

**EMBARGOED UNTIL DELIVERY: 2:00 PM EDT, JULY 16, 1995**

**THE HONORABLE JOHN H. GIBBONS  
ASSISTANT TO THE PRESIDENT FOR SCIENCE AND TECHNOLOGY**

**Fifty Years After Trinity: Working Toward a Happy Ending**

**Symposium on the 50th Anniversary of the Trinity Test  
Co-Sponsored by the U.S. Department of Energy and the  
National Academy of Sciences, Washington, D.C.**

**July 16, 1995**

This bell is fashioned after the "bonshoo" bell in the Hiroshima Peace Park. Its solemn tone reminds us of both the peril of destruction and the hope of peace inherent in the awesome power of the unleashed atom.

We are here today to commemorate the dawn of a double-edged age. The atomic fire lit at Trinity 50 years ago, just 30 months after Stagg Field, was an unparalleled scientific accomplishment, reflecting an extraordinary marshalling of talent and treasure. That fire raised the hope for a transformed world, an end to major war -- and indeed, there has been no large-scale war among the major powers for the past 50 years. But it also raised an unprecedented peril, giving our species the key to its own destruction for the first time. Awesome potential, combined with awesome danger -- and therefore awesome responsibility.

Today we are embarking on a new nuclear era, double-edged in a different way, whose ultimate shape remains shrouded in the future. It is an era of great hope: we have stepped decisively away from the nuclear brink. For the first time since the dawn of the nuclear age, the United States and Russia have no missiles targeted on each other. The United States is dismantling nuclear warheads literally as fast as we can -- some 1500 every year -- and everything we know suggests that Russia is doing the same.

But this is also an era of new dangers. The collapse of the Soviet Union and of the Cold War rivalry has raised new proliferation risks and lifted the lid on age-old ethnic, racial, and religious conflicts. The dismantlement of thousands of nuclear weapons leaves us with the daunting task of coping safely and securely with the hundreds of tons of fissile material these weapons contain. The technological revolution that is bringing our world closer together -- parts of which had their origins in the Manhattan District -- is also bringing problems closer to our shores.

A peril and a hope. Our challenge is to bequeath to our children a world in which the peril is forestalled and the hope fulfilled.

Five decades ago, even as the world was engulfed in the flames of war, Niels Bohr offered a remarkable vision of such a world -- a planet transformed for the better by the fearsome power of nuclear weapons. His profound insight was the "complementarity" of the bomb: he called the invention of nuclear weapons a great and deep difficulty which contained within itself its own solution.

He imagined that far-seeing statesmen would understand that a world armed with thousands of nuclear weapons ready to be launched at any moment was clearly an unacceptable danger to human survival. The unmistakable need to forestall this danger would force them to do what they otherwise would not -- to compromise national sovereignty in the interest of international control.

Since no one would give up such a weapon without absolute confidence that others were doing the same, verification would require a world of absolute openness. As Oppenheimer summarized it, "in principle everything that might be a threat to the security of the world would have to be open to the world." And that universal openness, in Bohr's vision, would itself transform the earth in favor of democracy, freedom, and the unending advancement of science and technology.

Unfortunately, over four decades of Cold War, we built precisely the world from whose terrors Bohr rightly shrank. Now our problem is: where do we go from here?

The time has come, 50 years after Trinity, for a deep national reflection on what we want our nuclear future to be. As the strategist Fred Ikle once asked so memorably: "can nuclear deterrence have a happy ending?"

We don't know, today, what such a happy ending would look like. We don't know, with all that has passed, whether we can build a world that matches Bohr's vision. But we do know the general direction we need to head:

- We want a world in which there are fewer nuclear weapons held by fewer countries, and they matter less in determining national power and stature. Thus we want deep, transparent, and irreversible nuclear arms reductions.
- And we want a world in which all nations can benefit from the peaceful applications of the atom, under strong safeguards to prevent any diversion for military purposes.

So as we reflect on our long-term nuclear future, it is incumbent upon us to roll up our sleeves and do the hard work needed to keep heading in the right direction -- forestalling the dangers, and seizing the opportunities, that we face today. We're better off focusing on the

here-and-now challenges of nuclear dismantlement and nonproliferation than locking horns over exactly what nuclear force we are going to need twenty years from now.

And I can tell you, over the past 30 months, this President and this administration have had their sleeves rolled up, and we have some remarkable successes to report:

- Just a few short years after the breakup of the Soviet Union, all of the non-Russian successor states have agreed to join the Nonproliferation Treaty and ship all the nuclear weapons on their soil back to Russia.

- The START I treaty, which will eliminate delivery systems that carry 9,000 nuclear warheads, has entered into force. Already, thanks in part to the Nunn-Lugar assistance program, hundreds of missiles and launchers once pointed at the United States have been eliminated, and thousands of nuclear warheads have been shipped to dismantlement plants.

- We are working to ratify START II, which will remove another 5,000 warheads from the deployed arsenals of the United States and Russia.

