Concluding a 10 month-long review, General John Shalikashvili released his report on the Comprehensive Test Ban Treaty (CTBT) to the president January 5, voicing strong support for the treaty and outlining measures to build bipartisan support for it.

In late January 2000, following the October 1999 Senate rejection of the CTBT, President Bill Clinton and Secretary of State Madeleine Albright asked Shalikashvili to consult with senators and discuss their concerns in order to lay the groundwork for future ratification of the treaty.

In a letter to the president presenting his report, the general wrote, "The overarching question has been whether the contributions that the Test Ban Treaty can make to national and international security outweigh any potential risks." He concludes that "an objective and thorough net assessment shows convincingly that U.S. interests, as well as those of friends and allies, will be served by the Treaty's entry into force."

In his report, Shalikashvili puts forward a number of recommendations to address the senators' concerns and indicates he is "confident that there would be broad bipartisan support" to develop "a more integrated non-proliferation policy," enhance "U.S. capabilities to track nuclear proliferation and monitor nuclear testing," and strengthen stockpile stewardship.

Touching on how the United States would maintain its nuclear stockpile under the CTBT, Shalikashvili told the president that the deterrent could "remain effective" and that the United States could maintain "the ability to remanufacture aging components," assuming "prudent" stewardship.

Shalikashvili urged ratifying the treaty and pursuing its entry into force, warning that a delay would make it more likely other countries would "move irrevocably to acquire nuclear weapons or significantly improve their current nuclear arsenal" and less likely that the United States "could mobilize a strong international coalition against such activities."

The following is the full text of Shalikashvili's report.

I. Introduction

A decade after the end of the Cold War, nuclear weapons are still important to U.S. and allied security, a silent giant guarding against a catastrophic miscalculation by a potential adversary. The United States has the safest, most reliable, most capable arsenal of nuclear weapons in the world. It will need a credible deterrent as long as nuclear weapons exist.

Equally important to our security are global non-proliferation efforts. For the past half century, the United States has led the campaign to prevent the spread of nuclear weapons to additional countries or terrorist groups, and to reduce the chances that such weapons would ever be used.

The Comprehensive Nuclear Test Ban Treaty places obstacles in the path of nuclear weapon development by states that could some day threaten the United States or its allies. The question associated with Treaty ratification is whether the security benefits from the Treaty outweigh any risks that a ban on all nuclear explosions could pose to the U.S. deterrent.
Four types of concerns have been most prominent in the debate on advice and consent to ratification in October 1999 and in my subsequent investigations:

1. Whether the Test Ban Treaty has genuine non-proliferation value;
2. Whether cheating could threaten U.S. security;
3. Whether we can maintain the safety and reliability of the U.S. nuclear deterrent without nuclear explosive testing; and
4. Whether it is wise to endorse a Test Ban Treaty of indefinite duration.

After examining these issues, I remain convinced that the advantages of the Test Ban Treaty outweigh any disadvantages, and thus that ratification would increase national security. In each area, though, I am recommending additional actions to address concerns and further strengthen the U.S. position under the Treaty. I believe that we can go a long way toward bridging differences on these issues if they receive a level of sustained bipartisan attention equal to their high importance for national security.

The broad objectives of my specific recommendations are to:

1. Increase bipartisan and allied support for a carefully coordinated comprehensive non-proliferation program;
2. Enhance U.S. capabilities to detect and deter nuclear testing and other aspects of nuclear proliferation;
3. Improve the management of potential risks associated with the long-term reliability and safety of the U.S. nuclear deterrent; and
4. Address concerns about the Test Ban Treaty's indefinite duration through a joint Executive-Legislative review of the Treaty's net value for national security to be held ten years after ratification and at regular intervals thereafter.

Test Ban Treaty supporters, skeptics, and opponents all agree that the United States needs to revitalize support for an integrated non-proliferation strategy, enhance its monitoring capabilities, and develop a bipartisan consensus on stewardship of the U.S. nuclear deterrent. I urge early implementation of my recommendations on these issues because they would strengthen U.S. security regardless of the immediate fate of the Test Ban Treaty. Action on these steps would also go a long way toward addressing concerns that have been voiced about the Treaty. Together with my recommendation on the ten-year joint review procedure, these steps offer a way to build bipartisan support for Test Ban Treaty ratification as an integral component of an overarching strategy to stop nuclear proliferation and strengthen the nuclear restraint regime.

II. Historical Background

Restrictions on nuclear testing have figured prominently in efforts to slow the development and spread of nuclear weapons. President Dwight D. Eisenhower began the American quest to ban explosive tests of nuclear weapons as a way to keep the U.S.-Soviet nuclear arms competition from spiraling out of control. President John F. Kennedy believed that a ban on nuclear testing could help prevent proliferation, which he saw as a deadly serious threat to American security. Unable to reach agreement about verification of a ban on underground tests, Kennedy settled as a first step for a ban on tests in the atmosphere, in outer space, and under water. The Limited Test Ban Treaty was signed in July 1963, ratified two months later, and remains in force today.

Then, as now, there were those who opposed limits on nuclear weapon tests. Renowned scientists proposed ways in which nuclear test restrictions could be circumvented and predicted that U.S. nuclear laboratories would atrophy. Prominent military commanders objected to moving all tests underground. Some senators denounced the Limited Test Ban Treaty as leading to U.S. nuclear weakness and war. President Kennedy told these people that there are "risks inherent in any treaty, [but] the far greater risk to our security is the risk of unrestricted testing."
American presidents after Kennedy continued working for nuclear test restrictions. The 1970 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) affirmed the linkage between banning nuclear tests and preventing the spread of nuclear weapons. Successive NPT Review Conferences further emphasized the importance of a comprehensive test ban to the non-proliferation regime. The superpowers negotiated the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty in the mid-1970s. These accords placed a 150 kiloton yield limit on underground nuclear explosions and prescribed extensive verification provisions for so-called peaceful nuclear explosions. But during the Cold War, disputes over verification and concerns that ending underground tests would give an advantage to the other side's nuclear program precluded a comprehensive test ban treaty.

In July 1992, President George Bush determined that the United States would not conduct nuclear tests to develop new nuclear weapon designs for force modernization purposes. The Congress then imposed an eight-month moratorium on U.S. nuclear weapon tests, restricted subsequent tests even for safety and reliability purposes, and directed the President to work toward achieving a multilateral comprehensive ban on the testing of nuclear weapons by September 30, 1996 (P.L.102-377, 1992). In 1995, agreement by the United States and other nuclear weapon states on the goal of negotiating a comprehensive test ban treaty by the end of 1996 helped persuade non-nuclear weapon states to accept the indefinite extension of the Non-Proliferation Treaty.

