

**Statement by  
Dr. Robert B. Barker  
Before the  
SENATE ARMED SERVICES COMMITTEE  
Thursday, October 7, 1999**

Mr. Chairman, members of the Committee, I am honored to have been asked to assist the Senate in its assessment of whether the purported benefits of a comprehensive nuclear test ban (CTBT) are real and significant enough to warrant the risks attendant to the cessation of nuclear testing and sole dependency upon the Department of Energy's Stockpile Stewardship Program (SSP) as an alternative to testing. Today I will address those risks in detail.

My comments are based upon a professional career devoted to nuclear weapons related work, ranging from being a nuclear weapon designer to serving three Secretaries of Defense as their expert on nuclear weapon matters. The details of that career are described in more detail below. Let me start by briefly summarizing my conclusions:

First, sustained nuclear testing is the only demonstrated way of maintaining a safe and reliable nuclear deterrent. Our confidence in the safety and reliability of our nuclear weapons has already declined since 1992, the year we deprived ourselves of the nuclear testing tool to evaluate stockpile safety and reliability. It should be of grave concern to us that this degradation in confidence cannot be quantified.

Second, stockpile problems affecting safety and reliability are inevitable; they can arise anytime. Serious problems may already have arisen.

Third, our nuclear weapons are less safe than they could be and will stay that way unless we can conduct nuclear tests.

Fourth, the Stockpile Stewardship Plan is not now, and never will be-even ten years from now when its major components might be operational-a "substitute" for nuclear testing in the sense of giving us equal confidence in the safety and reliability of our nuclear weapons. Nor will SSP alone allow us to improve the inherent safety of nuclear weapons or provide new nuclear weapon designs in response to new requirements. Only when SSP can be directly calibrated with nuclear tests conducted for that purpose will we know if it really works.

Fifth, the cessation of testing, with its clear risks to the maintenance of a credible deterrent, has been justified on the basis that national security is enhanced through non-proliferation benefits. I can find no evidence that this assertion of benefit has been subjected to any reasonable standard of proof. It seems all too likely that we are accepting "risk" with no "benefit."

It is no accident that my views coincide -with those which can be drawn from a report submitted to the Senate by then President Bush on January 19, 1993. Throughout the Reagan and Bush

administrations, where I served, it was determined as a result of extensive study that nuclear testing would be necessary for the foreseeable future, while a CTBT remained a long term goal. President Bush's report addressed the limitations on testing then imposed by legislation and called for the -repeal of those limitations and the resumption of nuclear testing. He cited incorporating enhanced safety measures, the development of backup warheads for those which would eventually fail, validating non-nuclear predictive techniques (like Stockpile Stewardship), and evaluating the vulnerability of U.S. military equipment as the reasons why continued nuclear testing was necessary. An unclassified extract from President Bush Report follows:

Report to the Committees on Armed Services and Appropriations of the Senate and the House of Representatives on Nuclear Weapons Testing required by Section 507 of the FY 1993 Energy and Water Development Appropriations Act. Transmitted by President George Bush, January 19, 1993

"D. (U) Proposed Test Program

(U) In signing the Energy and Water Development Appropriations Act, 1993, President Bush described Section 507 of the Act as highly objectionable. Specifically, the President noted that Section 507:

may prevent the United States from conducting underground nuclear tests that are necessary to maintain a safe and reliable nuclear deterrent. This provision unwisely restricts the number and purpose of U.S. nuclear tests and will make future U.S. nuclear testing dependent on action by another country, rather than on our own national security requirements. Despite the dramatic reduction in nuclear arsenals, the United States continues to rely on nuclear deterrence as an essential element of our national security. We must ensure that our forces are as safe and reliable as possible. To do so, we must continue to conduct a minimal number of underground nuclear tests, regardless of the actions of other countries. Therefore, I will work for new legislation to permit the conduct of a modest number of necessary underground nuclear tests.

