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HEARING
ON
NATIONAL DEFENSE AUTHORIZATION ACT
FOR FISCAL YEAR 2022
AND
OVERSIGHT OF PREVIOUSLY AUTHORIZED
PROGRAMS
BEFORE THE
COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED SEVENTEENTH CONGRESS
FIRST SESSION

SUBCOMMITTEE ON STRATEGIC FORCES HEARING
ON
**FISCAL YEAR 2022 BUDGET REQUEST
FOR NUCLEAR FORCES AND ATOMIC
ENERGY DEFENSE ACTIVITIES**

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CONTENTS

	Page
STATEMENTS PRESENTED BY MEMBERS OF CONGRESS	
Cooper, Hon. Jim, a Representative from Tennessee, Chairman, Subcommittee on Strategic Forces	1
Turner, Hon. Michael R., a Representative from Ohio, Ranking Member, Subcommittee on Strategic Forces	1
WITNESSES	
Dalton, Melissa, Acting Secretary of Defense for Strategy, Plans, and Capabilities, U.S. Department of Defense	2
Dawkins, Lt Gen James C., Jr., USAF, Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, U.S. Air Force	7
Verdon, Charles P., Acting Administrator, National Nuclear Security Administration	4
Wolfe, VADM Johnny R., Jr., USN, Director, Strategic Systems Programs, U.S. Navy	6
APPENDIX	
PREPARED STATEMENTS:	
Cooper, Hon. Jim	33
Dalton, Melissa	36
Dawkins, Lt Gen James C., Jr.	70
Turner, Hon. Michael R.	34
Verdon, Charles P.	46
Wolfe, VADM Johnny R., Jr.	57
DOCUMENTS SUBMITTED FOR THE RECORD:	
[There were no Documents submitted.]	
WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING:	
[The information was not available at the time of printing.]	
QUESTIONS SUBMITTED BY MEMBERS POST HEARING:	
Ms. Cheney	90
Mr. Langevin	83
Mr. Moulton	88
Ms. Stefanik	89
Mr. Turner	84

FISCAL YEAR 2022 BUDGET REQUEST FOR NUCLEAR FORCES AND ATOMIC ENERGY DEFENSE ACTIVITIES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON STRATEGIC FORCES,
Washington, DC, Thursday, June 10, 2021.

The subcommittee met, pursuant to call, at 11:03 a.m., via Webex, Hon. Jim Cooper (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. JIM COOPER, A REPRESENTATIVE FROM TENNESSEE, CHAIRMAN, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. COOPER. The hearing will come to order. I would like to begin by thanking our distinguished panel of witnesses for testifying today. We look forward to hearing from each of you. First, Ms. Melissa Dalton, the Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities; Dr. Charlie Verdon, the Acting NNSA [National Nuclear Security Administration] Administrator; Vice Admiral Johnny Wolfe, Director of U.S. Navy Strategic Systems Programs; and Lieutenant General James Dawkins, U.S. Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration.

In reading through your testimonies, we are reminded that the work of this subcommittee is probably the most important, technical, and consequential of any committee in the House. I would also like to point out the astonishing continuity over recent years in funding and support of the triad and nuclear programs. Seldom do you see this level of bipartisanship in modern-day Washington, but I am glad that it is occurring in our number one defense priority.

I ask unanimous consent that the remainder of my opening statement will be inserted in the record and I turn over the opening statement to my colleague, Ranking Member Mr. Turner.

[The prepared statement of Mr. Cooper can be found in the Appendix on page 33.]

STATEMENT OF HON. MICHAEL R. TURNER, A REPRESENTATIVE FROM OHIO, RANKING MEMBER, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. TURNER. Thank you, Mr. Chairman. I appreciate your holding this hearing and I appreciate your bipartisan commitment to these topics. I too will ask that my statement be entered into the record, and I am going to summarize a few of the points.

But, one, I know, obviously, we are under a great deal of pressure having gotten the budget so late, so I am very concerned

about the effects of a CR [continuing resolution] and I am looking for the witnesses to discuss what that might be. Certainly, in the nuclear enterprise and the nuclear modernization, the effects of a CR are felt much more strongly. I also want to point out that Congress has the ability to change this, not just by getting our work done but because the fiscal year is statutory not constitutional. And we should probably change this. It could pick up at least 3 months a year for the Department of Defense if we made the fiscal year the calendar year.

I am disappointed in the top line in the President's budget. It does not keep up with inflation as we look to those of our adversaries—China, Russia, North Korea, and Iran—that are modernizing. I think that there is a lot that we need to be focusing on and we are going to certainly be in a resources crunch. There has been a lot of bipartisan work as you have said, Mr. Chairman, on all the issues that fall under our committee.

I am very concerned and I think we are all shocked to have heard the news of the Acting Secretary of the Navy appearing to take action to zero out the sea-launched cruise missile. This is something that is incredibly important. We just saw in the news also that the Secretary of Defense and the Chief of Staff, apparently, were not informed. We know that the Nuclear Posture Review isn't underway, and yet we have the first steps towards actions that would be unilateral disarmament.

And, of course, even for those who wish to reduce nuclear forces, the best way to accomplish that is through arms control and you can't achieve arms control if you unilaterally give away assets that could be both beneficial to deterrence and/or beneficial to negotiations. I am looking forward to our witnesses today to discuss their thoughts on that breaking news.

With that, Mr. Chairman, I yield back and the rest of my statement will be entered into the record.

[The prepared statement of Mr. Turner can be found in the Appendix on page 34.]

Mr. COOPER. I thank the gentleman.

The first witness, Ms. Dalton.

STATEMENT OF MELISSA DALTON, ACTING SECRETARY OF DEFENSE FOR STRATEGY, PLANS, AND CAPABILITIES, U.S. DEPARTMENT OF DEFENSE

Ms. DALTON. Chairman Cooper, Ranking Member Turner, and distinguished members of the subcommittee, thank you for the opportunity to testify today. May I request permission to submit my written statement for the record and provide brief opening remarks?

Mr. COOPER. Without objection, so ordered.

Ms. DALTON. Thank you. As I described to the subcommittee in April, the United States today faces a complex global threat environment characterized by increasingly sophisticated and militarily capable strategic competitors, destabilizing regional dynamics, and accelerating technological changes that pose significant dangers.

China is rapidly becoming more capable and assertive, and concerns regarding its nuclear modernization and expansion are increasing. Russia's comprehensive modernization of its nuclear capa-

bilities, over 80 percent complete, includes the addition of new dual-capable systems that threaten the United States and its allies and partners. We are confronted with multifaceted deterrence challenges across domains from both competitors, which add increased escalation risks, all making deterrence more challenging. And strategic risks emanating from both North Korea and Iran add significant complications to the strategic threat picture.

For these reasons, nuclear deterrence remains the Department's highest priority mission, but more is needed to confront these growing, multifaceted threats. That is why Secretary Austin has directed a National Defense Strategy focusing on integrated deterrence, an effort to address threats and opportunities across conventional, cyber, space, hybrid, information, and nuclear domains.

With regard to nuclear deterrence, our nuclear forces remain essential to ensure no adversary believes it can ever employ nuclear weapons for any reason, under any circumstances, against the United States or our allies and partners without risking devastating consequences. That is why the nuclear triad remains the bedrock of our strategic deterrence, but we must modernize our aging capabilities to ensure a credible deterrent for the future.

The President's fiscal year 2022 budget submission supports our efforts to modernize the nuclear triad. It funds all critical DOD [Department of Defense] nuclear modernization requirements, helping to ensure that modern replacements will be available before aging systems reach the end of their extended service lives. The fiscal year 2022 budget request for nuclear forces is \$27.7 billion. This includes \$15.6 billion to sustain and operate our current nuclear forces, and \$12.1 billion for recapitalization programs.

This modernization effort is at a critical juncture given our aging platforms. As Secretary Austin has stated, U.S. nuclear weapons have been extended far beyond their original service lives and the tipping point where we must simultaneously overhaul these forces is now here. Updating and overhauling our Nation's nuclear forces is a critical national security priority. Even as we continue with nuclear modernization, we will continually review ongoing programs to assess their performance, schedule, risks, and projected costs. The Department will always seek to balance the best capability with the most cost-effective solution.

Our pending review of nuclear policy and posture, which will be nested under the National Defense Strategy, will ensure that we have the right capabilities to meet our priorities now and in the future. The review will allow us to examine our nuclear posture and policy with an eye towards acting on direction in the administration's Interim National Security Strategic Guidance that the United States takes steps to reduce the role of nuclear weapons in our National Security Strategy while ensuring our strategic deterrent remains safe, secure, and effective, and that our extended deterrence commitments to our allies remains strong and credible.

In so doing, our review will focus on the vital interests of the United States and our allies and partners. It will be informed by current and projected global security environment, trends, threats posed by potential adversaries and the capabilities of the United States and our allies and partners to address those threats; the roles of nuclear weapons; a strategy to reduce those roles and the

impacts of policy, posture, and capabilities on strategic stability; and the risks of miscalculation.

Consultation with allies will be a core component of this review and we have begun engaging with allies to ensure that their views are heard and understood before reaching any conclusions. Unique to this review and consistent with the interim guidance, preserving strategic stability will be a significant area of analysis in the review. Steps in this respect have already started with the extension of the New START [Strategic Arms Reduction] Treaty, and further analysis based on the President's priorities will occur as our strategic reviews proceed. We look forward to keeping Congress informed as we conduct these reviews.

Mr. Chairman, let me conclude by thanking this subcommittee for its previous support for nuclear deterrence and the opportunity to testify. I look forward to your questions.

[The prepared statement of Ms. Dalton can be found in the Appendix on page 36.]

Mr. COOPER. Thank you very much, Ms. Dalton.

Every witness statement will be inserted for the record by unanimous consent, so I will ask you gentlemen to limit your remarks, as Ms. Dalton did excellently, to about 5 minutes.

The next witness will be Dr. Verdon.

STATEMENT OF CHARLES P. VERDON, ACTING ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Dr. VERDON. Thank you.

Chairman Cooper, Ranking Member Turner, and members of the subcommittee, thank you for the opportunity to testify today. On behalf of our entire national security enterprise workforce, I express our appreciation for this subcommittee's strong bipartisan support for NNSA's nuclear security missions as demonstrated most recently in fiscal year 2021 National Defense Authorization Act, and fiscal year 2021 budget for the Department of Energy.

We meet today against the backdrop of a world marked by growing security challenges. China and Russia are modernizing their nuclear arsenal, investing significant resources in delivery platforms that have made clear that nuclear weapons will be a vital element to their statecraft. At the same time, the risk for proliferation of nuclear weapons and other weapons of mass destruction pose profound and existential dangers.

Recognizing these global security challenges, the President's fiscal year 2022 budget request for \$19.7 billion for NNSA reflects support for the three enduring missions for which Congress charged the NNSA in 2000: ensuring the safety, security, and effectiveness of the U.S. nuclear stockpile; reducing the threat of nuclear proliferation and nuclear terrorism around the world; and providing nuclear propulsion for the U.S. Navy's fleet of aircraft carriers and submarines that is critical to the U.S. national security and our allies.

[Inaudible.]

Dr. VERDON. [continuing]. Stockpile. Our alignment and synchronization—

[Inaudible.]

Dr. VERDON. [continuing]. To improve. The fiscal year 2022 budget request enables NNSA to execute its nuclear warhead and infrastructure modernization efforts begun under the Obama/Biden administration. The administration is beginning to undertake a formal review of efforts to modernize our nuclear deterrent to include DOD delivery platforms, the nuclear weapons required under those platforms, and the NNSA infrastructure needed to produce and maintain those weapons.

Regardless of the review's specific findings, so long as we retain a nuclear arsenal we must have the infrastructure, science, technology, and engineering to produce and maintain the nuclear weapons stockpile. Unfortunately, the NNSA's production infrastructure has atrophied considerably, both in terms of the physical infrastructure and the capabilities needed within those facilities. Continued recapitalization is imperative. The potential impacts to the U.S. deterrent if not addressed are no longer over the horizon.

Of particular importance is reestablishing the capability to manufacture plutonium pits. This capability is needed to address risks due to plutonium aging, degrading warhead performance, improve warhead safety and security, and provide the ability to respond to evolving threats to the U.S. nuclear deterrent. We fully recognize that the potential impacts of plutonium aging on warhead performance are uncertain at this time. Plutonium didn't exist—at least we didn't know about it—until, you know, before 1940, and simply has not been in existence on the planet long enough to have concrete data on how our pits will behave when they are approaching a century old.

Given this, it is an assessment of our best technical experts in the weapons program, the three NNSA laboratory directors, and independent experts like the JASONS, that the risk is just too high not to have the capability to manufacture plutonium pits at a rate sufficient to refresh the stockpile's pits before they exceed 80 to 100 years in age.

In addition to our mission to ensure the continued effectiveness of the nuclear stockpile, nonproliferation also remains an important and growing priority. The NNSA's Defense Office of Nuclear Nonproliferation is critical to implementing the President's call to lock down fissile material and radiological materials around the world. The fiscal year 2022 budget request enables NNSA's Defense Office of Nuclear Nonproliferation to continue to work worldwide with our partners to prevent state and non-state actors from developing nuclear weapons or acquiring materials usable in nuclear weapons.