The Comprehensive Nuclear Test Ban Treaty was negotiated in the Conference on Disarmament between January 1994 and August 1996. It was opened for signature on September 24, 1996. As of early December 2000 it has been signed by 160 countries and ratified by 69. By its own terms, the Treaty cannot enter into force until it has been ratified by the United States and 43 other specified states with nuclear power or research reactors. So far, it has been signed by all of these specified states except for India, Pakistan, and North Korea, and it has been ratified by 30 of the required 44, including Britain, France, and Russia.

The Senate's October 1999 vote against U.S. ratification of the Test Ban Treaty raised concerns at home and abroad that the United States might be walking away from its traditional leadership of international efforts to stem nuclear proliferation. I am confident that this was not the Senate's intent. Two days before the vote, 62 senators sent a bipartisan letter to their leaders requesting that consideration of the Treaty be postponed until the next Congress. My consultations with many of these senators, as well as other leading senators on both sides of the issue, have convinced me that the question is not whether, but how, the United States should lead global efforts to deal with nuclear proliferation. Thus, it is important to understand why a sufficient number of senators were not ready to approve ratification in October 1999 and to revisit some fundamental questions about non-proliferation and nuclear deterrence whose implications extend well beyond the Test Ban Treaty itself.

III. Nuclear Weapons, Non-Proliferation, and the Test Ban Treaty

Preventing proliferation is an enduring American interest. Soon after the end of World War II, the Congress voted for a strict prohibition against sharing nuclear information with any other country, even with Britain, which had helped us develop the atomic bomb. Since then, every president and many congressional leaders have worked to reduce other countries' possibilities and reasons for developing nuclear weapons. Over the decades, the United States has utilized a wide range of non-proliferation tools. We have entered into mutual security alliances and helped friendly states satisfy defense needs without having their own nuclear weapons. We have cooperated closely with like-minded states in threat reduction efforts, including export controls. We have negotiated and joined numerous international treaties, including the sequence of test ban treaties; the Non-Proliferation Treaty; and the SALT/START series of strategic arms accords. These and other less formal arms control arrangements convey the same message: nuclear weapons are different; they must be constrained
The United States has more reason than ever to lead global efforts to stop proliferation and strengthen the nuclear restraint regime. During the Cold War, the United States and NATO needed to keep nuclear weapons in the foreground of their struggle with the Soviet Union to offset the military advantages and political leverage that otherwise could have resulted from their adversary's conventional superiority and wide range of nuclear capabilities. Now the shoe is on the other foot. It would not be in our security interest to assign a high profile role to nuclear weapons in the U.S. military posture. Better that they remain in the background, for if the world's strongest conventional power needed new types of nuclear weapons, other nations would have even more incentive to acquire them. Any activities that erode the firebreak between nuclear and conventional weapons or that encourage the use of nuclear weapons for purposes that are not strategic and deterrent in nature would undermine the advantage that we derive from overwhelming conventional superiority.

The Test Ban Treaty in an Integrated Non-Proliferation Strategy

The Test Ban Treaty allows the United States to keep a strong nuclear deterrent and pursue its non-proliferation objectives at the same time. As Ambassador Sir Michael Weston, head of the British delegation, said during the negotiations, the Test Ban Treaty "bans the bang, not the bomb." By outlawing all nuclear explosions, the United States and other parties to the Treaty accept a constraint on their ability to develop new types of nuclear weapons. We remain free, though, to keep our nuclear stockpile safe and reliable through other means, including testing all elements of the nuclear warhead up to the point where the core nuclear explosive package would go critical. The Test Ban Treaty, in conjunction with other measures, slows the acquisition and advancement of nuclear weapon capabilities while the United States and other nuclear weapon states decide how fast and how far to go with nuclear reductions.

The Test Ban Treaty is not an isolated measure operating in a vacuum. Rather, it is an integral and inseparable part of our national non-proliferation strategy. An effective strategy must include the skillful use of a variety of political, diplomatic, economic, and military responses tailored for particular proliferation problems. This requires meticulous coordination among the relevant Executive Branch agencies, steady bipartisan support from Congress, and close cooperation with other countries. Only the United States has both a compelling reason and the necessary resources to lead global non-proliferation efforts. I believe that U.S. leadership is absolutely essential to success.

Persistent efforts to stem nuclear proliferation have been remarkably successful. The setback represented by the Indian and Pakistani nuclear weapon tests in 1998 does not outweigh the fact that a number of countries that had nuclear weapon programs have reversed or abandoned them, and some countries that inherited nuclear weapons have relinquished them. There is no valid reason for future congresses or administrations to give up defending this enduring American interest. For the sake of future generations, it would be unforgivable to neglect any reasonable action that can help prevent nuclear proliferation, as the Test Ban Treaty clearly would.

The Test Ban Treaty's Value for National Security

Banning nuclear explosions places direct constraints on other states' ability to acquire and improve nuclear weapons. From a technical standpoint, it is true that a state could have some degree of confidence that an unsophisticated fission device would work without testing it, as the United States did with the bomb used against Hiroshima. A proliferator could acquire an ambiguous nuclear deterrent, but it could not use a nuclear test to demonstrate its capability, as India and Pakistan did in 1998 with a resulting rise in regional tensions.

The main technical constraints that the Test Ban Treaty places on nuclear weapon development involve the vertical progression from first-generation fission designs and more advanced fission weapons; to second-generation thermonuclear designs with increasingly sophisticated yield-to-
weight ratios; to exotic "third-generation" technologies, such as nuclear explosion-pumped x-ray lasers and enhanced radiation weapons. Experts disagree about how far up this developmental ladder a proliferator could go without testing, but the difficulty would increase dramatically after the first steps. It would be extremely hard, if not impossible, for additional countries to develop a thermonuclear weapon, especially a sophisticated one that could be delivered easily over intercontinental distances.

A ban on nuclear explosions would also place technical constraints on countries that already have nuclear weapon capabilities. Test Ban Treaty signature by India or Pakistan would not close off their nuclear options, but it would rule out certain developments and help prevent a destabilizing nuclear arms race in South Asia. China would not be free to test explosively a post-production sample of a more advanced warhead than is in its current arsenal. This would, for example, impede China from placing multiple warheads on a mobile missile. And while Russia and the United States already have a wide range of nuclear capabilities and knowledge, the Test Ban Treaty provides insurance against a renewal of the nuclear arms race though "third generation" nuclear designs.

