

**Statement of Dr. Charles P. Verdon  
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**On  
*Status of the B61-12 Life Extension and W88 Alteration 370 Programs*  
Before the  
Subcommittee on Strategic Forces  
House Committee on Armed Services**

**September 25, 2019**

Chairman Cooper, Ranking Member Turner, Members of the Subcommittee, thank you for the opportunity to testify on the status of the Department of Energy's National Nuclear Security Administration's (NNSA) B61-12 Life Extension Program (LEP) and W88 Alteration (Alt) 370 Program. NNSA appreciates the Committee's continued support of the U.S. nuclear security enterprise.

The 2018 Nuclear Posture Review (NPR) acknowledged that the global security environment is growing increasingly dangerous and uncertain. Countries such as Russia, China, and the Democratic People's Republic of Korea are modernizing, expanding, and diversifying their nuclear arsenals. NNSA's modernization activities are central to the President's goal to ensure that U.S. nuclear capabilities are modern, robust, flexible, resilient, ready, and appropriately tailored to deter 21st-century threats and reassure America's allies.

The United States' nuclear capabilities continue to be the cornerstone of America's national security and global stability, and serve as the ultimate deterrent against a nuclear attack. U.S. nuclear capabilities provide a nuclear "umbrella" of protection for many allied nations, reducing their need to develop and field their own nuclear weapons, thereby helping to dissuade nuclear proliferation. Further, the U.S. nuclear weapons program provides the scientific, technological, and engineering foundation for U.S. nuclear nonproliferation, counterproliferation, and counterterrorism programs. For these reasons, it is the policy of the United States to retain and maintain its nuclear deterrent until nuclear weapons can be prudently eliminated.

**NNSA's Unique Position**

NNSA is uniquely situated to provide the research, development, production, and dismantlement capabilities necessary to support the U.S. nuclear weapons stockpile. This includes managing an industrial base within its nuclear security enterprise (NSE). The NNSA NSE spans eight government owned, contractor operated sites throughout the country. Over the past five years, NNSA has begun to make significant investments rebuilding the NSE to provide the modernized weapons required by the Department of Defense (DoD). Learning from our history, but looking forward, we are making progress in repairing, replacing, and modernizing our industrial base, stabilizing deferred maintenance, and addressing high-risk excess facilities; nonetheless, much more remains to be done over the next decade and beyond. In fact, more than half of NNSA's

facilities across the NSE are over 40 years old, and roughly 30 percent date back to the Manhattan Project.

NNSA needs to build an effective, responsive, and resilient nuclear weapons infrastructure to adapt to shifting requirements. This will require sustained investments to make the necessary improvements to the NSE. NNSA needs the continued support of Congress to provide the resources to enable the United States to have a safe, secure, and reliable nuclear weapons stockpile.

### **Weapons Modernization Activities – Life Extension Programs, Alterations, and Modifications**

Modernizing the U.S. nuclear stockpile requires investment in three main components: (1) production capabilities, (2) technical and scientific expertise and tools, and (3) infrastructure. At this time, every leg of the Nation’s nuclear triad is undergoing modernization. NNSA needs to provide modernized weapons, synchronized with DoD platform modernization, which requires responsive and resilient production and scientific infrastructure to support these modernization activities.

NNSA is committed to the execution of policy direction provided by the 2018 NPR, as instituted by directives from the Nuclear Weapons Council (NWC). Warhead modernization activities, which include LEPs, Alts, and modifications (Mods), provide weapons that meet DoD performance and both DoD and NNSA safety and security requirements, and require no additional explosive nuclear testing to certify the warhead for entry into the stockpile. These activities address aging, lack of replacement parts, and new flight characteristics due to changes in DoD delivery platforms. NNSA extends the service life of weapons that have reached the end of their original design life through LEPs. Other modernization efforts include Alts, which do not change the weapon’s operational capabilities, and Mods, which do change the weapon’s operational capabilities. NNSA also conducts surveillance and assessment activities to ensure that weapons currently in the stockpile remain safe, secure, and effective. Laboratories, plants, and sites across the NSE work together on this enduring national security mission.

To execute these modernization programs for the Nation’s stockpile, NNSA, in partnership with DoD through the NWC, conducts activities in a joint nuclear weapons lifecycle process for sustainment of the stockpile through refurbishment activities. Referred to as the 6.X process, this addresses DoD and NNSA weapons modernization needs from concept assessment to full scale production, and finally to retirement. With five warhead modernization activities underway, NNSA is executing an unprecedented variety of complex component development and production work through this process, and continues to make progress across all five programs.

#### ***Technical Issues with the B61-12 LEP and W88 Alt 370***

NNSA informed Congress in the spring of 2019 that we experienced technical issues associated with a limited number of electrical components that will delay both the B61-12 LEP and the W88 Alt 370. There are two key aspects of each warhead modernization activity. First, we must

identify a technically feasible design that meets requirements and then we must establish confidence that the design will continue to meet requirements 20-30 years after production. While the problematic components have worked during all system tests (component, major assemblies, and full-up integrated system flight tests) for both the B61-12 LEP and the W88 Alt 370, technical issues were identified that led us to question the components' long-term viability.