With regards to our third mission of providing nuclear propulsion for the U.S. Navy, the Office of Naval Reactors remains at the forefront of technological developments in naval propulsion by advancing new technologies and improvements in naval reactor performance. This preeminence provides the U.S. Navy with a commanding edge in naval warfighting capabilities and the fiscal year 2022 budget request enables NNSA's Office of Naval Reactors to continue their programs which are so vital to the security of our Nation and the allies.

In closing, despite the challenges posed by COVID [coronavirus] pandemic, I am pleased to report that the NNSA did not miss a single major milestone or DOD requirement. This achievement is

a testament to the professionalism in NNSA's world-class workforce, the leadership of our sites, and their commitment to national security. In fact, I am happy to report that as we speak today, the system first production unit for the W88 Alt [Alteration] 370 is being assembled at Pantex. So I thank you again for the strong support of this committee and the opportunity to testify before you today and I stand ready to answer any questions you may have.

[The prepared statement of Dr. Verdon can be found in the Appendix on page 46.]

Mr. COOPER. Thank you very much, Dr. Verdon. Now we will hear from Vice Admiral Johnny Wolfe.

**STATEMENT OF VADM JOHNNY R. WOLFE, JR., USN,
DIRECTOR, STRATEGIC SYSTEMS PROGRAMS, U.S. NAVY**

Admiral WOLFE. Chairman Cooper, Ranking Member Turner, and distinguished members of the subcommittee, thank you for the opportunity to testify. I would like to thank this subcommittee for its continued support of the Navy's nuclear deterrent mission. As you heard from Admiral Richard, Commander, U.S. Strategic Command, nuclear deterrence underwrites every U.S. military operation and capability on the globe and serves as the backstop for both our national defense and the defense of our allies.

The Nation's nuclear triad of intercontinental ballistic missiles, strategic bombers, and ballistic missile submarines serves as the bedrock of our ability to deter major power conflict, assure our allies and partners, achieve U.S. objectives should deterrence fail, and hedge against an uncertain future. The Navy has provided unwavering and singular mission-focused support to the sea-based leg of the triad for over six decades.

We must sustain today's deterrent while modernizing for the future. This falls into four concurrent lines of effort. First, we must maintain the current D5LE [D5 Life Extension] missile inventory and provide the necessary operational support to sustain *Ohio*-class submarines through their service lives. This is being accomplished through an update to all of our subsystems. All of our life extension efforts remain on track and our current program will support the deployment of all existing warheads. We must also recapitalize our strategic weapons facilities to continue to support and sustain SSP [Strategic Systems Programs] and operations that enable our continuous at-sea presence.

Second, we must continue to work with our partners at PEO [Program Executive Office] *Columbia* to ensure that the transition between *Ohio*-class and *Columbia*-class submarines stays on schedule. For SSP, this requires a seamless transition of the current D5LE weapons system and missile inventory onto the new *Columbia* class. During this time of transition, we will ensure that the Navy's portion of the nuclear triad remains credible by introducing the W93 Mark 7 to rebalance the stockpile of W76 and W88s and meet STRATCOM [United States Strategic Command] requirements.

Third, it is imperative that we start the work on a future missile and corresponding weapons systems now. This next generation of the current D5LE missile, a missile in service since 1989 and boasting a remarkable history of 182 successful flight tests is called

D5LE2. D5LE2 will yield multiple benefits in missile performance to include extending its service life. D5LE2 is required to completely outload our *Columbia*-class SSBNs and ensure that Trident remains credible in the face of a dynamic threat environment. A D5LE2 missile must be developed, tested, and produced with a lead time sufficient to deploy on *Columbia*-class Hull 9 in fiscal year 2039. It will then be backfitted for the first eight hulls of the class.

Lastly, one of the greatest advantages the United States has is its alliances and partnerships. As the U.S. project officer for the Polaris Sales Agreement, I will continue to support the U.K.'s [United Kingdom's] sovereign deterrent for today's *Vanguard*-class submarines and their successor, the *Dreadnought*-class. For decades, U.S. policy has recognized that the independent British nuclear deterrent adds to global stability. Under the 1958 Mutual Defense Agreement and the 1962 Polaris Sales Agreement, the United States has provided assistance and material consistent with international law to the U.K. deterrent program. Without this assistance, the cost and schedule risk to maintain the U.K.'s independent deterrent would rise significantly, thus creating additional challenges for the U.K. in sustaining its nuclear contribution to NATO [North Atlantic Treaty Organization] alongside the U.S.

None of these four lines of effort are possible without investment in our people, our infrastructure, and our industrial base. Military, civilian, government, and contractor, the men and women of SSP are working hard to deliver a safe, secure, and effective strategic weapons system today that will serve us well into the latter half of the century. They remain my number one priority in order to ensure continued program success. Nuclear modernization will take time to complete, so work towards these ends must start now and cannot be delayed. It is only through your continued support that the Department's top modernization priorities can be achieved.

As the 14th director, it is my highest honor to represent the men and women of SSP comprising approximately of 1,700 sailors, 1,000 Marines, 300 coastguardsmen, and over 1,300 civilians and over 2,000 contractor personnel. It is my most critical goal to ensure they are poised to execute the mission with the same well of success, passion, and rigor both today and tomorrow as they have since our program inception in 1955.

Thank you for the opportunity to testify today on behalf of the men and women who make deterrence of major power conflict their life's work. I look forward to your questions.

[The prepared statement of Admiral Wolfe can be found in the Appendix on page 57.]

Mr. COOPER. Thank you, Admiral Wolfe. And now we will hear from Lieutenant General James Dawkins.

STATEMENT OF LT GEN JAMES C. DAWKINS, JR., USAF, DEPUTY CHIEF OF STAFF FOR STRATEGIC DETERRENCE AND NUCLEAR INTEGRATION, U.S. AIR FORCE

General DAWKINS. Chairman Cooper, Ranking Member Turner, and distinguished members of the subcommittee, thank you for inviting me to appear before you today to represent the dedicated men and women of the Air Force's nuclear enterprise. Along with my teammates here at the table, the airmen of the United States

Air Force remain committed and work tirelessly to continuously provide the Nation a safe, secure, effective, and credible nuclear deterrent. This commitment has become even more significant given the age of our systems and the nature of the current security environment.

The first time in our Nation's history we are on a trajectory to face two nuclear-capable, strategic peer adversaries. Russia has multiple types of nonstrategic nuclear weapons deployed or in research and development including short- and close-range ballistic missiles, cruise missiles, and anti-ship missiles. Three of Russia's novel strategic systems and its nonstrategic nuclear weapons are not subject to the New START treaty's limits or verification regime. The People's Republic of China [PRC], as our principal pacing threat, is nearing completion of its own nuclear triad and will likely at least double their nuclear stockpile this decade. The pace of the PRC's weapons development is very concerning.

The U.S. nuclear triad remains the primary military means by which the Department of Defense provides deterrence against existential threats to our homeland and allies. The triad has remained the force posture of choice for each President and Congress since the 1960s. The flexible options it provides the President complicates an adversary's decision calculus should they wish to pursue aggression against the United States or our allies. However, the triad is showing its age as many of its weapon systems and infrastructure date back to the early 1960s. The President's fiscal year 2022 budget fully funds our modernization efforts to provide the necessary improvements to counter our potential adversaries' increasing capabilities.

The Air Force continues to achieve significant progress in our modernization programs to include the Ground-Based Strategic Deterrent [GBSD], Long-Range Standoff Weapon [LRSO], and B-21 Raider. The GBSD is leveraging cutting-edge digital engineering and has met every major milestone of the past 5 years. The Long-Range Standoff cruise missile and the B-21 are also on schedule. The B-52 modernization efforts are on track ensuring the aircraft remains relevant through the 2050s. In partnership with the United States Space Force, our nuclear command, control, and communication system remains secure and effective as we modernize capabilities ensuring future connectivity for leadership and strategic forces in an increasingly challenging cyber environment.

The Air Force is committed to providing stable requirements and delivering these modernized weapons system programs on time and on budget. However, we can't do this alone and we ask for the continued support of the Congress to give stable authorization and appropriation across both the Department of Defense and the National Nuclear Security Administration enterprise. We owe this not only to our Nation, but also to our airmen who are in some cases manning the same missile sites and flying the same aircraft as their grandparents did. Yet we demand and, in fact, depend on our success against threats that are far more lethal and sophisticated than their grandparents could have imagined to accomplish a mission that is vital to our Nation's security and survival. I thank the committee for your advocacy and I look forward to your questions.

[The prepared statement of General Dawkins can be found in the Appendix on page 70.]

Mr. COOPER. Thank you, General Dawkins. I appreciate the testimony of all the witnesses. I am grateful for your expertise and your patriotism.

All members will be limited to 5 minutes in questioning to more evenly distribute the questioning, and if there is time perhaps, we can do a second round. I will start off and have a question or two for Ms. Dalton.

You characterize in your testimony that Russia has already 80 percent recapitalized their nuclear forces. What percentage of completion or recapitalization would you put on our—America?

Ms. DALTON. Thank you so much, Mr. Chairman, again for having the opportunity to testify. On balance, I would have to get back to you in terms of relative percentage of the U.S. program, but I can tell you that as the Secretary has stated, we are at a critical point of being relatively behind and the need to modernize and recapitalize across all three legs of the triad.

So the investments that are made in the fiscal year 2022 budget submission do seek to modernize for the GBSB or the *Columbia*-class and for LRSO, and these are critical capabilities to ensure that we can keep pace with the challenges before us, principally China. And your question pivoted directly off of Russia, but I think, you know, the intelligence records suggest that China's nuclear modernization is accelerating at a very concerning rate. So as we proceed with our Nuclear Posture Review, we are going to be closely looking at both of those threat factors to help inform upcoming programmatic decisions.

Mr. COOPER. Thank you. I was about to turn to China, which seems to be, what, doubling or more their nuclear capabilities, plus they have road-mobile or underground or other advantages that we lack. And I believe they are not constrained by any treaty, right? We at least have the New START extension with Russia but that does not apply to China.

General Dawkins, you mentioned that there are three novel Russian nuclear systems that are not covered by New START. Could you remind us what those are?

General DAWKINS. Yes, sir. There is the underwater—the submarine with a nuclear-armed torpedo, a very large system there meant as, I guess, a weapon of vengeance to come up on our coast and detonate. Very hard to defend against, of course. There is a nuclear-powered, nuclear-armed cruise missile that they have that again, not to have—they are under development on these systems, I am sorry. Under development on these systems that they would be able to use and, of course, they could certainly deliver, and then—and they are very difficult to defend against those cruise missiles.

And the third one is—I am failing to remember. I can take that for the record. But I know they have got a host of other systems they are using and the small nuclear weapons that they have put on some of their air defenses and other things, sir.

[The information referred to was not available at the time of printing.]

Mr. COOPER. Thank you. Those are my questions. I will turn it over now to the ranking member.

Mr. TURNER. Thank you, Mr. Chairman. In my opening statement, I referenced the news making of the Acting Secretary of the Navy with respect to taking a step for the cancellation of the sea-launched cruise missile, a missile that both General Hyten and Admiral Richard have openly spoken as fans of. We know that Secretary of Defense and the Chief of Staff have both reported in the news that they were unaware of this action and were not consulted. Admiral Richard said that he heard about it on the news.

Admiral Wolfe, can you tell me what you know of this action and if you could also then in your answer, in addition to what is happening over at the Pentagon with the sea-launched cruise missile that has had this subcommittee and committee's support, can you tell us about, you know, what Russia's programs are and what their sea-launched cruise missiles are capable of? Because certainly we need to take into consideration what our adversaries are doing whenever we take a step to review our own commitment to our own systems. Admiral.

Admiral WOLFE. Yes, sir. Thank you for the question, sir. So I had read the SECNAV [Secretary of the Navy] memo. I had not—I was not privy to it before it was actually signed. But my understanding is for the SECNAV it was part of a deliberate process to start the dialogue for building the next POM [Program Objective Memorandum]. I would point out, however, sir, nuclear modernization for the program of record for D5LE2, for *Columbia*, for TACAMO [Take Charge and Move Out], for our portion of the air is solid and it will continue and should continue to be fully funded to all of the estimates. I would also point out that in starting that dialogue, he does point out that it is not a decision. It is meant to get the dialogue started. And, of course—

Mr. TURNER. Well, I have got to tell you just to insert, it is a hell of a way to start a dialogue is to call for the canceling. But go ahead. You were going to talk about our adversaries, because I do have limited time.

Admiral WOLFE. Yes, sir. Understand. Yes, and from an adversary perspective, I think what General Dawkins talked about and what we all know is as Russia continues to look at how they can build some of these what they call tactical nuclear capabilities, certainly cruise missiles are a big part of that. Because I believe that they look at that as an advantage that they can even in some of their dialogue on escalating to deescalating that provides a significant advantage to them.

Mr. TURNER. Thank you.