The Test Ban Treaty is critical to sustained political support for the Non-Proliferation Treaty and other elements of a comprehensive non-proliferation strategy. Proliferation is held in check by an intricate web of bilateral, regional, and global arrangements. Weakening or removing one element can damage other components and erode the overall system of constraints. For example, our failure to ratify the Test Ban Treaty was one of several factors that put the United States on the defensive at the April 2000 NPT Review Conference and decreased our ability to focus attention on challenges to the non-proliferation regime posed by countries such as Iraq, Iran, and North Korea. Non-ratification has also complicated U.S. efforts to strengthen the International Atomic Energy Agency safeguards that non-nuclear weapon state parties to the NPT must have on their civilian nuclear programs. Many countries are reluctant to accept new obligations while the United States is unwilling to approve the Test Ban Treaty.

Preventing the spread of nuclear weapons demands coordinated actions based on common principles by many nations over many years. Our closest allies see the Test Ban Treaty as something that they have fought for alongside the United States since the days of President Eisenhower. All other NATO members, Japan, South Korea, and most of our other security partners have ratified it.

Once we ratify the Test Ban Treaty, which the rest of the world views as vital for non-proliferation, we will be better able to enlist cooperation on export controls, economic sanctions, and other coordinated responses to specific problems. International support for military action will also be greater if the United States is clearly making full use of cooperative threat reduction measures, too.

While widespread repudiation of the NPT is unlikely in the near term, the non-proliferation regime is not invulnerable. Until we ratify the Test Ban Treaty, we offer a convenient excuse for a country that wants to renounce its NPT obligations and openly acquire nuclear weapons to threaten its neighbors or intimidate us. Most law-abiding countries would much prefer a strong NPT regime to a world in which they and their neighbors felt compelled to acquire their own nuclear arsenals. But countries such as Japan, South Korea, and Germany, which have the knowledge, materials, and infrastructure needed to develop quickly a sophisticated nuclear weapon capability, could come under intense pressure should they ever lose confidence in the nuclear restraint regime.

**Recommendations:**

1. Working closely with the Congress and with U.S. friends and allies, the next Administration should implement on an urgent basis an integrated non-proliferation policy targeted on, but not limited to, countries and groups believed to have an active interest in acquiring nuclear weapons.
2. To increase high level attention and policy coherence, the next Administration should appoint a Deputy National Security Advisor for Non-Proliferation, with the authority and resources needed to coordinate and oversee implementation of U.S. non-proliferation policy.

3. As part of its effort to build bipartisan and allied support for an integrated non-proliferation policy, the next Administration should review at the highest level issues related to the Test Ban Treaty. There should be a sustained interagency effort to address senators’ questions and concerns on these issues of great importance to national security.

4. The United States should continue its testing moratorium and take other concrete actions to demonstrate its commitment to a world without nuclear explosions, such as continuing leadership in building up the International Monitoring System (IMS) being established for the Treaty.

IV. Monitoring, Verification, and Foreign Nuclear Programs

The Test Ban Treaty’s net contributions to national security depend, in part, on our ability to verify compliance. It is important to consider the sum of all sources of information that could be used to determine whether someone has conducted a nuclear explosion. Focusing only on classified national capabilities to monitor foreign nuclear testing or on unclassified capabilities of the International Monitoring System (IMS) underestimates our overall verification capabilities. When evaluating verification, the probability of deterring violations is as important as the probability of detecting them. Thus, the value of a verification system extends well past the range where a monitor has high confidence of detecting, identifying, locating, and attributing a violation, and down into the gray area where a potential evader lacks certainty about the likelihood of discovery.

U.S. Capabilities to Monitor Nuclear Testing

The United States will always need reliable information about any nuclear test activity that could threaten our security. The Test Ban Treaty does not add new monitoring requirements. Instead, it adds new sources of information and creates greater political clout for uncovering and addressing suspected violations.

The United States has a half century of experience operating the world’s most sophisticated nuclear test monitoring system, including airborne and surface-based sampling for radioactive debris, seismic and hydroacoustic stations, and various satellite-based sensors. In addition to this Atomic Energy Detection System (USAEDS), the United States has other potential sources of information about test-related activities, such as communication intercepts and human intelligence. No would-be evader should underestimate U.S. intelligence capabilities, which are already impressive and continually improving.

Additional Verification Assets from the Test Ban Treaty

Once the Test Ban Treaty enters into force, the United States will use its own intelligence assets and additional capabilities provided under the Treaty to verify compliance with it. The United States already receives valuable data from the IMS. For example, seismic stations in the partially completed system picked up signals from several recent 100-ton chemical explosions at the former Soviet test site in Kazakhstan. They could detect non-evasive explosions with yields of 10 tons or lower at the Russian test site at Novaya Zemlya and will soon provide comparable capabilities for the Chinese test site at Lop Nur.

The full IMS, along with its associated communication infrastructure and International Data Center, will provide global coverage that vastly surpasses the monitoring capabilities that the United States relied on during the Cold War. For example, the IMS primary seismic system will provide three-station 90% detection thresholds below 500 tons on all continents and below 200 tons for all historic test sites in the northern hemisphere - with one and two station detection thresholds going even lower. The IMS hydroacoustic system will be able to detect explosions with yields equivalent to a few pounds of dynamite in most of the Southern oceans. The IMS infrasound and radionuclide networks
will offer additional evidence to detect, identify, and attribute Treaty violations.

National and international verification capabilities are complementary, not competing, systems. Many USAEDS stations are being incorporated into the IMS, and other countries will pay 75% of their costs. The Treaty provides for stations inside Russia, China, and other sensitive locations, including some places where we could not gain access on our own. Mandatory on-site inspections (OSIs) - a verification tool that we will not have without the Treaty - can be a powerful deterrent and could provide definitive evidence of a violation. Clear Treaty obligations and data vetted by the international community will also help the United States mobilize support for resolving compliance concerns and addressing violations.

The value of the on-site inspection provisions has been questioned because 30 of 51 Executive Committee members must approve an OSI request and because there are managed-access provisions to protect sensitive information about activities that are not prohibited by the Treaty.

Seats on the Executive Council are allocated on the basis of regional groupings and the Treaty permits information from national technical means of verification to support an OSI request. Therefore, the United States concluded that, assuming that its case were reasonable, friends, allies and other states that would be concerned about violations in their regions would prove enough support to get the necessary votes.

The United States supported carefully crafted managed-access provisions because we wanted both effective inspections and protection against abuse. For example, an inspected State Party can restrict access to sites no larger than four square kilometers each and totaling up to 50 square kilometers. Such areas are small enough to permit effective use of various information-gathering techniques from outside the boundaries of those restricted areas. If this proves insufficient, however, some members of the inspection team must be granted access to accomplish specific tasks within the site.