(U) Despite our strong concerns with Public Law 102-377, the Departments of Defense and Energy have endeavored since its enactment to devise a fiscally, militarily and technically responsible testing program to comply with its constraints. We have concluded that it is not possible to do so, for several reasons.

(U) First, regarding weapons safety, the Administration considers the planned enduring nuclear weapons stockpile to be reliable and safe. Given the weapon's safety and the high cost of introducing new warheads incorporating additional safety improvements throughout the deployed force, we do not believe it would currently be cost-effective to incorporate them in the existing stockpile.

(U) However, one or more of the weapons systems in the enduring stockpile might develop a significant flaw and require repair or replacement. Of all U.S. nuclear weapons designs fielded since 1958, approximately one-third have required nuclear testing to resolve problems arising

after deployment. Therefore, we should have available weapon designs with enhanced safety features, that are thoroughly designed and tested, should they be needed. This aspect of planning for the future becomes more compelling recognizing that the weapons in the enduring stockpile may be retained well into the mid-21st century.

(U) The administration advocates a series of nuclear tests to develop backup warheads which would provide enhanced reliability and safety, and serve as a hedge against the emergence of a significant flaw in one or more weapons types in the existing stockpile. However, it is not possible to develop warheads with the requisite reliability and safety within the constraints of Public Law 102-377. They cannot and should not be developed in haste. Realistically, the effort will take more than 15 test over three years. In addition, post-production tests would be required to have confidence in the warheads; such test could be well into the future, and thus would not be allowed under Public Law 102-377.

(U) Second, in accordance with earlier Congressional direction, the Administration- has engaged in a major effort to increase predictive capability, and thus reduce our reliance on nuclear testing for force safety and reliability. It is questionable whether tests dedicated to that purpose would be allowed under Public Law 102-377. Even if they are, the limited amount and duration of underground nuclear testing allowed would permit us only marginally to increase our predictive capability, and would certainly not bring it to a point that we could maintain the safety and reliability of the U.S. nuclear deterrent without underground nuclear tests.

(U) Third, the legislation provides for one test of the reliability of a nuclear weapon per year. That in itself might be adequate, but the requirement for weapons reliability testing is a long-term one, that will not come to abrupt end on September 30, 1996. The U.S. nuclear deterrent is far too important to our security and that of allies to forswear in the near future these tests required to ensure that it remains safe and reliable.

(U) Fourth, the legislation does not allow underground nuclear testing to ensure that U.S. forces, other than our nuclear weapons, would be able to fulfill their functions despite exposure to nuclear effects. Such testing is extremely important for a wide range of systems, including conventional systems, sensor of all types, other defensive systems, and all command and control elements. Thus the constraints of Public Law 102-377 will have an adverse impact on a wide range of U.S. capabilities, in addition to our nuclear deterrent.

(U) In consequence, the Administration has concluded that it is not possible to develop a test program within the constraints of Public Law 102-377 that would be fiscally, militarily and technically responsible. The requirement to maintain and improve the safety of our nuclear stockpile and to evaluate and maintain the reliability of U.S. forces necessitates continued nuclear testing for those purposes, albeit at a modest level, for the foreseeable future. The administration strongly urges the Congress to modify this legislation urgently, in order to permit the minimum number and kind of underground nuclear test that the United States requires regardless of the action of other states to retain safe and reliable, although dramatically reduced deterrent forces."

The record could not be more clear, on January 19, 1993 a CTBT was a long term goal because

nuclear testing was necessary for a safe and reliable U.S. deterrent. What changed?

Before amplifying on my assessment of the risks of a CTBT for the security of the United States I will review with you those aspects of my career in nuclear weapons related work that have been most relevant to my reaching my conclusions.

### A Career in Nuclear Weapons Work

I began my career in nuclear weapons work when I joined Lawrence Livermore Laboratory in 1966 fresh from receiving my Ph.D. in Physics. I became a nuclear weapon designer, learning to simulate nuclear weapon explosions on the computers of the time, bringing designs from calculated concepts to real hardware which were then tested in underground nuclear detonations.