Ms. Dalton, you know, this announcement in the news comes just on the precursor of the President sitting down with Putin. I believe that unilateral disarmament is certainly, you know, as a policy, idiotic because we don't have a support for our deterrence and certainly we have no bargaining chips when we meet with our adversaries. Doesn't this weaken President Biden as he goes to sit down with Putin and say, "Hey, we should start more arms control negotiations," where his own staff are talking about unilaterally stopping programs that are both important to our deterrence and may be the subject of arms control negotiations?

Ms. Dalton.

Ms. DALTON. Representative Turner, in the President's budget request for fiscal year 2022 from a policy perspective, the Department had intended to provide a modest amount of funding for SLCM [sea-launched cruise missile] and plans to revalidate that requirement in the course of the Nuclear Posture Review [NPR]. That is still our intent to look closely at this program in the NPR. And I would say in terms of the administration's approach to our arms control negotiations we do not support unilateral disarmament, but we—

Mr. TURNER. Well, this point that you made here, so the Nuclear Posture Review, has it commenced?

Ms. DALTON. It is on the cusp of commencing, sir, so it is—

Mr. TURNER. It hasn't even commenced, but yet you have people in the chain of the administration already targeting systems for canceling. Isn't that—I mean isn't the Nuclear Posture Review supposed to be like adversary risks-driven, capabilities-driven? How is it that one system could be singled out when you haven't even begun the Nuclear Posture Review?

Ms. DALTON. Sir, it is our intent to look closely at the SLCM program within the context of the Nuclear Posture Review and make programmatic decisions for fiscal year 2023 based upon that objective analysis.

Mr. TURNER. Ms. Dalton, when you were before us before, the last time, we were talking about there were some proposals that people had tried to latch onto for Minuteman life extension programs that were—it was known as like the "best 200." You said that you don't have an ongoing study, you are just updating previous studies. We don't have a copy of the previous best 200 study that was completed at the end of the Obama administration. Would you commit to providing that to the committee?

Ms. DALTON. Happy to follow up with that, sir.

Mr. TURNER. Okay. If you could get that to us this week, we would appreciate it. We are coming back next week, as you know, and it would be very timely for us to be able to look at it.

General Dawkins, you have indicated that the Ground-Based Strategic Deterrent is \$38 billion less than the Minuteman III life extension program. Could you elaborate on that? It keeps coming up as a discussion item. Not only are we gaining with the Ground-Based Strategic Deterrent additional capabilities, but it is clear from your understanding that it is both the most cost-effective path, correct?

General DAWKINS. Yes, sir. Thank you for the question. And that is true, sir. The GBSD, from the minute that—or from the time we did the analysis of alternatives back in 2014, it was shown to be more cost effective than life-extending the Minuteman III over the course of the entire weapons system out to 2075. That \$5 billion difference back then in 2014 has since grown to \$38 billion now. So again, it is \$38 billion more expensive to life-extend the Minuteman III. This is primarily—yes, sir.

Mr. TURNER. No, I was going to jump to my last question to go to Dr. Verdon. Real quickly, you have given us in classified session the justification for ensuring that we needed both Los Alamos and Savannah River in order to be able to hit our 80 plutonium pits.

What can you tell us in open session of the need for the Savannah River Plutonium Processing Facility?

Dr. VERDON. So again, we would say all of our analysis still indicates that the two-site solution that we identified is the most susceptible in terms of both capacity, schedule, and cost way for us to implement and meet the 80 pits per year. When we look at the schedule, when we look at the cost, it still comes out to be the most effective way for us to implement and to achieve that requirement is to take advantage of both the existing facilities at Los Alamos and at Savannah River to implement pit production.

Mr. TURNER. And you are not able to just do it all at Los Alamos, correct?

Dr. VERDON. Doing it, no. It would require building a whole new facility at Los Alamos to be able to do it. PF-4 is not large enough.

Mr. TURNER. Thank you.

I yield back, Mr. Chairman. Thank you.

Mr. COOPER. I thank the gentleman. The next questioner will be Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman. I want to thank our witnesses for their testimony today. Let me begin with this. The President's budget request included an additional \$700 million for the *Columbia* above the expected fiscal year 2021 estimates due to an updated cost estimate assessment and a program evaluation review.

Vice Admiral Wolfe, do you believe this assessment is accurate and that the funding in the budget is adequate?

Admiral WOLFE. Yes, sir. Thanks for the question. So I did talk to Admiral Pappano from PEO *Columbia* and yes, sir, based on the CAPE [Director of Cost Assessment and Program Evaluation] estimate that was completed in August of 2020, which is what the new estimate and the reason for the increase in request for this fiscal year, it is consistent with everything that the Navy has seen that what the CAPE has done and we have funded to that CAPE estimate. So yes, sir. We believe it is accurate.

Mr. LANGEVIN. Very good. Thank you.

Dr. Verdon, so I have been interested for some time now in developing low-enriched uranium fuel for submarine propulsion. In doing so would prevent us from having to restart production of weapons-grade uranium and it also can't be stolen for that purpose. I wanted to ask for the record, will NNSA continue to support effort to study the viability of this critical nonproliferation effort should additional funding be made available?

Dr. VERDON. We are committed to this and continue to look at that. We are still working with the administration to balance the requirements of both the nonproliferation requirements and also the Navy's operational requirements. So that still continues to be a study but we are continuing to look at what are the technical feasibilities of doing it, but the broader administration is taking a hard look also at the balance of the nonproliferation goals against the Navy's operational requirements as well.

Mr. LANGEVIN. Thank you. Thank you.

Vice Admiral Wolfe, in your testimony you mentioned that we can no longer wait to invest in critical workforce skills and in com-

plex technologies. What types of programs should Congress be encouraging?

Admiral WOLFE. Yes, sir. I think with what we do with our workforce, looking at the critical technologies, things like rad-hard [radiation hardening] and those that are very unique to what General Dawkins' organization and what we do, I think we very much put a premium on education and programs that encourage our folks to continue their education as well as to hone their skills for these critical programs.

Mr. LANGEVIN. Thank you. I—again, we need to focus heavily on a workforce development especially where we have significant gaps. It is in our national interest to address those gaps sooner rather than later.

The final question I had for General Dawkins. Are your NC3 [nuclear command, control, and communication] modernization efforts meeting their scheduled performance and budget metrics?

General DAWKINS. Yes, sir. For the most part they are. We have got—I could go into an acronym soup here, but some of the new systems to replace our current systems that provide advanced high-frequency capability to our missile sites and several other upgrades are again on time and tracking well. There have been some systems that are producing the learning of the crew force, if you will, that we are getting our requirements correct and ensuring that those are going to be on track for the future. But for the most part, sir, we feel that we are in a good place but this will take renewed focus or a constant focus to ensure that we don't get behind.

Mr. LANGEVIN. Okay. Well, this is something that we are going to continue to track. We look forward to staying in touch with you on that topic. Those are the questions I had for this point. Mr. Chairman, I yield back the balance of my time.

Mr. COOPER. Thank you, Mr. Langevin.

Now, Mr. Wilson.

Mr. WILSON. Thank you, Chairman Jim Cooper and Ranking Member Mike Turner, for the bipartisan cooperation on putting together this very important hearing and we appreciate each one of the witnesses.

And Administrator Verdon, according to the President's budget, the Critical Decision 1 [CD1], the Savannah River Plutonium Processing Facility is expected to be released sometime this month of June. And is that timeline still accurate, and if so, will that create the first credible cost and schedule baseline and does the President's budget match what was revealed through the NNSA's initial review of the paperwork?

Dr. VERDON. So yes, sir. We are still on track to accomplish the CD1 approval requests before the Deputy Secretary and by the middle of this month. And, indeed, the fiscal year 2022 budget request has the funding in there necessary that if we get the approval to do the work to progress towards Critical Decision 2 to continue to mature the design.

Mr. WILSON. Well, thank you very much. And as you well know, NNSA is so well thought of at Savannah River Site. We wish you the best of success.

Additionally, Administrator, I appreciate your opening comments. I appreciate the very pithy and positive statements by Con-

gressman Mike Turner all the way from Dayton, Ohio. And the questioning and restating of the Department of Energy Secretary Jennifer Granholm; the NNSA nominee, Jill Hrugy; U.S. Strategic Command commander Admiral Charles Richard—all are on record supporting the two-sites solution. This shows clear bipartisan support from among the administrations.

Moving forward, what do you see is the biggest risk to delay in achieving 80 pits per year by 2030? Is it the funding? Should this be addressed in future budget requests?

Dr. VERDON. It will be—yes. It will be, what the funding that will be required will be, you know, one of the key factors, and then it is also how we manage the supply chain getting the critical equipment in, in a timely fashion. And we are beginning to work that issue as we speak to work with vendors to try to make sure we can optimize that between both the Savannah River requirements and the Los Alamos requirements. But certainly identifying the right funding profile that will—that can be, you know, afforded by the Nation will be one of the key factors.

Mr. WILSON. Thank you very much.

And, General Dawkins, numerous studies have shown a one-site pit production solution is cost prohibitive and does not provide the basic resiliency necessary for our nuclear infrastructure which is so crucial as we have discussed to have the deterrence to maintain peace through strength. From a defense perspective, what are the consequences to the credibility of our nuclear deterrence limiting pit production to one site production?

General DAWKINS. Sir, thank you for the question. And having served at NNSA several years ago, I know that they are challenged with the infrastructure that they have. We work very closely. We work also with the Nuclear Weapons Council within NNSA to ensure that the plans that we have are executable. I think we would—and across the Department, speaking for the Department—would be challenged to continue with all of our modernization programs out into the future. It would be difficult with a single site. Again, I am not the expert on that. Dr. Verdon, I could defer. I will defer to him, but I know that our Nation needs to be able to produce pits and having everything in one location might be, you know, it might be more strategically valuable to have a couple.

Mr. WILSON. Well, we actually—Savannah River Site looks forward to working collaboratively with Los Alamos and to achieve pit production which is so critical since many of the pits are 60 years or older. And so we have got to modernize, and I want to back you up and work with Chairman Cooper and Ranking Member Turner.

And, finally, a question for Secretary Dalton, and that is the Biden administration has expressed its intent to develop its own Nuclear Posture Review indicating a change in U.S. nuclear policy. What parts of the 2018 Nuclear Posture Review does the administration plan to change and what is the timeline for delivery?

Ms. DALTON. Thank you for the question. So we are just beginning the Nuclear Posture Review and we will be conducting that as I noted nested within the National Defense Strategy. Statutorily, we are required to deliver to Congress the NDS in January of 2022, so we are aiming for a similar timeline for the completion of the NPR. But as noted in my last honor to testify before you all,

I am happy to come up and brief you on some of our emergent findings of the NPR as we proceed this summer.

And in terms of the review of declaratory policy, that is obviously a Presidential-level decision. And so even as the Department progresses in its work on specific DOD aspects of nuclear posture, we will also be engaged in an interagency process to review the nuclear policy implications. But our North Star, to begin with, is the Interim National Security Strategic Guidance which indicates that this administration will take steps to reduce the role of nuclear weapons in our National Security Strategy while upholding our extended deterrence commitments to allies and partners and ensuring a safe, effective, and secure nuclear deterrent.

Mr. WILSON. Well, we look forward to working with you. I am confident about our Savannah. I now yield back.

Mr. COOPER. I thank the gentleman.

Now Mr. Moulton is recognized.

Mr. MOULTON. Thank you, Mr. Chairman. I want to thank everybody for coming here today and participating in this discussion and my colleagues on the committee because this couldn't be a more important topic.

Secretary Dalton, I would like to start with you. Hypersonic weapons, we have talked a lot about them recently, and they have the potential to be highly destabilizing, particularly if we pursue them blindly in a tit-for-tat with PRC or Russian development without carefully developing the operational concepts for their use. On the other hand, conventional hypersonic missiles could certainly change our adversaries' calculus in a way that reduces our reliance on nuclear weapons for strategic stability.

So, Ms. Dalton, do you believe we have a clear vision for how we integrate hypersonic capabilities into the U.S. arsenal in a way that deters rather than potentially increases the risk of a nuclear response?

Ms. DALTON. Thank you, Representative Moulton. It is a great question and I think this is why the Secretary has encouraged us in the course of the NDS to look at, holistically, at an integrated deterrence so we are not looking at any one domain or system in a silo. So, you know, to take the specific mention of hypersonic missiles, this administration is proceeding with investments in that capability because we think it is important to be able to keep pace with key challengers such as China and Russia to be able to respond with speed and at distance.

But as we are developing these capabilities, as you mentioned the importance of concepts of operations, we are doing a lot of leg work behind the scenes in classified channels to ensure that as we are developing out this capability we are doing so responsibly, and at present are only making investments in a conventional capability when it comes to hypersonic missiles. But this will be among the capabilities that we are looking at through this frame of integrated deterrence so that we can account for potential escalation risks as we look across different scenarios involving, particularly, China and Russia.