Scientific and commercial activities, such as earthquake monitoring and satellite imagery sales, offer another source of unclassified data that can be used to detect and deter nuclear explosions, or to support an OSI request. Thousands of digital seismic stations collect data in real or near-real time around the world. While data from these multi-use systems are not always as reliable or as readily available as data from USAEDS and IMS stations, they can be a valuable supplement for monitors and a source of additional uncertainty for evaders. Under ideal conditions, for example, an evader might reduce the amplitude of seismic signals by a factor of 70 by conducting a small explosion inside a very large underground cavity. But an evader should expect a much smaller "decoupling factor" of 10-30 if nearby scientific stations might pick up high frequency seismic signals in addition to the lower frequency seismic signals that travel longer distances.

**How Big a Problem is Evasion?**

While it is prudent to assume that some countries might want to cheat, it is not so easy to advance a nuclear weapon program through evasive testing as some people fear. A potential cheater would have to calculate correctly the combined capabilities of national, international, and scientific monitoring systems. If it wanted to muffle or mask the signals from a test, it would have to surmount numerous practical constraints and make tough judgment calls on a long list of technical questions about which even American experts disagree. Attempts to camouflage tests or test preparations generate their own suspicious signals. Synergies among monitoring technologies also must be considered. For example, cavity-decoupled explosions can reduce seismic signals but increase the probability of radioactive venting. Most objectives would require a series of secret tests, and each explosion would increase the probability of discovery. Finally, in this increasingly interconnected world, states that violate their legal obligations risk having their citizens reveal what remote monitoring might not uncover.

Ironically, the more nuclear testing expertise a country has, the better able it would be to conduct an evasive test and extract useful information - but the less difference that information would probably
make in advancing that country’s nuclear capabilities. Even under worst-case assumptions, it is unlikely that an experienced nuclear tester could hide an explosion with a yield above one or two kilotons. Of course, those responsible for U.S. efforts to monitor against evasive testing must consider worst-case possibilities as well as more likely scenarios. But in my view, anyone who is concerned about what might occur under the Test Ban Treaty should also worry about what might happen without it.

The military significance of activities that would be ruled out unless a country was willing to openly violate the Treaty outweighs anything that could be gained from clandestine testing. A proliferator does not need to test to be confident that a relatively simple fission bomb would work. Gaining confidence in more efficient designs - ones that are smaller, lighter, more easily transportable, and less demanding of special nuclear material - becomes increasingly difficult without a significant risk of detection.

Nuclear weapon states could not make a major qualitative breakthrough without testing above several kilotons. China has only single warhead missiles; inability to test above detectable levels would impede future efforts to put multiple warheads on mobile missiles. Russia might seek to make safety or reliability improvements to existing weapons and perhaps develop another type of tactical weapon. Tests that are small and infrequent enough to avoid detection, however, would not enable Russia or any other advanced nuclear weapon state to develop new weapon systems that would undermine the U.S. nuclear deterrent.

**Steps to Strengthen Monitoring and Verification**

Just as the Test Ban Treaty should be viewed in the larger non-proliferation context, so too should Test Ban Treaty verification be viewed in a broader context. In recent years, support for arms control and non-proliferation intelligence has not kept pace with support for other intelligence priorities. For budgetary reasons, the capability to detect the nuclear electromagnetic pulse from an atmospheric explosion is not currently supported and the capability to monitor for telltale radiation signatures from explosions at high altitudes or in space may soon be lost. Since non-proliferation is an enduring national security challenge, intelligence support for current military activities should not reduce support for more long-term elements of an integrated non-proliferation strategy.

The conduct of an explosive nuclear test is the culmination of a long process with observable indicators of a would-be proliferator's intentions. There are valuable synergies between capabilities for monitoring nuclear explosions and abilities to track activities "upstream" from an explosion. The Test Ban Treaty might channel a proliferator toward particular weapon designs which would be more likely to work without testing, but which would require resources that are harder to acquire without being noticed. Likewise, improved non-proliferation intelligence can provide early warning of clandestine nuclear test preparations, thus enabling monitors to focus greater attention on small signals from a specific location.

Steady progress has been made in monitoring technologies and analytical techniques before and after the Treaty was signed. Strong support for this work, and faster transitions from research to operational use can add up to major verification improvements. Scientists are calibrating seismic stations by determining how signals travel through the nearby geology in order to lower detection thresholds and improve location accuracy. New signal processing techniques help detect very small signals and differentiate explosions from earthquakes. Prototype radionuclide sensors at some IMS stations are 100 times more sensitive than previous automatic systems, and extremely sensitive analytical techniques are also being developed.

Nobody expects advances in remote monitoring capabilities to lower detection thresholds all the way to zero yield. Therefore, it is important to prepare for on-site inspections after entry into force, and to pursue cooperative steps to increase transparency. The Treaty provides the basis for confidence-building measures so that chemical explosions used for mining are not mistaken for nuclear explosions, or used to hide them. Additional bilateral cooperation is also possible. Russia has begun to announce sub-critical experiments and pledged in two joint presidential statements to work with
the United States on mutually beneficial technical exchanges to facilitate Test Ban Treaty verification. Various measures can be envisioned, including exchanging more information about non-prohibited activities at former nuclear test sites, placing seismic stations near test sites, putting neutron detectors inside tunnels, or sending observers to each other’s test site. As with managed access inspections, the United States should weigh the value of each option against potential costs, such as complicating legitimate activities at the Nevada Test Site.

In short, the United States should take whatever steps are necessary to deter or detect any nuclear explosions that could decrease national security regardless of what it decides about the Test Ban Treaty. The Test Ban Treaty offers technical and political resources to make this job easier.

Recommendations:

1. Higher funding and intelligence collection priorities should be assigned to monitoring nuclear test activities and other aspects of nuclear weapon acquisition or development by other states.
2. Collaboration should be increased among U.S. government officials and other experts to ensure that national intelligence, the Treaty’s international verification regime, and other scientific stations are used as complementary components of an all-source approach to verification.
3. The transition from research to operational use should be accelerated for new verification technologies and analytical techniques.
4. The United States should continue working with other Test Ban Treaty signatories to prepare for inspections and develop confidence-building measures.
5. Additional steps should be taken unilaterally or bilaterally to increase transparency regarding the nature and purpose of activities at known nuclear test sites.

V. Stewardship of the U.S. Nuclear Stockpile

Strong bipartisan support for stewardship over the safety and reliability of the U.S. nuclear deterrent will be necessary regardless of whether the United States ratifies the Treaty, continues indefinitely the testing moratorium, or resumes nuclear testing at some future time. The United States can safely reap the national security benefits of Test Ban Treaty ratification as long as it takes appropriate steps to manage risks associated with its Stockpile Stewardship Program and retains the ability to test again if an unanticipated development makes that necessary for national security.

Requirements for Successful Stockpile Stewardship

Over the last decade, U.S. management of its nuclear deterrent has changed in ways that reflect the changes in global relations. During the Cold War, it was standard U.S. practice to develop new nuclear weapon designs, confirm that they worked through various means including explosive testing, and then use newly manufactured weapons to replace older weapons. Most of the approximately 1000 nuclear test explosions conducted by the United States were carried out for new warhead development.

