SEEKING A RESPONSIVE NUCLEAR WEAPONS INFRASTRUCTURE AND STOCKPILE TRANSFORMATION

John R. Harvey
National Nuclear Security Administration

Presented to the National Academy of Sciences Symposium on:

"Post-Cold War U. S. Nuclear Strategy:
A Search for Technical and Policy Common Ground"

11 August 2004

Introduction

Thank you for inviting me to participate in this important meeting.

Today, I plan to discuss the President's recent decision to reduce the size of the nuclear weapons stockpile and efforts underway in parallel to create a responsive nuclear weapons infrastructure. I will also touch on issues associated with stockpile modernization and transformation.

For those who don't know, NNSA is part of the Department of Energy. NNSA supports the Department of Defense, which provides delivery platforms and operates nuclear weapons systems, by sustaining and, as necessary, modernizing the U.S. nuclear stockpile, and by assuring the safety, reliability and performance of warheads in that stockpile.

Nuclear Posture Review

On 1 May 2001, President Bush at the National Defense University, articulated his vision for nuclear weapons programs:

> We can, and will, change the size, the composition, the character of our nuclear forces in a way that reflects the reality that the Cold War is over. I am committed to achieving a credible deterrent with the lowest-possible number of nuclear weapons consistent with our national security needs, including our obligations to our allies.

Soon after taking office, the President called for a fundamental reexamination of the roles and purposes of nuclear weapons in the post-Cold War era. The results of that examination were described in the December 2001 Nuclear Posture Review. The NPR reaffirmed that nuclear weapons, for the foreseeable future, will remain a essential element of U.S. national security strategy. At the same time the NPR recognized that the world had changed dramatically and, contrary to some press reports, it continued the trend of the past decade towards a reduced reliance on nuclear forces in that strategy.

More broadly, NPR implementation will integrate the strategic capabilities provided by nuclear forces with those provided by missile defenses, other active and passive defenses, advanced conventional strike and a responsive defense infrastructure. This will provide future Presidents with a much broader array of strategic options and increased flexibility. The emphasis on missile

defenses means that the U.S. will no longer be as heavily dependent on offensive strike forces for deterrence as it was during the Cold War. The strengthening of non-nuclear strike forces—including precision conventional strike and information operations—means that the U.S. will be less dependent than it has been in the past on nuclear forces to provide offensive deterrent capabilities. As a result, NPR implementation, we believe, will make the U.S. less reliant on nuclear forces than at any time since the start of the Cold War.

Present and Future Nuclear Stockpiles

The President's direction to seek the lowest possible number of nuclear weapons consistent with national security needs was codified in the Moscow Treaty. The United States will reduce its strategic nuclear forces by the end of 2012 to 1700-2200 *operationally-deployed* strategic nuclear warheads—about a two-thirds reduction from the pre-NPR (December 01) level.

Recently, as part of its plan to implement the NPR, the Administration concluded an assessment addressing the long-term requirements for *non-deployed* warheads. These are warheads, in addition to the operationally-deployed force, that are needed for routine maintenance as logistics spares and to replace those warheads eliminated during destructive surveillance testing. Because we can't currently produce replacement warheads, non-deployed warheads will also be maintained for prudent risk management, for example, to hedge against new or emerging geopolitical threats or technical problems in the stockpile.

Last May, after careful consideration of the opportunity presented and an evaluation of the risks involved, the President decided to reduce the total size of the U.S. nuclear stockpile, including both Active and Inactive warheads as well as non-strategic nuclear weapons. *By 2012, the U.S. nuclear stockpile will be reduced by nearly one-half, resulting in the smallest nuclear stockpile in decades. This also represents roughly a factor of four reduction in the nuclear stockpile since the end of the Cold War.*

As a result of this planned reduction, NNSA will be able to scale back the number of warheads that were previously slated for refurbishment in warhead Life Extension Programs. We will begin planning for these reductions now; the associated costs avoided will be reflected in out-year budgets starting in the next decade.