Mr. MOULTON. Madam Secretary, if I may say, integrated deterrence and some other things you have said are music to my ears and hopefully to the ears of others on the committee. But in a lot

of ways you have succeeded in saying a lot of good things without answering the question. It seems pretty clear that we don't have a strategy. And while it must be developed in classified terms, I understand that, it also needs to be clearly communicated to our adversaries which can't be entirely classified. So I look forward to hearing more about how you develop this. We have to have these operational concepts made clear before we spend billions of dollars on taxpayer money to develop weapons that we may not need or could actually make our strategic situation worse.

Let me move, if I may, to General Dawkins and Admiral Wolfe. Thank you both very much for your calls. We discussed on the phone in our extended conversations the importance of not only developing a highly technically qualified workforce, but retaining them. And I am anxious to hear how you measure your progress. What we are doing today is clearly not adequate. We are losing too much talent and it is going out the door quicker than we can count. How are you actually measuring your progress in better training, retaining, attracting, and retaining personnel?

General DAWKINS. Representative, thank you for that question. And that is something that is foremost on our mind particularly as we get, or going into the bow wave of modernization where all of these programs are ramping up. Whether it is finding workforce inside the Air Force itself or out in the industrial complex, that is something that OSD [Office of the Secretary of Defense] tracks closely that we track in the Nuclear Weapons Council and the Air Force is focused on that as well.

The way we track that is we do keep track of where—of our ability to hire. That is, you know, at times challenging because of the nature of the work we do and security clearances, but we do work with local universities. For instance, out with the Ground-Based Strategic Deterrence out at Utah, they work with local universities and other places to recruit these folks and bring them in and then offer the incentives that they can to actually retain them. And the broader Air Force—

Mr. MOULTON. I am afraid I am just about out of time and Chairman Cooper is quite strict with us as he should be. But if you could just take this for the record and share with us some of the statistics, the ways that you actually track this so we can see measurable progress on these fronts that would be very helpful.

Thank you, Mr. Chairman.

Mr. COOPER. I thank the gentleman.

Mr. Lamborn.

Mr. LAMBORN. Thank you, Mr. Chairman. Can you hear me okay?

Mr. COOPER. Yes.

Mr. LAMBORN. Okay, thank you.

Admiral Wolfe, I have a question for you, a background question about the sea-launched cruise missile, but first I just want to make a comment about the Acting Secretary's unilateral decision. It appears to me that he has gone rogue and I don't say that lightly. It appears to me that he has gone rogue because the people above him and the people below him are denying any knowledge of this decision and seem to be disavowing the decision. And, secondly, it comes at a horrible time. It really does damage to President

Biden's position vis-a-vis Mr. Putin and these upcoming discussions, so the timing could not be any worse.

But back to you, Admiral Wolfe. For background, what kind of capability does it give the United States and our strategic posture to be able to have the capability and flexibility that a sea-launched cruise missile provides?

Admiral WOLFE. Sir, at a very high level I can answer that. I really believe that Admiral Richard could really give you in a classified setting what the real capabilities. But what I would tell you is, it gives—if you think about deterrence, it gives you another decision tool for the President and for STRATCOM. And what it really does is it causes yet another calculus thought that the adversary has to have before they think that we would have to use something bigger than a sea-launched cruise missile. So it does provide many options to continue this deterrent thought process.

Mr. LAMBORN. Thank you so much.

General Dawkins, I have a couple of questions for you. I am going to focus in on the MILCON [military construction] projects that are intended to be accomplished out at Vandenberg Air Force Base and for software at Hill Air Force Base in support of GBSD. If those MILCON projects were not funded in this year's NDAA [National Defense Authorization Act] and appropriation bills, how much would that set back the GBSD program and how detrimental would that be?

General DAWKINS. Sir, thank you for the question. And as you are aware, the Vandenberg Space Base, Space Force Base is where we do our testing. We typically do four, what we call a "Glory Trip," ICBM [intercontinental ballistic missile] launch testings each year. As we transition to GBSD, our first test, our first flight for the GBSD missile will be 1 December of 2023. I know that they need to get to start that work out there at Vandenberg in order to facilitate this test. I would like to take it for the record though to get you the exact impacts if we do not get the full funding in the MILCON or it slips. But I do know there will be impacts, sir.

Mr. LAMBORN. And those would be negative impacts.

General DAWKINS. Yes, sir.

Mr. LAMBORN. Okay, thank you.

Changing gears, General Dawkins, I would like to hear you respond to something that Admiral Richard pointed out. He said that if we ever reduce the number of ICBMs or, God forbid, remove the leg of that triad completely that that would, "solve a critical problem for China." So could you elaborate on what he was referring to about China's calculus if we degrade the ability of our land-based leg of the triad?

General DAWKINS. Yes, sir. So without ICBMs, we quickly will turn China into a peer adversary. And so when we look at how the ICBM force is a ready and responsive force and most responsive of the legs of the triad, it provides a pretty—it enhances strategic stability by providing a great deterrent against an adversary, because they know that if they were to do us, mean to do us harm as a nation, it would have to be a fairly large attack for them to do that.

And, in fact, they would be attacking the homeland and that would—that in and of itself enhances deterrence and will make them or any central adversary perhaps take a step back and go, "do

we really want to commit to a large-scale attack against the United States homeland?”

Mr. LAMBORN. Thank you. And how serious of a problem is it for us to not have any kind of treaty or any kind of verification or knowledge of what China is doing with its tunnel system, with its ability combined with mobile launchers to hide the existence of and the number of ICBMs that they might have?

General DAWKINS. So, sir, I am a big believer in arms control treaties that are verifiable and executable or enforceable. You know, a lot of our treaties are based on simply numbers and I think it is important also to look to capabilities as an important part of that as well.

Mr. LAMBORN. Okay. Thank you, Mr. Chairman. I yield back.

Mr. COOPER. I thank the gentleman.

Mr. Panetta.

Mr. PANETTA. Thank you, Mr. Chairman. I appreciate your understanding in getting me in to ask questions.

Just real quick, Ms. Dalton, obviously, thanks. Thanks to all the witnesses for being here and thank you for your service. But, Ms. Dalton, when does the administration plan to complete its Nuclear Posture Review and when will it begin and what exactly will it entail going forward?

Ms. DALTON. Thank you, Representative Panetta, for the question. So as I mentioned in my opening remarks, the NPR will be nested within the National Defense Strategy and we are just commencing the NPR leg, if you will, of the strategic reviews. We plan to structure it in such a way that there will be decision off-ramps as we get into the end of the POM build and into the PBR [President's budget request] season such that, you know, the objective analysis that we do in the NPR can feed into programmatic decisions that are relevant for the fiscal year 2023–27 FYDP [Future Years Defense Program].

In terms of what we plan to cover in the NPR, as noted earlier there will be a look at declaratory policy which we will do in concert with the interagency. There will be a thorough assessment of the security environment. Many things have changed since the last time there was a Democratic administration in power that we will need to be cognizant of and we will look to define based on the integrated deterrence frame, which I know is still in development and, you know, we will be able to say more on as we move forward how that relates to thinking about the use of strategic forces like nuclear weapons in that deterrence construct. And then as I noted, the specific implications then for programs and modernization. So in brief, those are the areas for examination.

Mr. PANETTA. Okay. In regards to that and in regards to the nuclear command and control modernization, do you believe that there will be a review in regards to the sole launch authority of the President?

Ms. DALTON. So I know that that is a question that has come up in some of the early consultations that we have had with outside groups and we are committed to taking input from all stakeholders across the nuclear committee to help inform our review.

Mr. PANETTA. And that will include this subcommittee right here?

Ms. DALTON. Yes, absolutely.

Mr. PANETTA. Outstanding. Great. Thank you. I appreciate that and look forward to working with you.

Mr. Chairman, thank you. I yield back.

Mr. COOPER. I thank the gentleman.

Mr. Waltz.

Mr. Waltz.

Mr. WALTZ. Thank you. Yes, thank you, Mr. Chairman. And thank you. Thank you to all of our witnesses.

General Dawkins, yes, I think there is kind of a common criticism or belief out there that ICBMs are on a “hair trigger alert.” Can you tell us about the redundancies built into the launch system as well as how they are actually targeted out in the open ocean and how those are built in to assuage some of those concerns?

General DAWKINS. Yes, Representative, thank you for the question. So that is a misnomer. While the ICBMs are ready and responsive and we do have crew members, two crew members down there in the launch control centers awaiting a Presidential order, it requires an order from the President to be transmitted through our NC3 systems down to the crew members and for them to decode any of those orders they get, ensure that they are verifiably from the President and otherwise.

As far as the process goes, the President, if necessary, if we are under attack of some sort, the President has—we have a means to bring the President into a conference, the Department of Defense does, and Joint Staff, to ensure, and he can also bring all of his senior advisors across the national security complex, and any ones that he wants into this conference to discuss how to respond. It is a very measured process. And then the President can decide whether he wants to respond with nuclear weapons or choose something else.

The great thing about the triad is the President does not have to use the ICBMs because we have a survivable leg in the submarine-launched ballistic missile capability. So that is an example of the great attributes that the triad brings. So the President does not have to launch on attack or launch on warning, he can wait and gather more information before he has to make a decision, because he has a submarine force.

Mr. WALTZ. Great, thank you. And that leads me to my next question. This committee heard testimony from Admiral Richard that if the ICBM leg of the triad was allowed to atrophy further that he would need to put bombers and refuelers back on alert. Do you have a sense—and this is for any of the witnesses—of how much that would cost? And is it safe to assume that this cost was not factored into the \$38 billion in savings by choosing the GBSD over Minuteman III life extension?

General DAWKINS. Representative, that was not a factor in the cost of any of the studies in analysis. We don’t have an analysis right now that says how much extra that cost will be. I call it a transfer cost. If you do something with one leg of the triad, you may have transfer costs associated with it if you transfer other missions to the remaining two legs. With the bomber force, because we have not been on alert since the early 1990s when we were pulled off of alert and we had hundreds and hundreds of bombers,

actually, you know, able to be on alert, we would have to do a couple of things. We would have to buy more bombers, we believe, buy more tankers. We would have to get more infrastructure and, of course, bring in more people to be able to sustain that capability, the alert capability.

Just as concerning is how we would—if we didn't have that extra capability, we would detract from our ability to do our conventional missions with these dual-role bombers, the B-1 and the B-52 and soon to be the B-21 and the B-52. So again, it would be a drain on resources that we would also use, or we also use today for other combatant commanders.

Mr. WALTZ. Thank you. And I don't know, does anyone else have anything to add on that if we allowed the ICBM to atrophy, the burden that that puts on the other two legs, cost and impact on readiness?

Admiral WOLFE. Yes, sir. This is Admiral Wolfe. So I would tell you from a Navy perspective, as Admiral Richard looks at what he needs to achieve in support of the President, there is a possibility that that could call on the Navy to pick up more of that mission. And I would tell you today, with the platforms that we have got and the assets we have got, that would be almost impossible. In the future, that would potentially require you to build more *Columbia*-class submarines. That would potentially cause us to build more assets and look at how we could work with our partners at NNSA to then provide the adequate number of warheads that would go on there. So I would say there would be a huge downstream impact even to the United States Navy.

Mr. WALTZ. So less ICBMs, more bombers, more subs. Is that just—not to oversimplify, but that is essentially what we would be facing to keep the same capability, the same deterrent capability.

Admiral WOLFE. I would just add the word “potentially,” sir. Potentially that could be the outcome.

Mr. WALTZ. Thank you, Mr. Chairman. I yield my time.

Mr. COOPER. I thank the gentleman.

Mr. Khanna.

Mr. KHANNA. Thank you, Mr. Chairman, and thank you to everyone here for your service and testifying.

On April 3rd, 2019, Lieutenant General Richard Clark, who I know you know, then the Air Force Deputy Chief of Staff for Strategic Deterrence, noted that we have one more opportunity to extend Minuteman III. I would like to understand why that option of extending it one more time is not a good option and why that hasn't been explored.

General DAWKINS. Thank you, Representative Khanna, and thank you for the question. So I am familiar with the statement from 2 years ago. I think it is important whenever we discuss life-extending the system or GBSD, we understand that we are talking about a total system replacement. General Clark was talking about a subcomponent of just the missile itself, and the missile itself has several key subcomponents. There is 330-plus parts in it, but there are about 4 subcomponents that actually have to be modernized or life-extended as well, and we needed to have made those decisions on some of those key ones several years ago back in 2015.

Now what he was talking about was just a single-stage booster and it has three, and he said there would be—that we might be able to repour the propellant one more time. What we have found whenever we have repoured the propellant, and basically you take the booster and you ream the propeller out, bring it out, you extend the wall of the booster—result in a 50 percent rate. So just doing that we would not have enough boosters to even contribute to the other stages of the missile that would have to be replaced at great expense. One example is the propulsion system rocket engine. We needed to have started that program back in 2016. That was roughly almost a \$7 billion project back then, and I don't know what it is grown to now.

Mr. KHANNA. I respect that as your service and your expertise. I guess my question is, has there been a comprehensive study on how much it would cost and what it would require to extend Minuteman in a cost-benefit analysis between that choice and the GBSB system?