When the Cold War ended, the United States ceased explosive testing for the purpose of developing new designs for a very large arsenal. It shifted to maintaining a smaller stockpile of well tested, safe, and reliable warhead designs with a smaller nuclear weapon production complex. Nuclear weapons are now required to last longer than an individual weapon typically remained in the Cold War stockpile. These changes have decreased the relative value of nuclear testing and increased the importance of stockpile stewardship, which has been done in various forms for many decades.

As long as the United States retains any nuclear weapons, they must be kept safe and reliable. The SSP must have the people, knowledge, materials, equipment, and facilities for three basic tasks:
1. To enhance surveillance of weapons in the enduring stockpile to monitor for age-related changes and to identify any other defects due to design problems or manufacturing errors;
2. To deepen scientific understanding of how nuclear weapons work and how they age in order to determine whether defects could affect performance or safety and to ensure that any remedial measures are adequate and appropriate; and
3. To remanufacture components and refurbish warheads using a smaller and updated nuclear weapon complex.

As additional insurance, the Stockpile Stewardship Program also needs to retain the expertise and infrastructure to resume nuclear testing within two to three years should there be a major change in international circumstances or a serious stockpile problem that could not be resolved in any other way.

**Status of the Stockpile Stewardship Program**

The Stockpile Stewardship Program is working today. Almost all of the approximately 4000-6000 parts of a nuclear weapon, including all safety- and reliability-critical electrical, mechanical, and arming subsystems, are outside of the "physics package," - i.e. the subsystem that creates the nuclear explosion. Under the Test Ban Treaty, these parts can still be thoroughly tested, including with full-scale flight tests of "denuclearized" production units. The science component of the SSP has experimental programs to answer questions about materials and processes inside the physics package. The SSP also has the world's most powerful computers. They are offering an increasingly sophisticated capability to model potential changes in warhead performance by analyzing data from new experiments that do not involve nuclear explosions in conjunction with data from historical tests of existing weapon designs.

The Secretaries of Defense and Energy, the Commander in Chief of the U.S. Strategic Command, the directors of the three nuclear weapon laboratories, and numerous other experts with diverse assessments of the Test Ban Treaty agree that the U.S. nuclear stockpile is safe and reliable and that nuclear testing is not needed at this time, as has been true since the U.S. testing moratorium began in 1992. The annual certification process provides a clear-eyed, candid, and careful evaluation of each nuclear weapon type in the stockpile: nothing is sugar-coated. The SSP tools that are already available have been able to identify defects and suggest remedial measures, make appropriate modifications, and fulfill required lifetime extensions, while maintaining a high level of reliability and safety of the warheads that have been the focus of the SSP to date.

**Managing Future Risks**

Nobody can guarantee that the Stockpile Stewardship Program will be able to address every possible future need without conducting a nuclear explosive test, just as no other military operation or scientific endeavor can be made risk-free. The key questions are: (1) what is the nature of the risks; (2) what should be done to better manage them; and (3) how does the inability to conduct nuclear explosions affect risk management?

*The Nature of the Risks:* Few nuclear weapon experts view sudden catastrophic failure of the nuclear deterrent as anything more than a remote theoretical possibility. Every year, each individual weapon type is monitored closely both for gradual changes and for other potential problems. The SSP has provided better understanding of stockpile characteristics, including fuller knowledge of what could go wrong. It has confronted the problem of false confidence, which should not be confused with a decline in actual stockpile reliability. One way to respond to residual concerns about a system-wide failure is to increase performance margins - i.e. to make relatively simple changes that do not require nuclear testing and that will ensure desired system performance.

Concerns have been voiced about whether progress in the Stockpile Stewardship Program will be able to outpace potential future challenges or whether confidence will gradually decline. Aggressive surveillance and improved predictive capabilities from deeper scientific understanding should provide enough time to correct any significant problem before it affects the reliability or safety of the
U.S. nuclear deterrent. Remanufacture to meet the original specifications is the preferred remedy for age-related defects. When necessary, however, new technologies can be incorporated in warhead components outside the physics package as long as such changes can be shown not to interfere with the physics package's proper functioning.

Need for Clear Priorities and Strong Leadership: The Stockpile Stewardship Program includes a number of excellent technical projects. Tensions exist among (1) work on weapons in the stockpile, (2) large-scale scientific and computing projects, and (3) revitalization of the nuclear weapon production complex. The net result has been concern that large-scale science and computational projects may be taking too many resources away from surveillance and other lower-profile programs that are central to the core missions of the SSP.

The establishment of the semi-autonomous National Nuclear Security Administration within DOE and the appointment of its first Administrator in July 2000 set in motion steps to strengthen the leadership of the SSP, clarify program priorities, increase accountability, and ensure adequate funds. The Administrator of the NNSA has initiated a comprehensive program review, as well as an assessment of specific needs such as infrastructure revitalization. Important changes have also been made to improve coordination among DOE headquarters, the nuclear weapon laboratories, the military, and other interested parties. Decisions about the timing and nature of work on individual weapons in the stockpile are being made through more regular meetings of the Nuclear Weapons Council, which includes the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Administrator of the NNSA; the Vice Chairman of the Joint Chiefs of Staff; the Commander of the U.S. Strategic Command; and other senior officials. These and other steps, such as the establishment of a high level external advisory mechanism for the SSP, should increase confidence that program elements which are most urgently needed are being fully funded, and that adequate resources are also being invested in long lead-time projects to meet future requirements.

Pit Production: The challenge of remanufacturing plutonium pits and certifying them without a nuclear explosion involves both short- and long-term issues. Plutonium pits are the core of a warhead's primary. Experts agree that pits are aging more gracefully than some initially anticipated. The general consensus is that pits have a lifetime of at least fifty to sixty years, and thus that the replacement of pits in stockpiled weapons need not begin for quite some time. Los Alamos National Laboratory is demonstrating on a small scale the ability to manufacture and certify replacement pits so that the average age of the stockpile can be kept at a prudent level. To decide whether the pit production capabilities at Los Alamos will be adequate for the long-run or whether a larger, multi-billion dollar pit production facility should be built elsewhere, it is necessary to finish relevant plutonium experiments, to determine the long-term size and composition of the nuclear stockpile, and to set a start date for full-scale remanufacturing.

Infrastructure Revitalization: Additional steps must be taken now to ensure that the U.S. nuclear weapon production complex can meet future refurbishment and remanufacturing needs. The physical infrastructure of the SSP has been allowed to deteriorate to unacceptably low levels. Some buildings' roofs are literally falling in, and many people work in demoralizing, or even dangerous, environments. Current production capability is near zero for some components and inadequate for others. The NNSA has recently completed an assessment of the problem, and is in the process of developing a multi-year infrastructure revitalization plan.

