

**On the Path to a “3+2 Vision” for U.S. Nuclear Forces**  
**Presented to the Peter Huessy Breakfast Seminar Series**

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Thanks Peter for inviting me to join with you today to address the challenge of sustaining and modernizing our nuclear forces and supporting infrastructure in a period of fiscal austerity.

I will speak to progress we have made over the past year, under the auspices of the DoD-DOE Nuclear Weapons Council, in advancing what we call the “3+2” vision for the future nuclear stockpile, and in developing a “baseline plan” to start down the path to get there.

The policies guiding our nuclear forces are clear. Very simply put, the President has stated a long term goal to eliminate nuclear weapons globally and to take concrete near-term steps toward that goal. At the same time, he has directed that we ensure that nuclear forces remain safe, secure and effective until they no longer are required in service to our nation’s security.

Although our nuclear weapons stockpile is the smallest since the Eisenhower administration, its role in deterring the most grievous of threats to our nation and its allies remains central.

Like any one of us, warheads and their delivery platforms are not immune to aging degradation; in order to sustain “safe, secure, effective” we must from time to time modernize.

We are, today, on the cusp of a modernization cycle for nuclear delivery platforms and the warheads they carry. The last such cycle occurred during the late 1970s and early 1980’s—the Carter-Reagan strategic modernization program—which fielded the B-1 and B-2 bombers, the Peacekeeper ICBM, the Trident D-5 SLBM, and air-, ground- and sea-launched cruise missiles.

It is noteworthy that many of the nuclear warheads and associated delivery platforms that we field today—the Minuteman III ICBM, the B-52 bomber, the B61 bomb, for example—evolved from modernization cycles that took place decades before that last one.

In coming years, many systems will need to be replaced, or their service lives extended. Nearly every warhead type in the stockpile will either undergo a life extension program or be retired over the next two decades.

At the same time, we are embedded in an increasingly austere fiscal environment. The Budget Control Act passed last year, coupled with fact-of-life cost growth in key programs, has forced us to tighten our belts. Omnipresent continuing resolutions coupled with sequester have further complicated efforts and impacted all Federal agencies including DoD and DOE.

**Work of the Nuclear Weapons Council over the past year**

It is useful to remind ourselves where we were about 18 months back when the linkage of the modernization challenge with budget realities was coming into much stronger focus.

NNSA's work program in large part responds to DoD's requirements for nuclear warheads and related stockpile support. In the process of building last year's FY 13-17 budget, we came to understand that the forbidding "bow wave" of LEP work load anticipated later this decade—involving overlapping LEPs for the W76, the W88 fuze update, the B61 bomb and the emerging W78/W88 LEP—was simply not executable with available resources.

Among other things, the scheduled completion of warhead LEPs was not well-aligned with the initial operational capability of delivery systems which would carry those warheads. There were also concerns that recapitalization of certain critical plutonium infrastructure would not be ready in time to carry out planned LEPs.

The budget that went forward fully funded modernization activities in FY13. Based on what we were asking NNSA to do, however, there were insufficient funds to sustain them in the out years.

Based on plausible funding expectations, we had too much on our plate—we had to make some adjustments.

To meet this challenge, the two Departments—Defense and Energy—strengthened their partnership in advancing a shared commitment to safe, secure, and effective nuclear forces.

This past year, the DoD Cost Assessment and Program Evaluation (or CAPE) office and NNSA collaborated on a joint review of DoD's near term nuclear weapons requirements and NNSA's funding options to meet those requirements.

NNSA provided unprecedented transparency into its program and the budget processes that support it. CAPE applied its experience overseeing DoD acquisition programs to develop rough "should cost" estimates for, and identify possible efficiencies in, NNSA programs.

Working together in a related effort, the two departments advanced a "25-year baseline plan" to align schedules for warhead LEPs, for the modern delivery platforms that carry those warheads, and for the initial operations for supporting uranium and plutonium infrastructure.

These two efforts led to a synchronized and balanced approach involving some further adjustments to DoD modernization schedules, and some resource reallocation within NNSA's five-year program.

By adjusting program schedules, we were able to "smooth out" the workload bow wave and increase prospects for affordable program execution.

This work facilitated NWC certification that NNSA's 5-year budget had, with acceptable risk, the necessary resources to meet DoD warhead needs on the adjusted schedules. Further work is underway to confirm that this baseline is affordable and executable over the longer term.