- President Clinton and President Yeltsin pledged at their summit last September to begin considering additional reductions and limitations as soon as START II is ratified. As Vice President Gore has said, the improved international security climate will permit -- and indeed require -- additional progress in reducing the size and structure of our nuclear forces.

- We are working to reach agreement on clarifying the ABM Treaty's distinction between strategic defenses and permitted theater defenses, in order to maintain this arms reduction momentum while responding to the threat of missile proliferation.

- To meet the new challenge of possible erosion of nuclear controls, we have launched a major new effort focused on controlling nuclear weapons themselves and the fissile materials needed to make them, rather than only the missiles and launchers limited by START. This includes U.S. and Russian pursuit of:

- cooperation to ensure that all nuclear weapons and weapons-usable materials are secure and accounted for;
- data exchanges and reciprocal visits to build confidence that nuclear weapons are being irreversibly dismantled and that nuclear stockpiles are safe and secure;
- new agreements to stop further production of fissile materials for weapons; and
- cooperation to ensure safe and secure disposition of all the hundreds of tons of plutonium and highly-enriched uranium we no longer need.

- Just this spring, the nuclear Nonproliferation Treaty was extended indefinitely, with overwhelming support from every corner of the globe, making this centerpiece of the nuclear nonproliferation regime a permanent fixture of the international landscape.

· This President's strong stand in going all-out to achieve a Comprehensive Test Ban was an essential factor in the overwhelming support the NPT received. President Clinton has made clear that we seek a test ban agreement which is truly comprehensive, which includes all the nuclear states as well as many other states as possible, and that will allow us to maintain a safe and reliable nuclear stockpile. Making the needed investment in the Department of Energy's innovative Science-Based Stockpile Stewardship program will be critical in achieving that goal. The CTB -- a goal of Republic and Democratic Presidents from Eisenhower to Carter -- is a good idea whose time has finally come. We are prepared for the possibility that the United States has already conducted its last nuclear test.

· Through determined diplomacy, we have also stopped the North Korean nuclear threat in its tracks, with an agreement that will freeze and dismantle their nuclear program. This agreement is not built on trust, but on international monitoring. The recent agreement on the type of reactors to be provided represents another milestone in the long hard road of implementation ahead. Here too, we have focused investment and hard work on heading off a major threat to international security before it arose -- rather than having to face far higher costs and risks later.

· We have proposed a permanent global ban on the production of fissile materials for weapons -- ending mankind's production of the essential ingredients of nuclear weapons forever.

· The International Atomic Energy Agency is greatly strengthening the nuclear safeguards system, focusing needed attention on detecting secret nuclear programs that inspectors aren't asked to visit. This year, we increased our voluntary contribution by \$10 million. Again: investment in prevention.

· As part of the fissile material control effort I just mentioned, we are making every effort to combat the most frightening nuclear proliferation threat now facing us -- nuclear theft and nuclear smuggling. Nothing could be more central to our security than ensuring that the essential ingredients of nuclear weapons do not fall into the wrong hands. U.S. and Russian experts, for example, are working closely together to install modernized security and accounting systems at facilities such as Kurchatov and Obninsk. We are ramping this effort up just as fast as we can, as we build the basis of mutual confidence and transparency. As of one year ago, we had only spent about \$1 million on security and accounting for nuclear materials in Russia; over the last year, we've spent over \$10 million, and over the next 15 months, we expect to spend roughly \$100 million more.

· We are working hard to get the Chemical Weapons Convention ratified, and to negotiate new compliance measures to strengthen the Biological Weapons Convention.

· Since the Gulf War revealed how Iraq had taken advantage of weak links in international export controls, we have been working hard to strengthen those controls. And we have succeeded: the intelligence community tells us that, apart from nuclear smuggling, it

is harder today than ever before for proliferators to buy the technologies they need to build weapons of mass destruction and the means to deliver them. Yet at the same time, we have lifted out-dated restrictions on technologies critical to developing economies -- such as high-speed computers and communication systems -- and freed over \$30 billion in exports from unnecessary controls.

- We are working to establish a new, post-COCOM regime to constrain dangerous exports and limit arms sales to unstable regions or states that threaten international peace and security. And we have proposed new steps to curb the terrible civilian toll of anti-personnel landmines.

This is a record of solid achievement. We are moving as fast as we can to undo the daunting legacies of the Cold War arms competition. Our vision is of the United States and Russia running our nuclear weapons complexes in reverse -- dismantling thousands of nuclear weapons rather than building more, getting rid of nuclear weapons materials rather than producing ever larger stockpiles, cleaning up rather than further fouling our nuclear sites, fostering openness and trust rather than secrecy and suspicion. This administration is committed to making that vision a reality. What better gift could we leave our children as a legacy?