General DAWKINS. Yes, sir. There have been several studies and the foundation of one is the analysis of alternatives from 2014. It looked at life-extending Minuteman III versus GBSB and a few other options as well, and it was determined that at the time, the Obama administration, that we would forego life extension because it was more expensive. At the time, \$5 billion more expensive over the lifetime of a system to do a Minuteman III life extension versus going with a system replacement.

Mr. KHANNA. Now that was premised, I know there was something that you submitted premised on 400 deployed ICBMs by 2075. President Reagan would probably roll over in his grave if he thought we would have that many ICBMs by then when his vision was to end the nuclear arms race. How was 400 chosen?

General DAWKINS. 400 was again decided under the New START treaty. When we signed up to the New START treaty back in 2010, the Obama administration, at the time, determined the best way to meet the requirements of the treaty was to reduce from 450 to 400 ICBMs and then—

Mr. KHANNA. I understood that, but how do we know that we are going to need that many? And I guess, getting to Representative Waltz's question, isn't it true just strategically that the ICBMs are a much easier target for an adversary to take out than the submarine for the Air Force, and so has there been an analysis whether strategically—we may be better off, actually, having more submarine than Air Force capacity going in the future.

Ms. DALTON. Representative Khanna, thank you so much for all of these excellent questions. In the course of the NPR, we are going to be taking a hard look at what is required to maintain a safe, effective, and secure nuclear deterrent while also attempting to be fiscally responsible given the cost of these programs. So based on the analysis that General Dawkins has referenced, we will be interrogating that analysis with the types of questions that you are asking to ensure that we have the right balance across the triad.

Mr. KHANNA. Well, I think it just is very important. And also, you know, I know you have talked about the capacity being improved by the GBSB as opposed to Minuteman, but it is not clear. What is the vulnerability of the Minuteman? Are there things that

we couldn't do right now? Are we vulnerable in ways that would be improved by the GBS or, because they say it gives us better targeting?

The other question and, frankly, being from Silicon Valley with cyberattacks is whether we would be better off being in an analog system than going to a digital system. I mean couldn't the digital system make us more at risk to an adversary in an age of cyber warfare? You know, I obviously have deep admiration and respect for all of your patriotism. I know you are trying to do what is right for our country. I would just ask that, you know, if we could have more of an analysis on some of these questions as alternatives it will help better understand and help us make more informed decisions.

Mr. COOPER. The gentleman's time has expired.

Mr. DesJarlais.

Dr. DESJARLAIS. Thank you, Mr. Chairman. I want to talk about infrastructure for just a minute.

Mr. Verdon, Y-12 National Security Complex is one of the most important national security assets not only in Chairman Cooper and my home State of Tennessee, but in the entire country. However, if you were to look at the state of disrepair at some of the facilities, you wouldn't know it. We cannot modernize our nuclear arsenal without having the necessary infrastructure in place to undertake those programs.

In the fiscal year 2018 NDAA, my colleagues and I worked in this committee to help address this issue by creating the Infrastructure Modernization Initiative as well as broader minor construction authorities to help remedy these problems at NNSA. While both appear to have been successful in making some progress, it is abundantly clear that more work still needs to be done not only at Y-12 but across the nuclear security enterprise.

So my question for you, is the \$20 million minor construction threshold that you are all operating with adequate to accomplish desired modernization efforts or does that number deserve a second look in light of the inflation and increased construction costs?

Dr. VERDON. So I would say that based on those last points you brought up that we should take a look at it again, because certainly when you did give us an increase it was beneficial, but because of all those things you just cited that benefit is being eroded relatively quickly. So looking at increasing that would certainly be a benefit for us.

Dr. DESJARLAIS. All right. Any idea on what kind of number?

Dr. VERDON. So we were looking at something on the order of even going up to 30 or up to 40, for that would be for the types of projects that we would like to be able to move out and address quickly, based on what we are seeing for costs of increased labor and concrete and lumber and steel would be the kind of the range we would be looking at.

Dr. DESJARLAIS. Okay, thank you.

For General Dawkins and perhaps Ms. Dalton, if we have time for both of you both to answer on this next question. Many on this committee, myself included, have concerns about the Biden administration's Nuclear Posture Review and what it may look like particularly as it pertains to a sole purpose policy. In the past, Presi-

dent Biden has expressed support for a sole purpose doctrine and I am concerned that he may turn his personal stance into U.S. policy. Those concerns are also shared by many of our allies like Poland, Japan, the Republic of Korea who rely heavily on our extended deterrence and assurance. Admiral Richards, commander of our strategic forces, has stated that the sole purpose doctrine would be detrimental to our alliances and our goal of nuclear nonproliferation.

So, first, will this administration consult with our allies before making such consequential change to U.S. policy? And second, in your discussions with the decision makers on this issue, do you believe that they are fully aware of the consequences the adoption of a sole purpose policy would have on our alliances and our nuclear nonproliferation?

Ms. DALTON. Thank you for the question. We are absolutely committed to robust, early and often, consultations with our allies and partners as we embark on these strategic reviews. In fact, we have already begun those consultations. I will say that with the release of the Interim National Security Strategic Guidance that also prompted a number of questions from allies and partners in terms of the line on reducing the role, or taking steps to reduce the role of nuclear weapons. But, of course, the next part of that is while upholding our extended deterrence commitments to our allies and partners.

It is one of the top priorities of this administration to revitalize our alliances and partnerships. So as we move forward, we will be working in lockstep with our allies and partners to understand their threat perceptions, their asymmetry of interests when it comes to China and Russia, what their comparative advantages are when looking more broadly at deterrence to include where they may also be making nuclear contributions, but also as that relates to conventional means as well in cyber and space. And so we are absolutely committed to working this in lockstep and that will be a key priority in determining the way forward on our declaratory policy.

Dr. DESJARLAIS. Okay. General Dawkins, about 40 seconds left to chime in.

General DAWKINS. Sir, I defer to what Ms. Dalton said that I believe that all this will be looked at in the NPR, and I know that the allies want to be involved in the process as well and that what we provide for extended deterrence is the reason. And so again, I think the review will address all of those things. Thank you.

Dr. DESJARLAIS. Okay. Well, I thank all of our witnesses today. And, Mr. Chairman, I yield back.

Mr. COOPER. I thank the gentleman.

Let's see. Now we will hear from—who is next? Mr. Morelle. Thank you.

Mr. MORELLE. Thank you, Mr. Chairman, for the opportunity to be here and thank you to all our witnesses. In particular it's been good to have conversations with both Admiral Wilson and General Dawkins and I appreciate that. But I also hope that, Dr. Verdon, that you still have many friends in the Rochester area.

I want to just talk a little bit about my district which is home, in Rochester, New York, which is home to the Laboratory for Laser

Energetics at the University of Rochester. It is a key part of NNSA's inertial confinement fusion [ICF] program, which is a critical component of the Stockpile Stewardship Program, to maintain a safe, secure and effective nuclear deterrent. And I am glad to have the opportunity right now to just discuss the fiscal year 2022 budget and, Dr. Verdon, maybe I can start with you.

For nearly two decades, we have not seen major infrastructure investment in any of the three complementary ICF facilities. Meanwhile, China and Russia are building modern facilities intended to rival or exceed U.S. capabilities. So can you share, does NNSA have a plan to address research infrastructure using the ICF sites?

Dr. VERDON. So we are indeed beginning to—we have just started to look at that. And part of the reviews we had for 2020 in the JASON's review was to begin to lay the foundation of how we should move forward into the future in the area, the very important area of inertial confinement fusion, and part of that was with the focus on helping us identify what potential future facilities in those areas might look like or what they should be. So that is certainly, you know, it is in our process. We are starting that process now and, but the goal will be to identify what are the future capabilities or upgrades that would be needed in those areas.

Mr. MORELLE. That is encouraging. Do you have a sense of what the timeline will be for that, Doctor?

Dr. VERDON. So the reports, we are just digesting some of the conclusions of the reports now so it would probably be—it is probably going to still be, you know, a few years before we kind of go through it in quite a bit of detail, but we are beginning to gather information, as I say, about what people are thinking. But we are also trying to push the system to make sure we are not just thinking near term but as you say looking for the future—what do we really need for the long term?

Mr. MORELLE. Right. Aside from the facilities question, the ICF research is a critical component to the Stockpile Stewardship Program. So both the NNSA's ICF 2020 report and the review by the JASON Defense Advisory Panel provide specific recommendations to strengthen the capability. Are the current requested funding levels by the administration sufficient to fully implement these recommendations?

Dr. VERDON. We assess that they are, you know, that we are supporting the program that we need to conduct in this area. And so we believe that particularly the 2022 budget does support what we need to do in this area.

Mr. MORELLE. Well, recent budgets have focused on a NNSA production complex, yet I think it is NNSA science and technology and engineering capabilities and the associated expert workforce that underpin our confidence in the safety, security, and reliability of the nuclear deterrence. So do you agree that NNSA needs to maintain world lead in scientific capabilities and workforce, and again does the budget request, which contains significant cuts to several ST&E [science, technology, and engineering] areas from fiscal year 2021 levels, sufficiently prioritize those needs?

Dr. VERDON. It is always a risk-benefit, you know, calculus that we are constantly doing, but we believe that the funding that we put forward for 2022 supports the highest priority programs in that

area. And, you know, we are even upgrading some additional capabilities in the science area to include exascale computing and enhanced capabilities of some critical experiments in Nevada. So we are doing—adding new capabilities to address existing gaps.

So again, we are trying to make sure we balance, you know, all the requirements across the entire Stewardship Program, but we certainly support that the science area remains key. It underpins just about every decision we make.

Mr. MORELLE. Well, I appreciate that. I am obviously going to be a fierce advocate for this in our conversations over the next several weeks.

And, Mr. Chairman, I appreciate very much the time and the opportunity to have this conversation and I yield back the balance of my time.

Mr. COOPER. Thank you so much, Mr. Morelle. I appreciate that. Mr. Garamendi.

We seem to be having technical difficulties.

Mr. GARAMENDI. To say the least.

Mr. COOPER. Now we can hear you. Now we can hear you.

Mr. GARAMENDI. Okay. I am late to the meeting. I am having trouble with AT&T with whom I seem to be carrying on a long, long in duration fight. But thank you very much.

I want to follow up on questions that Mr. Khanna had posed to General Dawkins. Specifically, what I want to get into is the Minuteman III, the life extension of it. General Dawkins, under the present plan, it appears as though the Minuteman III will remain as one of the two ICBM systems for the next minimum of 15 years, probably closer to 20 years. Is that true that there will be actually two types of missiles being used over the next 20 years?

General DAWKINS. Congressman, thank you for the question. And I am not tracking two missiles, I am only tracking the single Minuteman III missile. There are two warheads though that go on top of the missile, the W87-0, right now, for the Minuteman III, as well as the 78.

Mr. GARAMENDI. That is a good piece of information, but I was actually talking about your present plan is to have the Minuteman III in the silos, operative, as well as the GBSD as the transition takes place. If that is correct then the Minuteman III is good for at least the next 15, probably closer to 20 years, as the GBSD comes on line. Therefore, the argument that the Minuteman III cannot be extended seems to be, to be incorrect.

Also with regard to the cost, the cost differential that you spoke to a few moments ago is really based on the next 75 years and extending the Minuteman III over and over again during that period of time, while the GBSD would be—the Minuteman III would be in place, as I just suggested, with the GBSD during the transition period, and then the GBSD would go forward and it too would have to be life-extended over that 75-year period of time. Is that correct?

General DAWKINS. Congressman, we have to keep the Minuteman III going until the last GBSD is put in place. So the plan right now is in 2027 to field the first GBSD. As that first one goes in, a Minuteman III system comes out and we will harvest the parts from that Minuteman III as well as all the infrastructure that supports it to feed back into the supply system to continue the remain-

ing missiles to keep them on line until 2036 when we will have the final GBSD in place. So it is a just-in-time—go ahead, sir.

Mr. GARAMENDI. Well, so the fact is that the Minuteman III is being life-extended. You are using the harvesting technique, which is one way of doing it; the other is to acquire the necessary parts and pieces to keep the Minuteman III in place.

My second series of questions go to the cost. The current estimate of the cost of the GBSD system over the next decade, that is the decade of the 2020s, is somewhere north of \$80 billion. What is the anticipated cost in the next decade, that is the decade of the 2030s?

General DAWKINS. Sir, I don't have that broken down by decade. I do know that over the life of the GBSD program, it is right now that is out from 2026, if you will, out to 2075, that was the time-frame that we were using, out to 2075, that it is somewhere in the number of \$264 billion for the total lifetime cost, that is, of GBSD.

Mr. GARAMENDI. I think it is very interesting and questionable of whether you use a 55-year time horizon here to estimate cost in the system. I will let that go at that point.

I want to turn very quickly to—well, we don't have time for that. The issue of command and control and the analog versus digital needs very, very careful attention. I will be out of time here. I am going to pursue this issue more completely to completely understand this phase-in, phase-out just-in-time and the fact that the Minuteman III is actually going to be life-extended for at least the next, probably the next 15, more likely the next 20 years. So with that, I yield back.