Over the next seven years I moved from novice designer to leader of the strategic nuclear weapon design group. For the five years following I managed the Laboratory's nuclear weapon systems analysis organization, working with the military services and the Office of the Secretary of Defense, to assure that the nuclear weapon design efforts of the laboratory would meet the future needs of the Department of Defense. I then became manager of LLNL's Special Projects organization, among whose responsibilities were the analysis of the nuclear weapon capabilities of other nations, including those of proliferant countries. In 1982 and 1983 I served as the Deputy Associate Director for Arms Control, providing the Laboratory's technical assistance to the Departments of Energy, Defense, State, and the Arms Control and Disarmament Agency.

From October 1983 to October 1986 I served in the Arms Control and Disarmament Agency as the Deputy Assistant Director for Verification and Intelligence. In this capacity I responsible for evaluating the effectiveness and ineffectiveness- of verification technology and performing .assessments of other nations' non-compliance with existing treaties to which the U.S. was party.

In October 1986 I became Assistant to the Secretary of Defense (Atomic Energy) (ATSD(AE)), I position I held until May 1992. In this capacity I was the principal advisor to the Secretary of Defense on all nuclear weapon matters, including nuclear weapon safety, security, and reliability and was DoD's day-to-day interface with the Department of Energy for nuclear weapon matters.

I returned to LLNL in 1992 where I served as an Assistant to the Laboratory Director until my retirement in March of this year.

### Lessons Learned

What have been the primary lessons of the various periods of this career?

As a nuclear weapon designer I learned the limitations of computer simulations and the humility that comes with the failure of a nuclear test.. Computer calculations, regardless of how good or fast the computer is, are only as good as the data and models you give them and the knowledge and experience of the individual doing the calculations. Even today no computers are big enough or fast enough to simulate all that goes on when a nuclear weapon explodes. Understanding the

limitations of calculations comes from experience with the inevitable differences between calculations and experiments, including nuclear tests.

As a system analyst I learned that nuclear weapon systems inevitably lose effectiveness in the face of emerging threats, changing technologies, and evolving requirements. Targets once threatened will burrow deeper, out of the range of effectiveness of existing weapons. Advances in detection and precision strike capabilities will threaten the survival of U.S. delivery systems, thus calling for longer range, or faster delivery, or stealthier characteristics, any one of which might necessitate changes to the nuclear weapon to be delivered. Weapons designed for the Cold War are unlikely to support the precision, limited damage strikes that may be required to deter proliferant nations' use weapons of mass destruction.

As an evaluator of other nations' nuclear weapon programs, I learned that mirror imaging is dangerous, and we should not assume that others will have the same need for testing that we have. Other nation's nuclear weapons will not decay at the same rate; every nation will not lose confidence in their nuclear weaponry at the same time. We cannot predict whether our weapons will have a longer shelf-life and effectiveness than our potential opponents'. Where we have striven for minimum weight, others may have chosen to maximize tolerance for production defects. Where we have chosen to build unique designs for every application, never expecting to rebuild an old design, they may have chosen to plan to routinely reproduce older designs. The risks of a test ban will not be the same for all nuclear weapon states. We cannot assume the least risk for ourselves.

In the arms control arena I was made very aware that nations do cheat on treaty obligations especially when they think they can do so without detection.

In the Pentagon, I became the customer of the DOE nuclear weapon infrastructure. In my five and one-half years as ATSD(AE) I found myself going to the Secretary of Defense too many times to tell him that DOE had just informed me that a weapon type in the inventory was not safe or would not work. These were not minor problems; these were catastrophic failures. In each case, all was well the day before, with no indication of safety or reliability problems. The next day all weapons of a given type were unfit for duty. Nuclear testing was critical in some cases to the finding of these problems and, in some cases, to achieving confidence that the fixes for the problems were acceptable.