Best practices from the electronic component industry were used to stress the components beyond their intended use range (e.g., utilized at higher than the intended voltages, exposed to temperature and mechanical insult) as a way of establishing confidence they will continue to work over their 20-30 year lifetime after production. Stress testing concluded that commercially available capacitors did not meet reliability requirements, though early tests conducted approximately three years prior showed these components met the requirements. NNSA determined that the prudent approach is to replace those components rather than risk component failure in future years. NNSA is coordinating closely with DoD to mitigate delays to these weapons programs. Delays to the First Production Unit (FPU) for both programs are estimated to be around 20 months. NNSA is working with DoD to develop specific production schedules, initial operational capability dates, and last production unit projections. All other major components, unaffected by the capacitor failures, are continuing with production and readiness activities.

Upon identification of these issues, NNSA launched two internal groups within the Office of Defense Programs composed of active and retired Federal and Management and Operating (M&O) contractor personnel to identify causes and potential lessons to be learned. Both teams gathered information from interviews, site visits, and discussions with other organizations that undertake similar electronic component work. There are a number of lessons associated with the occurrence of this technical issue that have been identified and are being addressed to minimize the re-occurrence of this issue in future warhead modernization activities. We have identified that the technical issues experienced within the B61-12 LEP and W88 Alt 370 programs ultimately stemmed from the processes used for inserting commercial off-the-shelf (COTS) components that left the programs vulnerable to technical risk and schedule delays. When triggered, these potential risks create disproportionate impacts on the program. A strategic reevaluation of the process is underway while tactical process improvements have been implemented. We are actively using the W80-4 LEP and the W87-1 Mod to take these lessons and identify solutions to minimize the chance of them reoccurring. The incorporation of the lessons learned into the W80-4 and W87-1 are reviewed on a regular basis.

### ***W88 Alt 370***

The W88 Alt 370, currently in Phase 6.4, *Production Engineering*, supports the sea-based leg of the nuclear triad. This program includes a new arming, fuzing, & firing assembly, a conventional high explosives (CHE) refresh, a new lightning arrestor connector to enhance nuclear safety, trainers, flight test assemblies, and associated handling gear to maintain the W88 warhead in the existing nuclear weapons stockpile. Earlier this month, the NWC approved a revised FPU date of the 4th quarter of Fiscal Year (FY) 2021 for the W88 Alt 370. NNSA is closely coordinating with DoD, and delays to this weapons system are being discussed with the Navy.

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

The B61 gravity bomb, with components dating from the 1960s, is the oldest weapon design in the U.S. nuclear stockpile. The B61-12 LEP refreshes obsolete technology and incorporates improvements in both safety and security features, and extends the life of the weapons system in the stockpile by at least 20 years. The B61-12 LEP will consolidate and replace the B61-3, -4, -7, and -10 bomb variants, reducing the overall number of gravity bomb types in the stockpile. The NWC also approved a revised FPU date of the 1st quarter of FY 2022 for the B61-12. Discussion of schedules that will meet deployment requirements have been coordinated with the Air Force. All other major components are continuing with production and readiness activities.

## **Production Infrastructure Modernization**

While currently providing the warheads required by the DoD, the NNSA production infrastructure is neither responsive nor resilient. To help prevent against additional delays to the B61-12 LEP and the W88 Alt 370, as well as delays to other warhead modernization programs, NNSA must continue to upgrade its production infrastructure.

A number of NNSA's key facilities do not meet modern safety standards and require significant increased investment to maintain them. Safety and efficiency remain important concerns; if these facilities encounter a prolonged outage due to these mounting issues, the result will impact stockpile maintenance and warhead deliveries. As we consider the need for maintenance or replacement of any individual aging facility, we also need to recognize the time and planning required to accomplish upgrades or construction, which can be a decade or more.

Additionally, NNSA must re-establish a number of full-rate production capabilities to manufacture nuclear weapons components of strategic interest that need to be replaced. These key components, including primaries, secondaries, and radiation cases, are critical to weapon performance. Production of these components and the materials needed to construct them was reduced or stopped during the 1990s when they were no longer required, due to the Cold War ending. Conducting LEPs and a greater emphasis on a responsive manufacturing infrastructure now require restoring or increasing the capacity of these materials and component capabilities.

## **Workforce**

Effective deterrence would be impossible without the vital contributions of NNSA's talented and dedicated workforce. NNSA must have a sufficient workforce, with the right capabilities, to ensure we can modernize the nuclear deterrent as well as carry out the full scope of NNSA's missions. To effectively accomplish our mission deliverables, including major modernization programs like the B61-12 LEP and the W88 Alt 370, NNSA's workforce must be aligned to meet the mission needs of today and those in the future.

NNSA's expanding and challenging national security missions require us to recruit, train, and retain a highly skilled and dedicated federal employee and M&O contractor workforce. A skilled federal workforce is required to execute appropriate program and project oversight as NNSA's NSE is busier than it has been since the end of the Cold War. Funding alone will not

accomplish this task; NNSA must continue to fully exercise its human resource authorities to attract, recruit, and retain its world-class workforce and provide its highly-talented men and women with the necessary tools to support their work.

## **Conclusion**

NNSA's diverse missions are critical to the national security of the United States: maintaining the safety, security, reliability, and effectiveness of the nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism around the world; and providing naval nuclear propulsion to the U.S. Navy's fleet of aircraft carriers and submarines.

NNSA is uniquely situated to deliver a safe, secure, and reliable nuclear weapons stockpile for the 21st century. NNSA continues to progress towards our milestones on every modernization program. Our efforts are closely coordinated with DoD to ensure we meet their requirements and integrate with their nuclear weapons delivery systems, while enhancing the safety and security of the Nation's stockpile.

By investing in NNSA's NSE and continuing our efforts to modernize our scientific, technical, and engineering capabilities and infrastructure, NNSA will continue to deliver on its nuclear security mission.