Mr. COOPER. I thank the gentleman. I want to thank all the members for participating. These remote hearings are not always easy, but I appreciate your participation especially when there are technical issues. I would like to close the hearing with this final question for Dr. Verdon.

Dr. Verdon, based on current estimates and planning, will the NNSA be able to meet the 80 pit requirement by 2030 as required by law?

Dr. VERDON. So based on our latest information, we assess that meeting the 2030, particularly at Savannah River, is not going to be achievable. It will be, right now, our estimate will be between 2032 and 2035 based on our current conceptual—our Critical Decision 1 information.

Mr. COOPER. So that is even using Los Alamos and Savannah River?

Dr. VERDON. Los Alamos we still have high confidence of achieving 30 pits a year by 2026. It is what we learned in putting the, you know, 30 percent design complete on Savannah River and being able to work closely with the vendors and starting to engage them on the details of the design that we identified that the Savannah River, getting Savannah River to produce more reserve pits by 2030 just doesn't look achievable at this time.

Mr. COOPER. Is there any other way to do it faster?

Dr. VERDON. Not that we have identified, because again a lot of what we are starting to see is the long poles in the tent is just ordering the long-lead equipment through the vendors and then also just the amount of dollars that you can execute in any given year

is also limited. That you could, you know, you could postulate you could do it, but the amount of dollars would be a difficult program. So that is why we are thinking we are trying to work out both technically and just what we can execute at.

Mr. COOPER. Thank you.

Does the ranking member have a final question at all?

Mr. TURNER. Thank you, Mr. Chairman. No. I think we have covered it all and I appreciate the information we have received today. It is certainly very helpful.

Mr. COOPER. I thank our distinguished witnesses. The hearing is now adjourned.

[Whereupon, at 12:29 p.m., the subcommittee was adjourned.]

A P P E N D I X

JUNE 10, 2021

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JUNE 10, 2021

Opening Statement of Hon. Jim Cooper
Chairman, Subcommittee on Strategic Forces
Hearing on
Fiscal Year 2022 Budget Request for Nuclear Forces and Atomic Energy
Defense Activities
June 10, 2021

This hearing will come to order. I would like to begin by thanking our distinguished panel of witnesses for testifying today. We look forward to hearing from Ms. Melissa Dalton, Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities, Dr. Charlie Verdon, Acting NNSA Administrator, Vice Admiral Johnny Wolfe, Director of U.S. Navy Strategic System Programs, and Lieutenant General James Dawkins, U.S. Air Force Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration.

In reading through their testimonies, we are reminded that the work of this subcommittee is the most important, technical, and consequential of any committee in the House.

It is clear from the President's Fiscal Year 2022 budget request that the nuclear deterrent remains the number one priority of the Department. It also makes clear that both the Department of Defense and the Department of Energy have an immense amount of work ahead of them in sustaining our current forces, infrastructure, and personnel, while also recapitalizing the nuclear enterprise for the next 70 years. Much of that expertise and workforce, has atrophied over the past 50 years, and there is no margin for failure in the nuclear business.

I look forward to hearing from the witnesses today on how key programs are faring such as the Ground-Based Strategic Deterrent, the Long Range Standoff Weapon, and the many warhead life extension programs. Each one of these efforts is a massive undertaking on its own, but the fact that they are all happening at the same time, with a small, specialized workforce, raises concern about the ability of the DoD and NNSA to deliver these programs on-time and on-schedule, particularly with issues already being raised on costs and timelines for plutonium pit production at Savannah River. While the nuclear deterrent must remain the number one priority, this subcommittee must ensure that the Departments of Energy and Defense are careful stewards of taxpayer dollars. We cannot afford to assume that because these programs are high priority that they are immune from oversight and careful scrutiny.

I request the witnesses keep their remarks to 5 minutes, and members respect the same time limit for their questioning.

I now turn to my Ranking Member, Mr. Turner, for any opening remarks he may have.

Statement of Hon. Michael R. Turner
Ranking Member, Subcommittee on Strategic Forces
Hearing on
Fiscal Year 2022 Budget Request for Nuclear Forces and Atomic Energy
Defense Activities
June 10, 2021

Thank you, Mr. Chairman. I want to welcome back Ms. Dalton. She had so much fun with Admiral Richard back in April, she's come back for more. I'd also like to welcome Dr. Verdon, Admiral Wolfe, and General Dawkins. Thank you all for your service.

I'd like to begin however, by pointing out that it's June 10th and we are just now receiving President Biden's Fiscal Year 2022 budget. This late submission makes it incredibly difficult for us to get a bill through the House floor, conferenced with the Senate, and to the President for signature before the end of the fiscal year. This late submission makes it all the more likely that we'll have some sort of Continuing Resolution, which will hamstring our warfighters and slow down key defense priorities. I would like to hear from the witnesses on specifically the impacts to our nuclear forces and atomic energy activities resulting from yet again, beginning the fiscal year under a continuing resolution. I have offered legislation, the 'It's About Time Act,' that would align the fiscal year with the calendar year. This would buy the Department of Defense as well as the other Federal Departments and Agencies an additional three months annually, allowing Congress to complete its work, rather than setting the DoD up for failure each year when it has become the new normal that the fiscal year will begin under a CR.

Additionally, I am also disappointed in the overall top line number and its failure to keep up with inflation. It's wholly inadequate and is quite frankly irresponsible and dangerous. This low top-line is why we're seeing key defense programs underfunded in this budget. This budget doesn't provide the resources necessary for items such as bolstering missile defenses for Guam, funding the Homeland Defense Radar – Hawaii, and shortchanging the Navy shipbuilding. If we can't keep up with inflation, how are we supposed to keep pace with increasing threats from China, North Korea, Iran, and Russia.

This budget is not ALL bad though. The bipartisan consensus forged during the debate over the New START Treaty, to modernize all three legs of our nuclear deterrent, seems to have held with this budget. Key programs that began under President Obama, such as Columbia Class submarines and the B-21 bomber were fully funded in the Biden FY22 Budget submission. The same goes for replacements for the Air Launched Cruise Missile (ALCM) and the Minuteman III ICBM. The two replacements for these systems, the Long-Range Stand-off Weapon (LRSO) and the Ground Based Strategic Deterrent (GBSD) respectively, were begun in 2016, when their Milestone-A decisions were signed during the Obama administration. All four of these systems were started under Obama, continued under Trump, and are now being funded by Biden. This speaks volumes

and I look forward to working with my Democrat colleagues to see these systems reach Initial Operational Capability.

In fact, the only system that began under Trump and is still being funded in the FY22 President's Budget Request is a new nuclear-capable Sea Launched Cruise Missile (SLCM-N). However, on this program specifically, I was disappointed to read that an Acting Secretary of the Navy, without hearing the results of a Nuclear Posture Review, has directed the service to zero out the program in Fiscal Year 2023. Vladimir Putin, who has scores of nuclear-capable cruise missiles of his own, is I am sure snickering at this unilateral concession. Its decisions like defunding SLCM-N, like waiving Nord Stream 2 sanctions and throwing Ukraine under the bus; like missing deadlines for Navalny CBW Act sanctions, that only serve to undermine our efforts to deter our adversaries and encourage their acts of aggression, particularly before the summit in Geneva next week. We're left wondering what other unilateral concession Biden will give to Putin in Geneva. Admiral Wolfe, I hope you can enlighten us today on any advice you made to the Acting SECNAV on the SLCM-N decision.

Getting back to the budget, I was pleased but unsurprised to hear that GBSD will be \$38 billion cheaper than a Minuteman III Life Extension. Minuteman III is at the end of its life and trying to life extend it further is an exercise in tilting at windmills. I'd like our witnesses to get into the specifics on their GBSD budget calculation and lay-out how the USAF got to \$38 billion in savings. I also hope our witnesses will explain what we will get for the modest plus-up in LRSO. Last, but not least, and despite Tuesday's news, I want to know when we will receive the SLCM-N Analysis of Alternatives. I was hoping that we could leverage existing programs, such as LRSO perhaps, to get SLCM-N here quickly and cheaply. Despite the Acting SECNAV memo from yesterday, we still want the SLCM-N AoA, and would prefer not to read the results in a press leak.

Finally, the New START Resolution of Ratification also called for modernizing the NNSA infrastructure that has been put-off for far too long. I'm glad to see the two-site solution for Pit Production was fully funded and I look forward to working with the New Mexico and South Carolina delegations to getting those sites completed. Dr. Verdon, I appreciated hearing Secretary Granholm and Dr. Jill Hruby fully backing this approach. I also wanted to thank General Hyten, Dr. Kahl, and yourself for coming up and briefing us on the status of the two-site solution. Hearing the three of you back it in unison was also quite helpful. But you certainly have your work cut out for you.

Statement by

Melissa Dalton

Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities

Office of the Secretary of Defense

Before the 117th Congress

Committee on Armed Services, Strategic Forces Subcommittee

United States House of Representatives

June 10, 2021

Introduction

Chairman Cooper, Ranking Member Turner, and distinguished Members of the Committee, thank you for the opportunity to testify on the Department's nuclear policies and the President's Fiscal Year (FY) 2022 Budget Request for nuclear forces and our nuclear posture.

As Secretary Austin has stated, nuclear deterrence is the Department's highest priority mission. Our nuclear triad remains the bedrock of our national defense and strategic deterrence, ensuring that no adversary believes it can ever employ nuclear weapons against the United States or our allies and partners without risking devastating consequences. The FY 2022 budget request reflects this Administration's commitment to modernizing our nuclear triad to ensure a credible deterrent for the future.

Today, the United States faces a complex global security environment, in which the critical challenges to our prosperity and security include strategic competition with an increasingly militarily capable China and Russia, dangerous regional powers, and accelerating technological changes with potentially strategic effects. China, Russia, Iran, and North Korea have all demonstrated the capability and intent to advance their interests at the expense of the United States, its allies and partners, and their regional neighbors. In particular, China has rapidly become more capable and assertive, and its military modernization, including its expansion of its nuclear forces, presents an increasingly urgent challenge. Russia's comprehensive conventional and nuclear modernization programs are adding new systems that threaten the United States and its allies and partners. Deterrence becomes more urgent in this competitive global environment, as our rivals' foreign policies fueled by advances in technology and enabled by new frontiers for conflict increase the risk of escalation.

We are confronted with multi-faceted deterrence challenges including threats in the cyber, space, and nuclear domains, as well as heightened escalation risks. In a security environment where assertive competitors are expanding and modernizing their nuclear capabilities, we must maintain credible strategic deterrence against adversaries and protect the American people and our allies and partners.

The Nuclear Threat

China

The People's Republic of China (PRC) is continuing its rapid expansion and platform diversification of its nuclear arsenal. In this decade, the PRC is ahead of the pace necessary to double the size of its nuclear stockpile and will soon field a nuclear triad. The 2021 Threat Assessment Report of the U.S. Intelligence Community from the Office of the Director of National Intelligence (ODNI) states, "China is building a larger and increasingly capable nuclear missile force that is more survivable, more diverse, and on higher alert than in the past, including nuclear missile systems designed to manage regional escalation and ensure an intercontinental second-strike capability." The PRC probably seeks qualitative parity with selected key U.S. and Russian capabilities in the period of 2035-2050.

The People's Liberation Army Rocket Force (PLARF) is examining how lower-yield nuclear weapons and air-launched ballistic missiles fit into its expanding nuclear arsenal—an arsenal that includes a mix of strategic-range systems capable of striking the United States and theater-range

forces capable of threatening U.S. allies and partners, as well as U.S. bases and U.S. forces in the region. The PRC is fielding a new generation of mobile missiles, with multiple independently targetable reentry vehicles (MIRVs) and penetration aids to overcome perceived missile defense capabilities. The PRC has also fielded a new road-mobile strategic intercontinental ballistic missile (ICBM) and is planning to arm its ballistic missile submarine with new submarine-launched ballistic missiles (SLBMs). Like Russia, the PRC is also committed to the development of hypersonic strike systems, including nuclear-armed missiles.

In addition to its land- and sea-based components, the PRC has announced development of a new nuclear-capable strategic bomber designed for stealth. The PLARF has also deployed a nuclear-capable precision-guided DF-26 intermediate-range ballistic missile capable of attacking land and naval targets. Although Beijing maintains its “No First Use” policy publicly, there is some doubt as to whether it intends to abide by it, and the PRC’s new nuclear weapons provide it with coercive options in a crisis or conflict.

Russia

Russia continues to invest in its strategic nuclear forces, in new capabilities to enhance its strategic deterrent (and place the U.S. homeland at risk), and in capabilities that improve conventional warfighting. According to the 2021 ODNI Annual Threat Assessment, Russia will remain the largest and most capable nuclear rival to the United States for the foreseeable future as it expands and modernizes its nuclear weapons capabilities and increases capabilities of its strategic and non-strategic weapons.

Russia’s comprehensive nuclear modernization program not only includes replacement of legacy systems, but includes fielding new, so-called “novel” nuclear systems. To date, Russia has recapitalized more than 80 percent of its strategic nuclear forces, prioritizing this effort.