People: Having first-class people at the labs and production facilities is vital to the continued success of the Stockpile Stewardship Program. Strong leadership, clear priorities, improved planning processes, agreement on resource allocations, first-rate equipment and facilities, sufficient and stable funding, and a firm national commitment to stockpile stewardship will all help to attract, train, and retain new generations of outstanding scientists and skilled technicians. It is also important to be sensitive to the impact of security measures on people's work environment and to find creative ways to mitigate any adverse effects.

Risk Management: The ability to conduct an occasional nuclear explosion appeals to some nuclear weapon experts because it would provide some useful data and offer extra confirmation that the physics package for a refurbished or remanufactured warhead will perform as predicted by other SSP
tools. But the cost to non-proliferation objectives would be high and the toll on other aspects of stockpile stewardship could be substantial. A return to nuclear testing would not make surveillance or infrastructure revitalization easier, and it could take attention and resources away from these priorities. The effects on personnel issues would be mixed, at best, since a return to nuclear testing would probably reduce support for building expensive cutting-edge research facilities to help future generations of scientists answer questions about a warhead’s physics package without violating the Test Ban Treaty.

In my judgment, the challenges facing the Stockpile Stewardship Program can be managed, and the safety and reliability of the U.S. nuclear deterrent can be maintained indefinitely, so long as future administrations and congresses provide high standards of accountability and sufficient resources to keep uncertainty at an acceptable level. Since we will retain the ability to withdraw from the Test Ban Treaty and resume nuclear testing should an unanticipated problem with stockpile reliability or safety make that necessary, there is no reason why we should not gain the security benefits of Test Ban Treaty ratification while strengthening bipartisan support for stockpile stewardship.

**Recommendations:**

1. Working with the Department of Defense, other Executive Branch agencies, and the Congress, the Administrator of the NNSA should complete as soon as possible his comprehensive review of the Stockpile Stewardship Program. The review will clarify objectives and requirements, set priorities, assess progress, identify needs, and develop an overarching program plan with broad-based support.
   - Highest priority should be given to aspects of stockpile stewardship that are most urgently needed to assure the near-term reliability of the U.S. nuclear deterrent, i.e. surveillance, refurbishment, and infrastructure revitalization.
   - Enhanced surveillance and monitoring activities should receive full support and not be squeezed by higher profile aspects of the SSP.
   - The NNSA should make a decision about the need for a large-scale plutonium pit remanufacturing facility as soon as possible after the next Administration has determined the appropriate size and composition of the enduring stockpile, including reserves.
   - A dedicated infrastructure revitalization fund should be established after the NNSA has completed a revitalization plan for its production facilities and laboratories.

2. The NNSA, working with Congress and the Office of Management and Budget, should place the SSP on a multi-year budget cycle like the Department of Defense's Future Years Defense Program. Some increase in funds for the SSP is likely to be necessary.

3. Steps to improve interagency management of stockpile stewardship matters, such as the revitalization of the Nuclear Weapons Council, are essential and should be continued.

4. Appropriate steps should be taken to ensure that the performance margins of various weapon types are adequate when conservatively evaluated.

5. Strict discipline should be exercised over changes to existing nuclear weapon designs to ensure that neither an individual change nor the cumulative effect of small modifications would make it difficult to certify weapon reliability or safety without a nuclear explosion.

6. The Administrator of the NNSA should establish an on-going high level external advisory mechanism, such as a panel of outstanding and independent scientists.

**VI. Minimizing Uncertainty with a Treaty of Indefinite Duration**

Few Americans think that the United States should resume nuclear testing, and even fewer want any other country to conduct nuclear explosions. Nevertheless, some people are uneasy about turning the eight year-old U.S. testing moratorium into a legally binding ban of indefinite duration because they worry about future developments concerning nuclear proliferation, verification, or stockpile stewardship.
Some Treaty critics have proposed that the long-term benefit/risk calculation could be improved by renegotiating key Treaty provisions. Others have suggested that simply continuing the current situation, in which all countries that have conducted overt nuclear tests have reciprocal unilateral moratoriums, would provide the main benefits of the Test Ban Treaty while preserving greater flexibility over time. On closer examination, a better way to reduce future uncertainties about U.S. participation in the Treaty and to provide assurances about how unforeseen circumstances would be handled if they were to arise is to condition ratification on stronger internal commitments worked out between the Executive and Legislative Branches of the U.S. Government.

Renegotiate the Treaty?

One proposal made by Treaty critics is to seek international support for renegotiations to give the Treaty a "sunset clause," requiring that it be renewed and re-ratified or abandoned after a certain period of time. Other proposals are to make the Treaty's enforcement more automatic or to change its scope to permit nuclear explosions at yields up to some level in order to prevent an asymmetry between U.S. fidelity to a zero-yield ban and potential undetected cheating by other countries. Could the United States, as a practical matter, gain international support for such Treaty changes? I think that it is highly unlikely. No other state is asking to renegotiate the existing text. If the United States insisted, others would try to change the Treaty's basic obligations in the opposite direction, to prohibit computer simulations, sub-critical experiments, and other integral components of our stewardship program. China would probably press again to exempt so-called peaceful nuclear explosions. Numerous countries would try to eliminate the Treaty's references to evidence gathered by national technical means being used in requests for on-site inspections, and some countries might try to remove OSI provisions altogether because they are intended to address cheating at low yields. India would also likely try again to link a test ban to a time-bound framework for nuclear disarmament.

The Test Ban Treaty is a zero-yield ban because we determined that this was in our interest and because no threshold above zero yield would have been negotiable, for reasons that remain true. The original U.S. and British scope position, which would have allowed "hydronuclear" tests with yields up to four pounds, might have been reluctantly accepted by the non-nuclear weapon states. But it was vigorously rejected by Russia, France, and China, which preferred yield limits of 10 tons, 300 tons, or an exemption for "peaceful" nuclear explosions, respectively. Such yield thresholds would have been politically unacceptable to many non-nuclear weapon states, and the PNE exemption was rejected by almost everyone.

A technical assessment done in 1995 by a distinguished panel of outside experts convinced the Administration that an occasional test below approximately 500 tons would contribute little to U.S. security. The assessment found that the marginal increase in long-term confidence that might come from routine testing up to 500 tons should be weighed against the negative impact on U.S. non-proliferation objectives of remaking the Comprehensive Test Ban Treaty into another threshold test ban treaty. It also noted that any such threshold would vastly complicate verification by adding a requirement for accurately estimating yields of small explosions. Based on such considerations, U.S. diplomats reached a shared understanding during the negotiations, including with Russia and China, that the Test Ban Treaty bans all nuclear explosions, including hydronuclear tests, but does not prohibit sub-critical nuclear experiments.