### **“3+2” Vision for the Nuclear Stockpile**

The 25-year baseline plan identifies the path toward a long-term stockpile end state, endorsed by the NWC late last year, that we have characterized as “3+2.” Beyond leveling the NNSA workload, the plan provides opportunities to reduce the number of warhead types, as well as the number of reserve warheads required to hedge technical or geopolitical contingencies.

Recall, there are four types of ballistic missile warheads—two each for ICBMs and SLBMs. The life-extended W76 SLBM warhead is in production today. The W78 ICBM and W88 SLBM warheads are aging and will require life extension with initial production to begin mid-next decade. The W87 ICBM warhead is pretty much OK for now.

There are three types of air-delivered weapons—two bombs (one, the B61, having multiple sub-variants) and one cruise missile. The B61 LEP is in engineering development; the LEP for the ALCM replacement warhead begins later this decade. The B83 bomb is currently in good shape.

In 3+2, we would, over the long term, consolidate these seven types down to five: three interoperable ballistic missile warheads and two air-delivered weapons—one bomb and one cruise missile (hence 3+2!).

By interoperable, we mean nuclear explosive packages that can be adapted to multiple delivery systems. For example, each of the three interoperable ballistic missile warheads could “swing” between ICBMs and SLBMs.

We are working right now to determine whether a single nuclear explosive package could be adapted to the Mk21 and Mk5 reentry bodies for, respectively, ICBM and SLBM delivery. If feasible and affordable, several advantages arise. Specifically, interoperability would:

- Increase resilience of deterrence by reducing today’s heavy reliance on a single SLBM warhead—the W76
- Enhance warhead safety, security and use control
- Potentially reduce NNSA costs if one warhead development program could meet the life extension objectives of two existing warheads
  - Also potential for lower sustainment/lifecycle costs
  - But: NNSA cost savings might be offset by additional DoD-specific costs; e.g., additional flight tests required in system development.
  - More study required.
- Maintain nuclear design and development skills by challenging designers and engineers in ways that refurbishment LEPs on existing warheads cannot.
- Reduce number of warhead types
- Reduce total stockpile size because fewer reserve warheads would be required to hedge.

Establishing that an interoperable warhead is feasible and affordable, and then developing and fielding it, is an essential first step down the path to “3+2”. Initial studies are scheduled to be completed by Summer 2015.

### **B61-12 Bomb LEP**

A full scope LEP for the B61 bomb is an important component of “3+2.”

The B61 non-strategic bombs, deployed with NATO dual-capable aircraft (DCA), provide the cornerstone of our extended deterrence commitment to Allies. The B61 strategic variant, carried by the B-2 bomber, is also an essential component of air-delivered strategic deterrence.

The B61 is also the oldest warhead design in the U.S. nuclear stockpile with components dating from the 1960’s (e.g. vacuum tube radars, obsolete electronics) and other limited life components (neutron generators, power sources) all reaching the end of service life.

To maintain fully capable strategic bomber and DCA forces, a life extension program is essential with initial production to begin in 2019.

A single warhead—termed the B61-12—would replace four (one strategic and three non-strategic) types of the B61 and further reduce the number of warheads and warhead types in the U.S. arsenal.

Some have raised concerns with the B61 LEP. “It’s not needed. “Even if it was, we can’t afford it.” A recent New York Times editorial raised a number of objections that opponents cite.

Some suggest that cost savings of several billion dollars could be achieved with the so-called “Triple Alt” option. Triple Alt would replace three aging bomb components—the radar, neutron generators and power supplies—but defer other needed but not so urgent fixes (e.g., NEP, WES refurbishment) until later next decade.

We considered the Triple Alt in the B61 LEP study but rejected it for several reasons:

- Does not meet key military requirements (yield, safety, use control, LLC interval, surety, compatibility issues with F-35, B-2A aircraft)
- Does not address other known aging issues associated with 40 year old components (Multiple Code Coded Switch, parachute, Programmer, Electronic Assembly).
- Would not achieve consolidation of warhead types from four down to one.
- Eliminates opportunity to reduce stockpile size (e.g., potential to retire B83-1 bomb later next decade).
- Would not save as much money as some have argued.

On this last point, we are acutely aware of the high cost of the B61-12 LEP and increased management attention is being devoted to controlling costs.