In each area of my career I have had the opportunity to see a different aspect of the U.S. nuclear weapon system. My judgments about the risks of the cessation of testing while trying to maintain a safe and secure stockpile come from someone who was 'there', someone who has had to live with the real and potential consequences of failure.

### The Risks for "Reliability" and Safe

The credibility of our-nuclear deterrent can only be sustained if we, ourselves, are confident it will work. That is, we must believe that nuclear destruction of whatever we target will be sure and swift once the decision is made to use a nuclear weapon. We, especially in our open society,

cannot sustain the credibility of deterrence for long if we lose confidence in the actual performance of the weapons.

The prudent approach to ending nuclear testing, as with any endeavor, would have been to demonstrate the success of an alternative approach before abandoning what has been demonstrated to be successful. I myself will have difficulty believing in a deterrent whose "confidence" is based on an uncalibrated, untested Stockpile Stewardship Program.

Less than a decade ago an attempt was begun to develop a potential replacement capability for nuclear testing. The Congress, in the FY89 Defense Authorization Bill, required the Department of Energy to define a Test Ban Readiness Program. The resultant program was designed to develop and determine the effectiveness of non-nuclear test alternatives by direct comparison with the results of an ongoing nuclear test program. This program would have required ten years to implement and required approximately ten nuclear tests per year to validate the alternatives to nuclear testing. The program was stopped in 1992 and ended by the premature cessation of testing.

The U.S. abandoned the prudent approach when it ceased nuclear testing in 1992 without demonstrating a reliable substitute for nuclear tests. Instead we have abandoned the known and embarked on a path whose risks are unknown but could be very great.

There are a number of questions about risk that should be critical in discussions of a CTBT and SSP. The questions sound as if there were quantitative answers. How much confidence in the reliability and safety of the stockpile is enough? How much confidence has been lost already because we have stopped testing? How much loss of confidence will trigger a need for a nuclear test to resolve the issue? How much safety is enough? What is the probability of success for SSP? What's the probability that a major stockpile problem will arise before SSP "works"? What are the risks of trying to meet a new weapon requirement for the stockpile without nuclear testing?

In my view there has been a major failure in coming to grips with these questions. It is not even clear that it has been decided who should bear the responsibility for "officially" answering the questions. For example who decided that today's nuclear weapons are safe enough and that further testing should not be conducted to make weapons as safe as currently possible before stopping testing?

Without answers to the above-listed questions, how can anyone feel comfortable with the risks on continuing down the current path? The biggest risk may be that we don't even know what the risks are!

I will address four areas of risk that bear on the credibility of the U.S. deterrent: stockpile defects; accepting less than the best in nuclear weapon safety; the inability to respond effectively to new

threats and requirements; and betting on SSP before it has shown what it can do.

### Stockpile Defects

As I stated earlier, inevitably, based on the history of the stockpile to-date, a problem will be discovered in a weapon type in the inventory. Past problems have been due to the aging of weapon components and the discovery of design defects years after a weapon has entered the inventory. The problems can bring into question the safety or reliability of all the weapons of a particular type. The risks of trying to solve such problems without nuclear tests have not been quantified.

I have used the word "reliability" because that is the custom in the nuclear weapon business, but it is the wrong word. Reliability conjures up in most people's minds a vision of some fractional or percentage failure rate in something. Today there are many people who will say "You have so many weapons, the Cold War is over, it doesn't matter if the reliability is only 65 percent (or some other low number) instead of the 99.9 percent you've been used to demanding. " While this attitude is itself debatable, when I and my colleagues, talk about loss of "reliability," we are talking about the concern that all weapons of a given type will fail to perform their mission.