Responsive Nuclear Weapons Infrastructure

The risks associated with a stockpile reduction of this magnitude are acceptable only if we continue to make progress in creating a responsive nuclear weapons infrastructure as part of the New Triad called for in the NPR.

Of the many new NPR concepts, one of the most important is recognition that a robust defense R&D and industrial base—which includes a *responsive nuclear infrastructure*—is as important as strike forces or defenses in achieving our overall defense goals.

By "responsive nuclear infrastructure" we refer to the resilience of the nuclear enterprise to unanticipated events or emerging threats, and the ability to anticipate innovations by an adversary and to counter them before our deterrent is degraded—all the while continuing to carry out the day-to-day activities in support of the stockpile. Unanticipated events could include

complete failure of a deployed warhead type. Emerging threats could call for new or modified warhead development, or for providing additional warheads for force augmentation.

The elements of a responsive infrastructure include the people, the science and technology base, and the facilities and equipment needed to support a right-sized nuclear weapons enterprise. But more than that, it involves a transformation in business practices that will enable us to respond rapidly and flexibly to emerging needs.

Our current infrastructure is by no means responsive. A nearly complete halt in nuclear weapons modernization over the past decade, coupled with past under funding of key elements of our manufacturing complex has taken a toll on our ability to be responsive. For example, we have been unable to produce certain critical parts for nuclear weapons (plutonium parts, some secondary components) for many years. But progress is being made. We restored tritium production last fall with the irradiation of special fuel rods in a TVA reactor, and anticipate that we will have a tritium extraction facility on-line in time to meet the tritium needs of a reduced stockpile. We are restoring some lost production capabilities, and modernizing others, so that we can meet the scheduled IOCs later this decade of refurbishment programs to extend the life of three warheads in the legacy stockpile—the B-61 bomb, the W80 ALCM/ACM warhead and the W76 Trident SLBM warhead. We are devoting substantial resources to restoring facilities that had suffered from years of deferred maintenance. Finally, we have identified quantitative metrics for "responsiveness"—in terms of timelines to carry out certain activities to address stockpile problems or deal with new or emerging threats—that will help guide our program.

Our basic strategy will be to apply out-year savings from the reduced refurbishment workload associated with the smaller stockpile to finance, in part, this responsive infrastructure. Among other things, we must achieve the scientific goals of stockpile stewardship, continue facilities and infrastructure recapitalization at NNSA's labs and plants, construct a Modern Pit Facility to restore plutonium pit production, strengthen test readiness and employ advanced concepts R&D to transfer knowledge to the next generation of weapons scientists and engineers who will populate this responsive infrastructure. We will need continued support from Congress for this important effort.

Stockpile Transformation

A responsive nuclear weapons infrastructure must also provide the tools, capabilities and personnel, if needed, to design, develop and produce new nuclear warheads. If we can produce new (or replacement) warheads on a timescale in which geopolitical threats could emerge, or in response to stockpile technical problems, then we can go much further in reducing non-deployed warheads and meet the President's vision of the smallest stockpile consistent with our nation's security. But, we have not exercised new warhead design and development for nearly twenty years and it is unclear whether we could do so now without a costly and time consuming relearning process that few would consider "responsive."

"New" warheads, even modified warheads, are highly controversial. The RNEP "study"—yes, "study"—has become so politicized that there is little hope for dispassionate debate about its merits. So let me speak more broadly about these issues.

Over the next decade and more, as we continue to draw down the nuclear stockpile, we must begin to examine opportunities for modest transformation of a smaller stockpile to (1) redress existing shortfalls in capabilities, (2) seek better ways (i.e., safer, more reliable, more secure ways) to achieve existing military capabilities, or (3) meet completely new military requirements generated by threats that we cannot now anticipate. More specifically, we need to ask ourselves whether the stockpile we have today—the legacy stockpile from the Cold War—is the right stockpile for the new century.