Russia has also modernized and improved the capabilities of its theater and tactical nuclear forces. It is assessed to have between 1,000-2,000 non-strategic nuclear weapons of more than a dozen types. Moreover, according to an April 2021 Defense Intelligence Agency assessment, the number of Russia’s non-strategic nuclear weapons is expected to grow significantly over the next decade. These tactical nuclear weapons are currently not limited by any arms control agreement.

According to the 2021 ODNI Annual Threat Assessment, Russia “believes such systems offer options to deter adversaries, control the escalation of potential hostilities, and counter U.S. and allied forces near its border.” Some of Russia’s stated drivers of its modernization for its newer systems include perceptions of U.S. missile defense and Western conventional force superiority. However, although Russia may claim these weapons are defensive in nature to address conventional imbalances with the United States and its allies, this nuclear arsenal provides Russia with a multitude of options to coerce or threaten the NATO alliance and our Asian allies and partners.

North Korea

North Korea continues its unlawful production of nuclear weapons and ballistic missile capabilities in violation of United Nations Security Council resolutions. North Korea’s nuclear capabilities constitute a significant and evolving threat to our allies, and its tested ICBMs are designed to strike anywhere within the continental United States.

Between 2006 and 2017, North Korea conducted six progressively more sophisticated nuclear explosive tests and three ICBM flight tests that demonstrate its ability to reach the U.S. homeland. It continues to produce fissile material for nuclear weapons. Most recently, in January 2021, North Korea unveiled a new type of submarine-launched ballistic missile, which it declared to be “the world’s most powerful weapon.”

North Korea’s continued development and deployment of nuclear weapons threatens its neighbors and the United States.

Iran

Iran continues to engage in destabilizing regional activities, pursue advanced military capabilities and technologies, and threaten U.S. allies and partners. Iran has developed and fielded a substantial arsenal of ballistic and cruise missiles that can strike targets at ranges up to 2,000 kilometers throughout the region. According to the Defense Intelligence Agency in April 2021, Iran continues to deploy an increasing number of more accurate and lethal theater ballistic missiles, as well as pursue technical capabilities that could enable it to produce an ICBM if it chooses to do so.

The Joint Comprehensive Plan of Action (JCPOA) effectively blocked Iran’s potential pathways to a nuclear weapon and enabled robust international monitoring of all aspects of Iran’s nuclear fuel cycle. Iran is not currently undertaking the key nuclear weapons-development activities needed to produce a nuclear device, according to the Intelligence Community. However, since the United States exited the JCPOA in May 2018, Iran has taken steps to expand its nuclear activities in excess of the JCPOA’s limits and now is much closer to having the fissile material required for a nuclear weapon than it was prior to taking these steps. Iran is also advancing its research and development on other capabilities of concern, such as the production of uranium metal, and is now doing so without the full benefit of the intrusive verification and monitoring measures that were in place when Iran was complying with its commitments under the deal. The Department supports the Administration’s strategy of pursuing principled diplomacy to again constrain Iran’s nuclear capabilities. The President has been clear about returning to compliance with the JCPOA if Iran resumes full and strict compliance with its commitments under the deal.

In addition, Iran’s development of more capable ballistic missiles makes it critical that the United States closely monitor developments in Iran to ensure our ability to deter its destabilizing and aggressive behavior.

Deterrence Policy

As the 2021 Interim National Security Strategic Guidance states, “we will address the existential threat posed by nuclear weapons,” and the United States “will take steps to reduce the role of nuclear weapons in our national security strategy, while ensuring our strategic deterrent remains safe, secure, and effective and that our extended deterrence commitments to our allies remain strong and credible.”

Strategic Reviews and Integrated Deterrence

In keeping with past practice for incoming administrations, the Department is launching a nuclear posture review, nested within the National Defense Strategy (NDS) review, to ensure that we have the right capabilities matched with the national nuclear strategy. This review will consider and assess U.S. strategy, posture, and policy adjustments, and consider program execution risk—all with a goal of maintaining a safe, secure, and effective nuclear deterrent, ensuring strategic stability, and reducing risks of mistake and miscalculation in crisis and conflict.

This process will be informed by the 21st century security and fiscal environment. It will align and be closely integrated with the NDS review, which began on May 3 and will be delivered to Congress in January 2022.

As reflected in his recent speech at U.S. Indo-Pacific Command and in a *Washington Post* op-ed, Secretary Austin's priority has been to focus on "integrated deterrence" to address threats and opportunities to strengthen deterrence across conventional, cyber, space, hybrid, and nuclear domains. He has asked the Department to think through our capabilities and operational concepts and determine how we use our cyber, space, and nuclear capabilities to create a more credible and resilient deterrent against our competitors. We are eager to build out this approach. As Secretary Austin recently testified, the FY 2022 budget request will help us achieve this new vision of 21st century deterrence.

The review will include this integrated approach to deterrence by considering how we maintain our deterrent capabilities within and across domains to strengthen U.S. national security and our extended deterrence commitments with allies and partners. We look forward to advancing this work, and ensuring our nuclear capabilities are matched with the challenges we face and aligned with the President's priorities.

Taking Steps to Reduce the Role of Nuclear Weapons while Ensuring a Safe, Secure, and Effective Strategic Deterrent through Nuclear Modernization

In the coming months and in line with the Interim National Security Strategic Guidance, we will also begin to explore the steps that can be taken to reduce the role of nuclear weapons in our national security strategy, while continuing to ensure our strategic deterrent remains safe, secure and effective and our extended deterrence commitments to our allies remain strong.

Our review of U.S. nuclear strategy and posture will assess the U.S. nuclear modernization programs to ensure that they deliver on time and are aligned with policy priorities and operational requirements.

One of the key priorities across the Department is to drive innovation and modernize our capabilities to meet our future needs. As Secretary Austin recently testified:

“We must modernize our aging capabilities to ensure a credible deterrent for the future. As we do, we will review ongoing programs to assess their performance, schedule, risks, and projected costs. The FY 2022 budget invests in nuclear modernization efforts, and the Department will always seek to balance the best capability with the most cost-effective solution.”

This Committee is well aware of the age of our nuclear systems and DoD's challenge in sustaining them as we simultaneously proceed with modernizing U.S. nuclear forces after decades of deferred recapitalization.

Effective deterrence requires a robust and credible nuclear command, control, and communications (NC3) system that ensures the President has the ability to direct U.S. nuclear forces at all times, even under the most challenging circumstances. NC3 will continue to be a top priority as the Department replaces an aging NC3 system and considers future architectures.

The United States is making significant investments in recapitalizing nuclear delivery platforms. The Department has embarked on several on-going concurrent programs, many of which plan to begin deliveries in the 2030 timeframe, to replace aging systems including: the Columbia-class ballistic missile nuclear submarines (SSBNs); modernization of the associated D5 submarine launched ballistic missile and new reentry bodies; the replacement and modernization of land-based Intercontinental Ballistic Missiles (ICBMs), with the Ground Based Strategic Deterrent (GBSD); a nuclear long-range stand-off (LRSO) cruise missile; the current and future bomber (B-52); a modern bomber (B-21); and nuclear-capable fighters (F-35).

The Department appreciates Congress's recognition of the importance of modernizing U.S. nuclear forces after decades of deferred recapitalization, and we request continued support to modernize and sustain the Nation's nuclear deterrent.

The FY 2022 Budget Request funds all critical DoD nuclear modernization requirements, helping to ensure that modern replacements will be available before the United States' aging systems reach the end of their extended service lives.

The FY 2022 Budget Request for nuclear forces is \$27.7 billion. This includes \$15.6 billion to sustain and operate our current nuclear forces and \$12.1 billion for recapitalization programs.

The OSD Cost Assessment and Program Evaluation (CAPE) Office assesses that nuclear forces, including modernization, only accounts for approximately 6-7 percent of the DoD budget over the next decade. This aligns with the recent May 2021 Congressional Budget Office (CBO) report, which says that "nuclear forces account for roughly 7 percent of the total 10-year cost of the plans for national defense."

The U.S. stockpile strategy must continue to evolve to enable the United States to field a modern deterrent fit for 21st century challenges. The Department of Energy's National Nuclear Security Administration (NNSA) life-extension, modifications, and nuclear weapons programs are designed to address DoD military requirements. Today's dynamic security environment requires a mix of weapon attributes, and weapons modernization and sustainment programs—all of which must be backed up by world-class personnel and a resilient infrastructure. The United States has adopted a stockpile strategy that will ensure our nuclear weapons remain safe, secure, and effective against current and future threats. The imperative behind this strategy is to meet current and future military requirements with higher confidence and without explosive nuclear testing.

Renewed Focus on Strategic Stability, Risk Reduction, and Arms Control

The 2021 Interim National Security Strategic Guidance also stated that “we will endeavor to head off costly arms races and re-establish our credibility as a leader in arms control.” President Biden has demonstrated his commitment to re-establishing U.S. credibility and leadership on arms control by concluding an agreement with Russia to extend the New Strategic Arms Reduction Treaty (New START) for five years.

The New START Treaty extension provides stability and predictability in addition to retaining limits on Russian systems that pose an existential military threat to the United States. It ensures legally binding constraints on a substantial portion of Russia’s nuclear warheads, with an upper limit of 1,550 nuclear warheads on deployed ICBMs, on deployed SLBMs, and counted for deployed heavy bombers equipped for nuclear armaments (each such heavy bomber is counted as one warhead toward this limit). The Treaty also limits both deployed and non-deployed heavy bombers and launchers of ICBMs and SLBMs. And it keeps in place an important inspection and notification regime to verify that Russia remains in compliance with its obligations under the New START Treaty.

We must look to build on the New START Treaty’s foundation. This will be a difficult endeavor, but the scope of Chinese and Russian nuclear modernization and expansion makes the task of seeking progress on further arms control, nuclear security, and risk reduction measures all the more necessary. In addition, the increasing potential for conduct in the cyber, space, and information domains to have strategic effects (with consequent escalatory risk) underscores the importance of meaningful dialogue with Russia and China on the range of emerging military technological developments that could threaten strategic and regional stability. Presidents Biden and Putin have already decided to hold strategic stability discussions. Similarly, the Administration will work to engage China with the goal of having it accept its responsibility as a nuclear-armed, technologically advanced power, which includes increased transparency and progress on nuclear risk reduction. The Department will support efforts to negotiate agreements and arrangements that make the United States and its allies and partners more safe and secure.

Commitment to Allies and Partners

As competitors continue to invest in efforts to challenge the United States, we are harnessing our greatest strategic advantage—our network of allies and partners—both globally and regionally to deter aggression from China and Russia, and to contend with persistent threats from North Korea and Iran.

Working closely with key allies and partners in Europe and the Indo-Pacific region to enhance our collective defense efforts remains a core focus area for the Department. From a strategic standpoint, and as Deputy Secretary Hicks testified, cooperation in this area strengthens our common protection, enhances deterrence, and provides assurances essential to the cohesion of our alliances in the face of growing threats. The United States maintains extended deterrence commitments with our NATO allies, and key Indo-Pacific allies and partners, and we retain robust dialogue with these allies to ensure the continued strength of our extended deterrence commitments.

As the 2021 Interim National Security Strategic Guidance stated, we will “stand behind our allies, work with like-minded partners, and pool our collective strength to advance shared interests and deter common threats.” No country should doubt the strength of our extended deterrence commitments or the strength of the U.S. and allied and partner capabilities to deter and, if necessary, respond should deterrence fail.

The Republic of Korea, Japan, and Australia

In Asia, our formal relationships with the Republic of Korea (ROK) and Japan are critical to regional security and stability and provide a critical deterrent to North Korean and Chinese threats. We have long-standing extended deterrence dialogues with the ROK and with Japan. Through regular bilateral meetings, site-visits, and table-top exercises, both dialogues have helped us to develop a shared perspective on deterrence principles and broader threats within the region. We also have meaningful consultation with Australia through the Strategic Policy Dialogue (SPD), which has deepened our understanding of Australian views on strategic and nuclear threats in the region. Moreover, we continue to use all of these venues to assure our allies regularly of the continued importance of U.S. extended deterrence commitments as a crucial part of our collective national security.

NATO

NATO Allies in December 2019 reiterated that “as long as nuclear weapons exist, NATO will remain a nuclear Alliance” and that “we are fully committed to the preservation and strengthening of effective arms control, disarmament, and non-proliferation, taking into account the prevailing security environment.” The United States continues to make available its strategic nuclear forces for the defense of NATO, and they remain the supreme guarantee of the security of NATO Allies along with the independent strategic nuclear forces of the UK and France, which have a deterrent role of their own. U.S. nuclear weapons in Europe and the capabilities and infrastructure provided by NATO Allies also support NATO’s nuclear deterrence and defense posture, and provide an essential political and military link between Europe and North America.

Unique among all NATO allies, the United States has had long-standing strategic staff talks with the United Kingdom and France. The UK’s Continuous-At-Sea-Deterrent contributes to NATO’s defense and has underwritten our collective peace and security for over six decades. We maintain regular dialogue through Biannual Staff Talks and other technical engagements. The UK purchases and uses U.S. Trident missiles, equipped with UK warheads, onboard its VANGUARD-class SSBNs; and the new U.S. COLUMBIA-class and UK DREADNOUGHT-class SSBNs will share a common missile compartment. The UK’s parallel replacement warhead program depends on the U.S. technology development from the W93/Mk7. The UK’s nuclear forces remain and will continue to be a key contribution to NATO’s nuclear deterrent posture.