The Test Ban Treaty includes a range of responses to non-compliance, such as suspending the rights and privileges of a State Party that fails to cooperate fully with requests from the Conference or the Executive Council, recommending collective action by States Parties, and bringing violations to the attention of the United Nations. Making the Treaty's enforcement mechanisms more explicit or more automatic would have gone against the long-standing U.S. position that States Parties, not international organizations, should have the authority to decide whether other Parties are in compliance, and what to do if they are not. And while it is possible to imagine times when more draconian enforcement provisions might be a stronger deterrent against cheating, it is equally easy
to imagine ways in which the United States or its friends could become the victim of unwisely crafted enforcement provisions.

The Test Ban Treaty does not foreclose any meaningful options that we currently have for responding, unilaterally or multilaterally, should someone else conduct a nuclear explosion. If the United States decided that it would be appropriate to resume testing, the six months required to withdraw from the Treaty would be less than the time it would take to prepare for an explosion.

More generally, the Test Ban Treaty's entry into force would make it easier to mobilize the international community against the violation not just of a norm, but of a legally binding prohibition against nuclear explosions. As part of a strengthened non-proliferation policy, the Administration, working closely with the Congress, should consult with U.S. friends and allies regarding appropriate actions to deal with situations that would not only violate the Treaty but, more importantly, jeopardize the foundation of the nuclear restraint regime and threaten international peace and security.

As for the Treaty's duration, no U.S. opening position drew more fire from all directions than its "ten-year, easy out" proposal. This would have allowed Parties to leave the Treaty after ten years without providing any justification. Other participants, both nuclear and non-nuclear states, made the case that the United States could invoke the supreme national interest provision if it had a serious reason for withdrawing, and that they could not accept all the restrictions the Treaty placed on them if they had to live with the specter of the United States deciding against renewal at the ten-year mark for arbitrary or unexplained reasons. Also, it was contradictory, in the run-up to the 1995 Non-Proliferation Treaty extension conference, for the United States to spearhead efforts for an indefinite extension of the NPT, yet only offer a ten-year commitment to a test ban regime.

Imagine the uproar that would occur if the United States issued an ultimatum: no U.S. ratification unless the Test Ban Treaty was given a ten-year time limit. Some countries already believe themselves to be seriously disadvantaged by the Treaty in comparison with the United States; they might be happy to see the Treaty collapse. Other countries would accuse the United States of reneging on the deal it made to secure the indefinite extension of the NPT. Since U.S. ratification is required for entry into force, its refusal to ratify the Treaty unless core provisions were changed would make it easier for other signatories to renounce their obligation to refrain from nuclear testing on the grounds that the Treaty's entry into force was being "unduly delayed." In short, there would be clear risks in a U.S. effort to modify the Treaty and very little chance of success.

**Indefinite Reliance on Voluntary Moratoriums?**

Could the United States get the same benefits without the possible risks associated with a Test Ban Treaty of indefinite duration by indefinitely continuing the U.S. moratorium on nuclear explosive testing in hopes that others would do the same? A prolonged moratorium would do less damage to U.S. non-proliferation objectives and diplomatic standing than would a resumption of nuclear testing, but most of the benefits that the Test Ban Treaty can provide would be lessened or lost without ratification, while uncertainties and risks would grow. Moreover, other countries will be more likely to sustain their testing moratoriums if they are viewed as interim measures pending the Test Ban Treaty's entry into force, rather than as endpoints in themselves.

As long as each state honored its moratorium, inability to test would place technical constraints on nuclear weapons development. However, other countries could renounce their moratoriums far more easily than the United States, France, or Britain could. Accusations about cheating would be a bigger problem under parallel moratoriums. Each state would define its own obligations, progress on the international monitoring system would slow or stop, and no provisions for on-site inspections would be available. Furthermore, the United States would lose the many political contributions that the Test Ban Treaty can make, directly and indirectly, to strengthening the global non-proliferation regime and unifying a non-proliferation coalition of like-minded states.

No one should underestimate the damage that could occur if the United States renounces the Test
Ban Treaty, or even waits too long to take the next steps towards ratification. The negative
diplomatic reaction to the October 1999 vote was muted somewhat by signs that the Administration
and key senators wanted to build bipartisan support for eventual reconsideration and ratification of
the Test Ban Treaty. Other nations will give the next Administration some time to sort out its
position. They will, however, be looking for concrete progress by September 2001 when states that
have ratified the Treaty plan to meet in New York to discuss ways to accelerate the remaining
ratifications required for entry into force.

If the United States were to stop working seriously toward Test Ban Treaty ratification, it would
exacerbate uncertainties about proliferation, verification, and stockpile stewardship. If other nations
conclude that the United States is not going to ratify the Test Ban Treaty and that the effort is
therefore dead, they would pay less heed to other U.S. non-proliferation pronouncements and might
question their own continued level of support for the NPT. Political and financial support for the
International Monitoring System would probably wither on the vine, leaving the United States with
the full bill for many monitoring assets, less cooperation on monitoring from other countries, and no
provisions for on-site inspections. It could also be more difficult to get bipartisan agreement on the
long-term shape and size of the Stockpile Stewardship Program. As long as the U.S. commitment to
the Test Ban Treaty remains unclear, funding for the SSP will be vulnerable to attack from members
of Congress who view testing as a better or cheaper alternative to some aspects of the program, as
well as from members who will support the SSP only in conjunction with Test Ban Treaty ratification.

Managing Uncertainty through Internal Commitments

All of my previous recommendations are intended to minimize uncertainties about the non-
proliferation value of the Treaty, verification, and stockpile stewardship. Careful internal
understandings and conditions, possibly attached to a senate resolution of ratification, offer an
additional way to reduce concerns about the Test Ban Treaty's indefinite duration.

In August 1995, President Clinton announced that U.S. support for a "true zero" Test Ban Treaty
would be conditioned on six safeguards. These involved:

1. Conducting a Stockpile Stewardship Program;
2. Maintaining modern nuclear laboratory facilities and cutting-edge research programs;
3. Preserving the ability to resume nuclear testing should the United States cease to be bound
   by the Test Ban Treaty;
4. Improving U.S. Treaty monitoring capabilities and operations;
5. Further developing broad intelligence collection, analysis, and operations activities related to
   foreign nuclear weapon programs; and
6. Specifying that if a high level of confidence in the safety or reliability of a nuclear weapon
   type deemed critical to our nuclear deterrent can no longer be certified, the President, in
   consultation with Congress, would be prepared to withdraw from the Test Ban Treaty to
   conduct whatever testing might be required.