The short answer is: "Probably not." The legacy stockpile consists largely of warheads that:

- generally have very high nuclear explosive yields,
- are designed to maximize yield versus size and weight so that many warheads could be carried by a single delivery vehicle,
- are designed to operate in very rigorous nuclear threat environments,
- are delivered by systems with accuracies that are nowhere near current state of the art (which for hard targets means high explosive yields and higher collateral damage) and,
- once their employment is authorized by the President, are typically "fire and forget" weapons because the survivability of the nuclear command and control system in Cold War scenarios could not be assured and thus could not be counted on to provide what is characterized as "post-launch control."

Finally, there is uncertainty in the *long-term* certification of the safety and reliability of these warheads absent nuclear testing.

Which, if any, of these features are relevant to the types of conflicts that could arise in this new century? That, of course, depends on the nature of the emerging threat. But, what if I told you that we had the opportunity, by relaxing some of the warhead design constraints imposed on Cold War systems, to provide replacement warheads for existing stockpile weapons that could be easily remanufactured with readily available materials, and whose safety and reliability could be certified with absolute confidence, without nuclear testing, for as long as this nation needed nuclear forces?

What if I told you that we had the opportunity to provide "end to end" command and control whereby, once launched, a cruise missile would "report back" its status and progress on engaging the intended target and if, for whatever reason, it did not reach its target, it would be rendered unusable to those who might seek to recover it and use it against us?

What if I told you that we could achieve absolutely assured nuclear weapons security and use control? Such a nuke could sit out on the front lawn of the Forrestal Building in Washington unguarded. No unauthorized person would be able to gain access to the weapon to employ it, mine its weapons-usable nuclear materials, or gain any classified knowledge about nuclear design from it. In short, stealing one of these nukes would provide a terrorist with absolutely nothing of value.

What if I told you that we could share this technology with any country seeking to improve the security of its own weapons without compromising the security of our own? What if I told you we could do the same to secure Special Nuclear Materials in any form?

Right now, these are simply ideas—concepts—whose feasibility has not yet been established. But should we not at least consider such opportunities for modernization? It is essential that we—Congress and the Administration—come to consensus on the importance of such exploration for our nation's future security.

Modernization versus Sustainment

Let me conclude with a comment on "sustainment" versus "modernization." There seems to be a broad national consensus that the U.S. should retain sufficient nuclear forces for the foreseeable future to deter aggression and retain as well the scientific and technical capabilities for responsible stewardship of both nuclear delivery systems and the nuclear stockpile. The debate has been, as I suggested earlier, on whether we should focus exclusively on maintaining existing capabilities and forces, or whether we should undertake as well modernization efforts aimed at transforming our capabilities. This is at the root of the ongoing controversy about RNEP, the Advanced Concepts Initiative, test readiness etc.

But the choice between "sustainment-only" and "some modernization" is a false one. Let me ignore for the time being the earlier question of whether the stockpile we have today is the right stockpile for the 21st Century. If we don't carry out a modest modernization program, in which new concepts are vetted in a competition of ideas, then we won't be able to sustain over the long term the systems and capabilities that we have today, much less transform the stockpile for the future. It is, in part, the reason that the 1994 NPR and the 2001 NPR both sought to ensure that DOE maintained an essential capability to design, develop and produce new warheads.

Let me explain. We are proceeding with an initiative to revitalize nuclear warhead advanced concepts efforts for a very important, yet often not well understood, reason. Advanced concepts design work, and engineering development of selected designs, is essential to train the next generation of nuclear weapons designers and engineers. These individuals must remain at the forefront of nuclear weapons technology first of all to ensure the safe stewardship of the nuclear stockpile for as long as the United States will deploy nuclear forces; second, to provide for future national security needs as determined by the administration and Congress; and, third, to ensure that the United States won't be surprised by the nuclear weapons developments of any other country. If such training—and I cannot emphasize this strongly enough—is disconnected from real design work that leads to an engineered system, we will, as one laboratory director put it, "create not a new generation of weapons designers and engineers, but a generation of analysts" who may understand the theory, but not the practice—the "art"—of nuclear warhead development programs. This would place at risk our capabilities for stockpile stewardship in the future.

Let me conclude on that point. I will be happy to take any questions.