Our best estimate is between \$7-8B for the full scope LEP.

Some cite the cost of the “triple alt” to be about \$1.5B. But that estimate was current at the same time that cost estimates for the full scope LEP were in the range of \$4B. We should expect at least a factor of two cost escalation—to about \$3B or so—for the triple alt.

The big factor arguing against the triple alt is the cost of the follow-on B61 LEP next decade to “finish the job.” A large contributor to LEP costs are the operations at DOE’s PANTEX plant to take the weapon apart, replace aging components, and then reassemble it. In the long run, it pays to do this operation only once.

In light of a continuing high NNSA workload during the 2020s, it is not clear whether a second B61 effort could be phased in during that period.

In making cost comparisons, we must also consider the added cost to life extend aging F-16 and other aircraft that can “talk” to the existing bomb.

On balance, with all factors taken into account, the current approach on the B61 is prudent. Moreover, NNSA will save costs by leveraging work on the B61 (e.g., radar development) for other LEPs. Indeed, the B61 could conceivably be adapted for the ALCM replacement warhead (also called Long Range Stand Off or LRSO) with attendant savings.

### **What is achieved in the FY14 President’s Budget Request**

In summary, not all that we desire in modernization can be afforded. And what we do get may not be on original timelines. This conclusion is common to both Departments.

Over the past year we have worked the details of viable modernization with focus on solid, cost-effective implementation of high priority programs that address the long term state of the nuclear enterprise. Such is reflected in the President’s FY 2014 request.

To sustain and recapitalize nuclear delivery platforms and the command and control system that links nuclear forces with Presidential authority, and to life extend nuclear warheads, the President’s request includes:

- Steps to ensure that the existing triad of nuclear forces—consisting of MMIII ICBMs, Ohio Class submarines deployed with the Trident D-5 SLBM, and B52 and B2 strategic bombers—remain safe, secure and effective until replaced by follow on systems.
- Advancement of ongoing LEPs for nuclear warheads delivered by these platforms including those for the W76-1 SLBM warhead, the B61 bomb, and for an interoperable warhead that could replace both the existing W78 ICBM and W88 SLBM warheads.
- Modernization of the sea-based deterrent with an Ohio Replacement submarine.
- Exploration of options for a follow on system to the Minuteman III ICBM.
- Development of a new, nuclear-capable strategic bomber, and a potential LRSO missile to replace the current ALCM.

- Steps to ensure a continuing ability to meet extended deterrence commitments to allies with a dual capable Joint Strike Fighter carrying a life-extended B61 bomb
- Modernization of the early warning satellites and radars, the communications satellites and associated links, and other systems that comprise our nuclear command and control system.

Among other essential NNSA programs supporting the stockpile, the President's request will:

- Sustain warhead surveillance efforts, and the science and technology that support stockpile assessment and certification in the absence of underground nuclear testing,
- Replace an aging facility for HEU operations at the Y-12 plant in Oak Ridge with a modern Uranium Processing Facility (UPF).

More generally, UPF coupled with a renewed progress on advancing plutonium capabilities will provide infrastructure needed to address technical problems in the stockpile, or respond to future geopolitical challenges, with a substantially smaller stockpile than we have today.

A note of caution. The President's budget request for FY14 issued early in April does not take into account potential further cuts under the sequester. It is not my job to speculate on that process but continued sequester cuts would mean additional adjustments and potential further impacts to warhead life extension and platform modernization.

### **Congressional Advisory Panel on NNSA Governance**

Because I know you are interested in this, let me conclude with the observation that the relationship between the Departments of Defense and Energy is unique in government.

DoD generates the requirements for nuclear warheads. DOE, with a separate funding line and oversight from appropriations subcommittees separate from those that oversee DoD, conducts the research, development and acquisition programs that address those requirements.

The legacy of this current arrangement evolved from the Manhattan Project in the 1940s when clear civilian control of this new and awesome technology, having both military and peaceful application, was mandated.

That legacy has had certain benefits relevant even today, but it has also introduced inherent inefficiencies in the way nuclear weapons programs are now pursued.

The FY 2013 NDAA establishes a Congressional advisory panel that will examine these and related issues in seeking to strengthen governance and oversight of the nuclear weapons enterprise. The Defense Department looks forward to working with NNSA and the panel to ensure that national security needs are most effectively met.

I would be happy to take questions.