly improved in the nearly six years since that event and which will continue to be upgraded, can reasonably be expected to detect even very low-level events in regions of concern.

General John Shalikashvili, former United States Chairman of the Joint Chiefs, completed a Report on CTBT in January 2001 and submitted it to President Clinton

before he left office, General Shalikashvili concluded that the net impact of the CTBT is that, on balance, the Treaty would enhance United States security in numerous ways.

He stated that there are, of course, risks but they exist with or without the Treaty.

- A potential proliferent state with the necessary knowledge, materials, and technology could assemble an unsophisticated nuclear device and be relatively confident that it would work without testing it. The CTBT is not a proliferation cure-all, but by supporting other elements of an integrated non-proliferation strategy, it will make this scenario less likely.
- There always will be some gap between zero-yield and the lower limit of remote sensing capabilities to detect, identify, and locate an explosion. With on-site inspections and other sources of information, though it is more likely that very low-yield testing would be detected or deterred with the CTBT than without it.
- Experienced nuclear weapon states could engage in some evasive testing. However tests that are small and infrequent enough to avoid detection would not permit them to develop new weapon systems and eventually even such violations are likely to be caught.
- The Stockpile Stewardship Program in the United States is designed to discover and resolve potential problems that might affect weapon safety or reliability, but no one can guarantee that a nuclear test will never again be needed. The Treaty's ratification makes this less of a concern by strengthening bipartisan support in the United States for effective stockpile stewardship and by formalizing domestic safeguards to ensure that the United States could be ready to test again if ever necessary for its national security.

- The CTBT will complicate and slow down the efforts of aspiring nuclear states, especially regarding more advanced types of nuclear weapons.
- It will hamper the development of nuclear weapons based on new designs and will essentially rule out certain advances.
- It will add to the legal and political constraints that nations must consider when they form their judgments about national defense policies.
- The CTBT is vital to the long-term health of the Nuclear Non-Proliferation Treaty, and will increase support for other elements of a comprehensive non-proliferation strategy.
- The United States is well positioned to sustain its nuclear deterrent under the CTBT.
- The verification regime established under the Treaty will enhance the United States' own very capable nuclear test monitoring system and foster new techniques to improve verification.
- The Treaty will make it easier to mobilize domestic and international support for clarifying ambiguous situations and for responding vigorously if any nation conducts a nuclear test.

General Shalikashvili concluded his Report by saying that he believed that it is very much in the national interest of the United States to secure the above benefits through entry into force of the Comprehensive Test Ban Treaty. As I indicated earlier, U.S. ratification of the CTBT is a prerequisite for entry into force. I believe as General Shalikashvili concluded that CTBT ratification if looked at objectively is overwhelmingly in the national security interest of the United States. If this opportunity

is lost, the global campaign against nuclear proliferation will be severely, and perhaps irreparably damaged.

And, I would add that again in my judgment a CTBT is essential to the long-term viability and survivability of the NPT. An end to testing by the NPT nuclear weapon states is the indispensable political *quid pro quo* for the foreswearance of the acquisition of nuclear weapons by the NPT non-nuclear weapons states—virtually the entire world. This was clear in 1968 when the NPT was signed, and it was made explicit in 1995 when the NPT was made permanent. Indeed, it was a political condition of the legally binding NPT indefinite extension. We would return to nuclear testing at our peril.

The United States enjoys a global military dominance today unparalleled in history. In my view, we should do everything we can to keep it that way. The only conceivable challenge to this world dominance would be the widespread proliferation of nuclear weapons which is held in check by the NPT. We do not need nuclear weapons to maintain our global position. What we need is for them not to spread further so that our conventional force superiority can continue to hold sway. If history tells us anything it instructs us that force is not the long-term solution to this question, rather it is the construction and maintenance of a world community built on institutions like the NPT regime, committed to this political outcome. Thus, our focus, in our own self interest, should not be on how to use nuclear weapons, but on how to push them back into the closet of history, to inhibit their proliferation as much as possible. And gradually over a long-period of time drastically reduce their number throughout the world.