This is tough, difficult, day-to-day work: it requires leadership, and a willingness to invest in preventing problems before they become expensive crises. Just two weeks ago, at the fifth meeting of the Gore-Chernomyrdin Commission -- an excellent example of the kind of nuts-and-bolts cooperative work now underway -- we made progress on a broad front:

- We quietly resolved a number of issues related to arms and missile technology sales, allowing us to announce that Russia would join the Missile Technology Control Regime and would be a founding member of the post-COCOM Forum.

- We put the purchase of 500 tons of Russian highly-enriched uranium on a sound footing, by offering to modify a trade agreement to allow the uranium to be sold more easily in the United States -- so that we could pay Russia for it when it was delivered -- and by offering an additional \$100 million pre-payment to help finance Russia's shipment of reactor fuel to Ukraine in compensation for warheads Ukraine is shipping back to Russia for dismantlement. That deal will provide an incentive for weapons dismantlement, ensure that Ukrainian disarmament takes place and that Ukraine has a reliable nuclear fuel supply, provide \$12 billion in badly needed hard-currency income for the Russian economy, and secure a valuable commercial product for the United States.

- We reached agreement on a number of steps to accelerate our ongoing cooperation in security and accounting for nuclear materials, including a new agreement under which the Department of Energy will help the Russian nuclear regulatory agency establish an accurate national inventory of all the plutonium and HEU Russia has.

- We established a Civilian R&D Foundation, with \$10 million in initial funding, which will provide a new lifeline for supporting Russia's outstanding scientific community.

- We witnessed the space link-up of the U.S. Shuttle and the Russian Mir space station -- a critical step on the path to building Space Station Alpha, the world's largest international technology collaboration, first agreed to in the Gore-Chernomyrdin Commission.

What next? Fifty years after Trinity, we in the science and technology community have a responsibility to look ahead and try to envision what the next 50 years may hold. For example, with a burgeoning world population coupled with economic growth, we will face daunting challenges. Food demands will drastically increase, energy demands will likely double (and electricity demands will triple). Climate-driven changes in weather and crop production patterns could create bounty for some and poverty and pestilence for others. We will have to cope with stewardship of the globe's environmental resources under unprecedented pressures.

All of these challenges, if not successfully addressed, hold the potential for provoking conflict. Only if we can replicate the Manhattan Project experience, by harnessing the best of the world's best scientific and technical minds, and committing a significant investment of resources can we hope to build a future of peace and plenty.

There was a time when science and technology's contribution to national security was primarily building new and better weapons. Trinity heralded the most earth-shattering achievement of that era.

But our security imperatives have changed. The dangers we face today are far more diverse than Fascist or Communist expansionism. The post-Cold War reality includes a contagion of violence that is spreading, in the face of economic, social, and environmental pressures that prevent governments from meeting their citizens' most basic needs. In Africa, Asia, the Caribbean, and even Europe, we find that endemic poverty, ethnic and religious tensions, overpopulation, environmental degradation, and mass migration are producing a tangled skein of conflicts -- that cannot be stopped once they have begun.

No weapon, no matter how powerful, can meet these diverse challenges. There is no silver bullet, but a central part of the answer lies in a strategy of prevention using the tools of science and technology.

President Clinton recognizes that reality. And that is why he has called for the development of a comprehensive National Security Science and Technology Strategy--the first this country has ever had. At a Forum held in this hall last March, the President charged his administration and the scientific community with drafting such a strategy. And the President's National Science and Technology Council (NSTC) has been tasked with building a government-wide consensus for the essential investments in R&D and S&T cooperation we will need to meet the future's national security challenges.

The resulting National Security Science and Technology Strategy will be on the President's desk later this month. It will call for a systematic government-wide effort to harness science and technology to meet our nation's broad national security aims. And as the President has made clear, those security aims include not only maintenance of ready and capable military forces, but engagement with other nations to ensure sustainable development, to stop the spread of weapons of mass destruction, and to build strong and vibrant economies around the world.

Unfortunately, there are those on Capitol Hill who apparently don't understand the importance of these long-term investments. Even compelling investments like the Nunn-Lugar arms reduction assistance program are under attack. As Senator Nunn asked: if some one offered you a weapon that could eliminate hundreds of missiles and thousands of nuclear weapons, what would you be willing to pay for it? We are going to have to work hard to ensure that our nation does not take the penny-wise and pound-foolish path of cutting the heart out of our science and technology enterprise -- particularly in areas central to our future security. That enterprise is the seed corn we plant for our future; nothing could be more foolish than to eat it now.

A peril and a hope. The challenges before us are great, but so are the opportunities. Getting to the "happy ending" that we all seek will be a big job. We are going to need help from the science and technology community -- bringing new insights and perspectives, and weighing in on the importance of a long-term strategy for harnessing science and technology to our national security needs. We will do well if we can muster the talent, vision, dedication, and wise perspectives that many of the people in this room brought to the Manhattan Project -- and if we invest in the science and technology needed to meet the challenges we face. That will truly be a fitting legacy of Trinity.

Thank you very much.