John Nuckolls, a former Director of the Lawrence Livermore National Laboratory, has likened these different uses of "reliability" to the difference between owning an automobile "lemon" and finding that your automobile is in a "recall" because the manufacturer has discovered a fatal flaw in every car built of that model. The "lemon" is an example of a statistical problem, where only some limited percentage is bad. We can stand some "lemons" in the stockpile; we cannot afford a "recall" that affects reliability or safety. Nuclear testing is required to help us fix "recall" problems.

At this point, in the debate that has occurred to date, somebody (not anybody who has actually been responsible for producing hardware) says " You don't need to do nuclear tests; just rebuild the weapons to their original specifications and the rebuilt weapons will last as long as the first production." Wrong! Rebuilding problematic weapons as closely as possible to the way they were built originally may be the lowest risk approach to solving stockpile problems, but it is not trivial and far from risk free. Establishing confidence in a rebuilt weapon will be as challenging as a new weapon requirement.

Difficulty in recreating a piece of hardware with the same performance as the original is not unique to the nuclear weapon complex. When production was interrupted on the rocket motor of the Navy's Polaris sea-launched ballistic missile and then restarted, even with the same design specifications, it could not be reproduced. The fix required redesign and recalling retired people to provide data on how the original motors were made. Missile motor testing was available to the Navy to help them understand their problem and to be confident that they had found a solution. Nuclear testing needs to play the same vital role when nuclear weapons must be rebuilt.

### Safety

We must make sure that our nuclear weapons are safe. To do less would be immoral. The history of U. S. nuclear weapon development is that with the design of each new weapon, efforts were made to incorporate the latest safety features in a steadily evolving safety technology. When weapons remained in the stockpile so long that their safety features were too deficient with respect to then current standards, these systems were retired solely because of this deficiency. This approach must continue to be our standard.

Currently available safety technology consists of features that can be incorporated into the design of a nuclear weapon, thereby providing inherent safety. These features can not only preclude a nuclear detonation, except when intended, but can also dramatically reduce the possibility of the detonation of the nuclear weapon's high explosive in violent accidents and reduce the probability of the dispersal of plutonium in fires.

There are weapons in the stockpile today which are less safe than they could be because they do not include this full suite of modern safety features. Of the nine types of weapons that will remain in the inventory only three types have all three of the most modern safety features while three types have only one such feature. These safety deficiencies will remain as long as we cannot conduct the necessary nuclear tests.

Further, without nuclear testing, improvements in the inherent safety of nuclear weapons are impossible. Future research could discover approaches that could add additional inherent safety, but these too would be precluded by the inability to conduct nuclear tests.'

Today these safety shortfalls are partially compensated for by handling procedures whose objective it is to shield the weapons from the violent events that could result in plutonium dispersal. Such procedures will always be dependent upon the human beings who must execute them. I have the highest regard for the military and the DOE civilians whose job it is handle and transport these weapons, but I cannot help thinking that the nation would have been kinder to them and the rest of us if all available inherent safety features were part of today's stockpile. We have too many examples where human error has been responsible for unwanted results. We have only to look at the recent examples of the Mars lander failure and the Japanese reactor accident.

I was deeply troubled by the decision to stop testing without conducting the tests it would have taken to make the entire stockpile as safe as it could be made. Will we continue to settle for less than the safest nuclear weapons we know how to build? Hopefully the Senate will revisit this decision to abandon our long held standard of making our nuclear weapons as safe as technology allows. Who is it who will stand up and take the blame when an accident with a nuclear weapon causes death and destruction that could have been avoided if missing safety features had been included?

### New Requirements

Nuclear testing has been critical to the development of new nuclear weapons, even when that consists of packaging existing design concepts into new or modified delivery systems. There seems to be agreement that the production of new designs without nuclear testing constitutes unacceptable risk. Where differences of opinion exist is whether it is necessary or advisable for



the U.S. deny itself new nuclear weapon capabilities. Are we prepared to accept the risks of not deploying new nuclear weapon systems as necessary?