When the Senate is ready to consider the Test Ban Treaty again, these existing safeguards could be
strengthened or expanded. A few senators expressed interest in making Safeguard F more explicit
about the annual certification process and about the conditions under which the President would
withdraw from the Treaty. Another idea is to require annual reports from the Administration to the
Senate on the overall state of the Stockpile Stewardship Program; the adequacy of support for the
safeguards; and the Treaty's adherence, implementation, compliance, and enforcement record.
The option that seems to go farthest toward addressing concerns about the Treaty's indefinite
duration is the possibility of involving the Senate in a full and formal review of the Treaty's net value
for national security at a specified time after ratification, and at regular intervals thereafter.
Recommendation:

1. The Administration and the Senate should commit to conducting an intensive joint review of the Test Ban Treaty's net value for national security ten years after U.S. ratification, and at ten-year intervals thereafter. This review should consider the Stockpile Stewardship Program's priorities, accomplishments, and challenges; current and planned verification capabilities; and the Treaty's adherence, implementation, compliance, and enforcement record. Recommendations to address concerns should be formulated for domestic use and to inform the U.S. position at the Treaty's ten-year review conference. If, after these steps, grave doubts remain about the Treaty's net value for U.S. national security, the President, in consultation with Congress, would be prepared to withdraw from the Test Ban Treaty under the "supreme national interests" clause.

VII. Net Assessment

My assessment of the net impact of the Test Ban Treaty is that, on balance, the Treaty will enhance U.S. national security in numerous ways. There are risks, but they exist with or without the Treaty and they can be managed through the steps recommended above.

1. A proliferator 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 Test Ban Treaty is not a proliferation cure-all, but by supporting other elements of an integrated non-proliferation strategy, it will make this scenario less likely.
2. 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 Test Ban Treaty than without it.
3. Experienced nuclear weapon states such as Russia, and to a lesser extent China, 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 that would undermine the U.S. nuclear deterrent, and eventually even such violations are likely to be caught.
4. The Stockpile Stewardship Program 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 for effective stockpile stewardship and by formalizing domestic safeguards to ensure that we would be ready to test again if necessary for national security.

The Test Ban Treaty's advantages, in my judgment, clearly outweigh the foregoing risks.
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. I believe that it is very much in our national interest to secure these benefits through entry into force of the Test Ban Treaty. If this opportunity is lost, the United States' ability to lead an effective global campaign against nuclear proliferation will be severely damaged.

VIII. Compilation of Recommendations

Nuclear Weapons, Non-Proliferation, and the Test Ban Treaty

1. Working closely with the Congress and with U.S. friends and allies, the next Administration should implement on an urgent basis an integrated non-proliferation policy targeted on, but not limited to, countries and groups believed to have an active interest in acquiring nuclear weapons.
2. To increase high level attention and policy coherence, the next Administration should appoint a Deputy National Security Advisor for Non-Proliferation, with the authority and resources needed to coordinate and oversee implementation of U.S. non-proliferation policy.
3. As part of its effort to build bipartisan and allied support for an integrated non-proliferation policy, the next Administration should review at the highest level issues related to the Test Ban Treaty. There should be a sustained interagency effort to address senators' questions and concerns on these issues of great importance to national security.
4. The United States should continue its testing moratorium and take other concrete actions to demonstrate its commitment to a world without nuclear explosions, such as continuing leadership in building up the International Monitoring System (IMS) being established for the Treaty.

Monitoring, Verification, and Foreign Nuclear Programs

1. Higher funding and intelligence collection priorities should be assigned to monitoring nuclear test activities and other aspects of nuclear weapon acquisition or development by other states.
2. Collaboration should be increased among U.S. government officials and other experts to ensure that national intelligence, the Treaty's international verification regime, and other scientific stations are used as complementary components of an all-source approach to verification.
3. The transition from research to operational use should be accelerated for new verification technologies and analytical techniques.
4. The United States should continue working with other Test Ban Treaty signatories to prepare for inspections and develop confidence-building measures.
5. Additional steps should be taken unilaterally or bilaterally to increase transparency regarding the nature and purpose of activities at known nuclear test sites.

Stewardship of the U.S. Nuclear Stockpile

1. Working with the Department of Defense, other Executive Branch agencies, and the Congress, the Administrator of the NNSA should complete as soon as possible his comprehensive review of the Stockpile Stewardship Program. The review will clarify objectives and requirements, set priorities, assess progress, identify needs, and develop an overarching program plan with broad-based support.
   ◦ Highest priority should be given to aspects of stockpile stewardship that are most urgently needed to assure the near-term reliability of the U.S. nuclear deterrent, i.e. surveillance, refurbishment, and infrastructure revitalization.
   ◦ Enhanced surveillance and monitoring activities should receive full support and not
be squeezed by higher profile aspects of the SSP.

- The NNSA should make a decision about the need for a large scale plutonium pit remanufacturing facility as soon as possible after the next Administration has determined the appropriate size and composition of the enduring stockpile, including reserves.

- A dedicated infrastructure revitalization fund should be established after the NNSA has completed a revitalization plan for its production facilities and laboratories.

2. The NNSA, working with Congress and the Office of Management and Budget, should place the SSP on a multi-year budget cycle like the Department of Defense's Future Years Defense Program. Some increase in funds for the SSP is likely to be necessary.

3. Steps to improve interagency management of stockpile stewardship matters, such as the revitalization of the Nuclear Weapons Council, are essential and should be continued.

4. Appropriate steps should be taken to ensure that the performance margins of various weapon types are adequate when conservatively evaluated.

5. Strict discipline should be exercised over changes to existing nuclear weapon designs to ensure that neither an individual change nor the cumulative effect of small modifications would make it difficult to certify weapon reliability or safety without a nuclear explosion.

6. The Administrator of the NNSA should establish an on-going high level external advisory mechanism, such as a panel of outstanding and independent scientists.

**Minimizing Uncertainty with a Treaty of Indefinite Duration**

1. The Administration and the Senate should commit to conducting an intensive joint review of the Test Ban Treaty's net value for national security ten years after U.S. ratification, and at ten-year intervals thereafter. This review should consider the Stockpile Stewardship Program's priorities, accomplishments, and challenges; current and planned verification capabilities; and the Treaty's adherence, implementation, compliance, and enforcement record. Recommendations to address concerns should be formulated for domestic use and to inform the U.S. position at the Treaty's ten-year review conference. If, after these steps, grave doubts remain about the Treaty's net value for U.S. national security, the President, in consultation with Congress, would be prepared to withdraw from the Test Ban Treaty under the "supreme national interests" clause.

*Source: Department of State*

**Source URL:** https://www.armscontrol.org/act/2001-01/features/findings-recommendations-concerning-comprehensive-nuclear-test-ban-treaty