Today's nuclear stockpile contains weapons designed to meet the requirements of the Cold War. It is an open question how long these same weapons will meet the needs of the post-Cold War world.

It is certainly true that during the Cold War nuclear weapon systems, particularly strategic weapon systems were periodically modernized. Modernization was driven by advances in technology that were not unique to nuclear weaponry. Targets became harder to threaten; they became less vulnerable to deployed yields and delivery accuracy. Our delivery platforms\_submarines, aircraft, land-based systems\_became vulnerable to attack as the acquisition and targeting systems of potential adversaries improved. As a result, the U.S. response was to preserve deterrence by increasing the lethality of our nuclear weapon systems and diminishing their vulnerability. Usually the weapon system changes caused us to require new nuclear weapon designs.

Several studies done for the Defense Department during the last Administration concluded that deterrence of attacks with weapons of mass destruction, nuclear, chemical, and biological weapons, against the interests of the U.S. and its allies would be enhanced by the addition of new nuclear capabilities to the U.S. nuclear arsenal. The testimony before this Committee by UnderSecretary Slocombe describes a broad basis for the continued retention of an effective nuclear deterrent.

It is difficult for me to believe that we will be able to maintain a credible deterrent against this array of potential threats if we are not prepared to deploy new nuclear weapon systems as our current ones become progressively less effective as a result of other nations' strong efforts to make them so. This Administration's 1994 Nuclear Posture Review, whose conclusions have been endorsed in the 1997 Quadrennial Defense Review, requires the DOE to maintain the ability to "Maintain capability to design, fabricate, and certify new warheads."

The record seems clear: it is a requirement to be able to meet new requirements. Nuclear testing is needed to meet new requirements. The absence of nuclear testing risks our ability to preserve deterrence in a technologically changing world.

## SSP

The risks posed by depending solely upon a Stockpile Stewardship Plan for safe and reliable nuclear weapons come from two directions\_one technical and the other financial. There is the risk that even a fully funded SSP, which achieves all its technical objectives, will fall short of achieving the levels of confidence we need for the safety and reliability of nuclear weapons. From the other direction inadequate funding would doom SSP to failure. In either case, there is the risk that full SSP capability will be delayed, for technical or fiscal reasons, to the point that the experienced nuclear weapon designers with nuclear weapon testing experience will have retired before the new staff, with new capabilities, are ready to take their place.

The Laboratories in which the country has entrusted the maintenance of our nuclear deterrent for the entire nuclear era were told by this Administration that they -would not test again and must do their best without testing. When asked to build a substitute for nuclear testing, under the outstanding leadership of Assistant Secretary Reis, the Laboratories generated a plan to greatly increase computational capability and to create new facilities that could more closely approach the physical conditions of nuclear explosions. It is a brilliant plan. This capability, if brought to reality, would not only allow better approximations of nuclear performance, it would also greatly enhance the ability to attract and retain the scientists whose judgments must be depended upon when those with nuclear testing experience retired. A sine qua non of this plan was that the new capabilities become operational before the experienced cadre of nuclear weapon scientists retired.

The plan is very challenging technically, and very exciting for the scientists involved. It called for an increase of a factor of 100,000 in scientific computing capability. This requires computers that run faster, vast machine memories, and new ways of storing and analyzing calculations. The machines for imaging the implosions of nuclear weapons, without nuclear yield, will press the frontiers of technology. The objective is to create an x-ray movie of an imploding nuclear weapon (without producing nuclear yield) to capture the instant when a nuclear explosion would begin. Other machines will create the conditions of temperature and pressure heretofore found only in nuclear weapons and stellar objects to enable a better understanding of how nuclear weapons operate and to explore the effect of certain defects on nuclear performance. As good as this plan is, I think I can say that no one with operational knowledge of nuclear weapon development and production believes that it can achieve the same levels of confidence that were achieved with nuclear testing.

Any one of the objectives set out constitutes a significant scientific achievement. For all of them to succeed on schedule would be an even bigger accomplishment. The timelines are demanding. Schedule slips have occurred already. One or more of the projects may not be completed before the last scientist who had nuclear testing experience retires. The most prudent plan therefore would be for the United States to continue to conduct nuclear tests as necessary to calibrate the new capabilities and give the new generation of designers a new nuclear test experience base from which to assess their new tools.

The real challenge that should be on the lips of every individual who thinks it's a good idea for the U.S. to have a safe and reliable nuclear deterrent is "Prove to me that this SSP is good enough to entrust U.S. national security to it." The consequences of failure are too great for anyone to simply assume SSP will do the job.

What are the odds that SSP will be successful? Dr. Sig Hecker, the recently retired Director of the Los Alamos National Laboratory, has said he can not guarantee success. Dr. Vic Reis, the Assistant Secretary of Energy for Defense Programs has asked the question of numerous prestigious groups of scientists, and according to him the vast majority believe that, if fully funded, the odds of success are better than 50-50. Senior nuclear weapon Laboratory scientists and managers have said the odds are "good." I was among a group of ex-DoD officials who served on a panel at the request of Dr. Reis, to evaluate the ability of SSP to meet DoD's requirements. We concluded that "...confidence in maintaining a safe and reliable stockpile

without nuclear tests will be good, but it will never be as good as was achieved with nuclear tests." The Senate will have to decide whether it -thinks these odds are good enough for U.S. national security.

Turning to the financial perspective, the DOE's SSP contains the budgeted portion of what the Laboratories have said they needed. The SSP also needs to provide for the production of tritium to meet weapon needs and the retention of a production complex that can rebuild those weapons which must be replaced and any new nuclear weapon production. This not an inexpensive program.

I suggest one significant shortfall is the ability to promptly conduct a nuclear test when one is shown to be unavoidable if a safe and reliable deterrent is to be maintained. I emphasize promptness here because I am uncomfortable with the vision of us discovering a fatal flaw in the safety and reliability of a stockpiled weapon type and then taking years to do the test to determine that we can confidently fix the problem. (I am even more troubled by the specter of the public debate that would ensue prior to a decision to test if the supreme national interest clause procedures outlined by President Clinton were carried out under a CTBT while the whole world knew that it was triggered by a major U.S. stockpile problem.) .

### Concluding Comments

In my comments today I have focused on the risks associated with the cessation of testing and not solely on the CTBT. The damage to our confidence in our deterrent is just as damaging with or without a CTBT if we continue to deny ourselves the ability to conduct nuclear tests as necessary.

Full funding of the SSP is our hedge, especially if it contains funding to ensure we can promptly conduct nuclear tests when it is clear we have no other choice. The Senate can ensure the option to test to preserve our deterrent exists by not giving its advice and consent to the CTBT.

I have not dwelt on the other deficiencies of the CTBT today. Lest it be thought that I support contentions that this treaty would inhibit proliferation in any way let me set the record straight. A prolifera

tor does not need to conduct nuclear tests to establish a nuclear capability. While untested designs will be of lower yield, heavier, and larger than optimized, tested weapons, such weapons are all that's needed for some countries to devastate their neighbors. However, a proliferator can conduct tests with little or no risk of detection, or, if conducted on the high seas, without fear of attribution. Such tests may add additional confidence or increase sophistication for the proliferator.

I am also concerned that the CTBT will add to proliferation. Without testing, as I have discussed at length, the effectiveness of our nuclear deterrent is guaranteed to erode. Those nations who have felt confident of our nuclear umbrella will rightfully lose that confidence and, in an increasingly uncertain world, some may conclude they must develop their own nuclear deterrent.

In conclusion, I see no benefits to U.S. ratification of the CTBT, and terrible costs. But even with no CTBT we pay the costs unless we are ready, able, and willing to conduct the nuclear tests that will maintain the nuclear deterrent component of our national security posture.