Similarly, France’s nuclear forces also contribute significantly to the overall security of NATO. The United States maintains a formal dialogue with France through Annual Staff Talks to facilitate understanding of each other’s threat perceptions and on other issues related to nuclear security.

Conclusion

Mr. Chairman, let me conclude by stating that the challenges we face are many, but the FY 2022 budget will help to ensure the United States has a modern nuclear deterrent that is safe, secure, and credible to keep the United States and its allies and partners safe. As the Department begins its strategic reviews, enhancing deterrence and addressing strategic threats remain the highest priority. We will continue to address the existential threat posed by nuclear weapons, strengthen strategic stability, pursue efforts to reduce nuclear risks and engage with our allies and partners.

I thank this Subcommittee for its previous support for our nuclear programs and urge your continued support for these important capabilities contained in the President's FY 2022 budget request.

Thank you, and I look forward to your questions.

Melissa G. Dalton
Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities

Melissa Dalton is the Acting Assistant Secretary of Defense for Strategy, Plans, and Capabilities. She is responsible for advising the Secretary of Defense and other senior defense leaders on national security and defense strategy; the forces, contingency plans, and associated posture necessary to implement the defense strategy; nuclear deterrence and missile defense policy; and security cooperation plans and policies. Ms. Dalton ensures that the Department of Defense (DoD)'s program and budget decisions support and advance senior DoD leaders' strategic direction, especially as articulated in defense planning guidance.

Prior to her appointment as the Principal Deputy Assistant Secretary of Defense for Strategy, Plans, and Capabilities in January 2021, Ms. Dalton was a senior fellow and deputy director of the Center for Strategic and International Studies (CSIS) International Security Program and director of the Cooperative Defense Project. Her CSIS research focused on reinforcing the principled foundations of U.S. defense strategy and military operations. Prior to joining CSIS in 2014, Ms. Dalton served for a decade as a career civil servant in the Bush and Obama Administrations at DoD. Her assignments included senior advisor for force planning, special assistant to the Under Secretary of Defense for Policy, policy adviser to the commander of the International Security Assistance Force in Kabul, Afghanistan, and country director for Lebanon and Syria in the Office of the Under Secretary of Defense for Policy. She also served as an intelligence analyst at the Defense Intelligence Agency.

Ms. Dalton holds a B.A. in foreign affairs from the University of Virginia and an M.A. in international relations from the Johns Hopkins University School of Advanced International Studies. She is a member of the Council on Foreign Relations and was a Council on Foreign Relations International Affairs Fellow. She was appointed by Congress to serve on the Syria Study Group in 2019.

**Statement of The Honorable Dr. Charles P. Verdon
Acting Under Secretary for Nuclear Security
and Administrator of the National Nuclear Security Administration
U.S. Department of Energy
Before the
Subcommittee on Strategic Forces
House Committee on Armed Services**

June 10, 2021

Chairman Cooper, Ranking Member Turner, and members of the Subcommittee, it is an honor to appear before you, on behalf of the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). NNSA greatly appreciates the Subcommittee's bipartisan support for our nuclear security missions.

The President's Fiscal Year (FY) 2022 Budget Request reflects the U.S. commitment to maintain a safe, secure, and effective nuclear weapons stockpile, reduce global nuclear threats, and provide the U.S. Navy's submarines and aircraft carriers with militarily effective nuclear propulsion. NNSA continues to maintain the current stockpile, is on track to modernize the nuclear stockpile with our life extension and alteration programs; make substantial progress on maintaining, repairing, and recapitalizing NNSA's deteriorating infrastructure; provide policy and technical leadership to address all aspects of the nuclear threat reduction mission; and deliver nuclear propulsion that meets the U.S. Navy's operational requirements.

The U.S. nuclear deterrent is the foundation of our national defense, and its credibility serves as the ultimate insurance policy against a nuclear or large-scale conventional attack. The world is in a moment of many global challenges. China and Russia are modernizing their nuclear arsenals, and the risk of proliferation of nuclear weapons and other weapons of mass destruction poses profound and existential dangers. In the face of these challenges, it is our most solemn obligation to protect the security of the American people. The United States must be responsive to the increasing desire for state and non-state actors to reshape the world in their favor at the expense of our Nation, allies, and partners, and at times in contravention of international norms.

A Changing Threat Environment

The President's FY 2022 budget request of \$19.7 billion, an increase of \$10.8 million, or 0.1 percent, over the FY 2021 enacted level,¹ enables NNSA to execute its long-standing nuclear modernization efforts begun under the Obama-Biden Administration while this Administration undertakes its formal review of efforts to modernize our nuclear deterrent, to include Department of Defense delivery platforms, the nuclear weapons required for those platforms, and the NNSA infrastructure needed to produce and maintain those weapons. This will preserve space for future policy decisions related to nuclear modernization, nuclear nonproliferation and counterterrorism, and naval reactors as the Administration adjusts to the changing international threats facing America. Russia, China, and our adversaries should make no mistake – America

¹ The FY 2021 Enacted level referenced here does not include the mandated transfer of \$91 million from Naval Reactors to Nuclear Energy for the operation of the Advanced Test Reactor.

will do whatever is necessary to deter our enemies and provide stability in our strategic relationships with allies and partners.

The U.S. nuclear weapons stockpile is currently safe, secure, and militarily effective. However, the legacy stockpile systems are aging, and NNSA's production infrastructure has atrophied considerably. America must invest in the weapons and infrastructure modernization programs to provide the capabilities needed to ensure the deterrent's viability into the future. Future American political leaders will not have the weapons and infrastructure in place to support the nuclear arsenal unless we reestablish that capability now.

The need to modernize the nuclear weapons stockpile and recapitalize the supporting infrastructure needed to produce and maintain that stockpile has reached a tipping point. Approximately 60 percent of NNSA's facilities are more than 40 years old and more than 50 percent are in poor condition. Assessments of facilities throughout the enterprise have identified numerous single-point failures. Production capabilities allowed to lapse are needed once again, and reestablishing these capabilities is both a priority and a challenge. If not appropriately addressed, the age and condition of NNSA's infrastructure will put at risk NNSA's missions, and the safety of its workforce, the public, and the environment.

With support from the Administration and Congress, NNSA is undertaking a risk-informed, complex, and time-constrained modernization and recapitalization effort. To do so, NNSA must rely on its own industrial base within its nuclear security enterprise for some critical processes and parts, in addition to using commercial industry. NNSA manages eight government-owned, contractor-operated organizations throughout the country focused on the nuclear security enterprise. This includes national security laboratories, production plants, and sites that perform the research, development, production, and dismantlement necessary to maintain and certify a safe, secure, reliable, and effective nuclear stockpile.

NNSA's unique and specialized capabilities also extend to global nonproliferation efforts. NNSA's Office of Defense Nuclear Nonproliferation (DNN) supports future arms control negotiations with well researched, tested, and evaluated technologies that strengthen confidence in verification of treaty obligations. DNN's unique capabilities are critical to America's national security and welfare, working worldwide to prevent state and non-state actors from developing nuclear weapons or acquiring weapons-usable nuclear or radiological materials, equipment, technology, and expertise.

In addition, the U.S. Nuclear Navy remains second to none, largely because Congress and the American people have strongly supported and invested in the Office of Naval Reactors, which is responsible for the U.S. Navy's nuclear propulsion work. Nuclear propulsion for the U.S. Navy's fleet of submarines and aircraft carriers is critical to the security of the U.S. and its allies, as well as the security of global sea lanes.

COVID-19

I am pleased to report NNSA did not miss a single major milestone or Department of Defense (DoD) requirement because of the COVID-19 pandemic. We completed our mission while ensuring the health and safety of the workforce during the global pandemic. It is a testament to

the dedication of the men and women of the nuclear security enterprise that NNSA met its major deliverables and reflects our deep commitment to protecting America's national security.

NNSA accomplished this by adopting a policy of maximum telework and social distancing to safeguard the health and welfare of the workforce, while also identifying mission-critical activities that could not be performed remotely. NNSA worked with its M&O contractors to set priorities and relied on them to make decisions based on the local situation, input from health officials, and regulations to protect their workforce.

Weapons Activities

The FY 2022 budget request for the *Weapons Activities* account is \$15.5 billion, an increase of \$139.3 million, or 0.9 percent, over FY 2021 enacted levels. This budget request supports the Administration's goals to modernize the Nation's nuclear weapons stockpile and infrastructure to meet DoD deterrent requirements.

Stockpile Management

For Stockpile Management, the FY 2022 budget request is \$4.6 billion, an increase of \$342.4 million, or 8.0 percent, over the FY 2021 enacted level. Included in this request is funding for activities of NNSA's Office of Defense Programs which, in coordination with the DoD, has supported the nuclear deterrent for almost 30 years without the need for additional nuclear explosive testing. In FY 2021, the science-based Stockpile Stewardship Program allowed the Secretaries of Energy and Defense to certify to the President for the 25th consecutive year the nuclear weapons stockpile remains safe, secure, and militarily effective. This remarkable scientific achievement is made possible through the expertise of NNSA's world-class scientists, engineers, and technicians, and prior investments made in the necessary infrastructure and tools.

NNSA is requesting \$771.7 million in FY 2022 for the B61-12 Life Extension Program (LEP), which consolidates four variants of the B61 gravity bomb and improves the safety and security of a weapon that first entered service in 1966. Currently in Phase 6.5, First Production Unit, the B61-12 LEP has achieved first production on most of its components and will achieve the system's first production unit (FPU) in the first quarter of FY 2022.

NNSA is requesting \$207.2 million in FY 2022 for the W88 Alteration (Alt) 370, which supports the sea-based leg of the nuclear triad and is currently in Phase 6.5 with a system FPU date on track for the fourth quarter of FY 2021. Nearly all major components have completed their respective FPUs.

NNSA is requesting \$1.1 billion in FY 2022 for the W80-4 LEP, which is currently in Phase 6.3, Development Engineering, in support of the U.S. Air Force Long Range Standoff (LRSO) program. FY 2022 will see a planned ramp-up of production development and design activities as the program transitions to Phase 6.4, Production Engineering.

NNSA is requesting \$691.0 million in FY 2022 for the W87-1 Modification Program, which will replace the aging W78-0 warhead. NNSA has planned first production in FY 2030 to support fielding on the Ground-Based Strategic Deterrent ballistic missile system in the Mk21A reentry

vehicle. The program will deploy new technologies that improve safety and security and improve manufacturability. Efforts in the next fiscal year will focus on completion of the Weapon Design and Cost Report, conducting an independent cost estimate, and entry into Phase 6.3.

The W93/Mk7 is a new program of record authorized by Congress in FY 2021 and was established to meet DoD requirements. Starting the W93 program in FY 2021 ensured coordinated development of the warhead along with the Navy's Mk7 aeroshell program. The W93 will incorporate modern technologies to improve safety, security, and flexibility to address future threats, and will be designed for ease of manufacturing, maintenance, and certification. All the key nuclear components will be based on previously tested nuclear designs and will not require underground nuclear explosive testing to certify. NNSA is requesting \$72.0 million in FY 2022 for the program, an increase of \$19.0 million, or 35.8 percent above the FY 2021 enacted level. FY 2022 will focus on completion of Phase 1 activities and entry into Phase 2, Feasibility Study and Design Options.

Production Modernization

The Production Modernization program focuses on the production capabilities of nuclear weapons components critical to weapon performance, including primaries, secondaries, radiation cases, and non-nuclear components. For Production Modernization, the FY 2022 budget request is \$2.9 billion, an increase of \$363.1 million, or 14.3 percent over the FY 2021 enacted level. Included in this request is funding for activities that support the Primary Capability Modernization, Secondary Capability Modernization, and Non-Nuclear Component Modernization programs.

Primary Capability Modernization includes the plutonium program and the high explosives and energetics programs. NNSA urgently needs to recapitalize our plutonium pit production fabrication capabilities to support our weapons modernization programs, as high explosive and energetic materials are required for every weapon system in the stockpile and are also under increasing demand.

NNSA's priority infrastructure need is reestablishing a modestly sized production capacity for plutonium pits. The FY 2022 budget request of \$1.7 billion includes funding for plutonium operations and the plutonium pit production projects at Los Alamos National Laboratory (LANL) and Savannah River Site (SRS). At LANL, the Los Alamos Plutonium Pit Production Project advanced in the Critical Decision (CD) process from Critical Decision (CD)-0 to CD-1 (Alternative Selection and Cost Range), in April 2021. In June 2021, the Savannah River Plutonium Processing Facility will also achieve CD-1. This summer, efforts will focus on beginning to develop the 90% design package needed for CD-2 (Performance Baseline). This two-site approach is necessary to re-establish the nation's ability to produce plutonium pits in support of defense requirements, and to provide needed resiliency against unplanned outages.

Secondary Capability Modernization includes our Uranium, Depleted Uranium, Lithium, Tritium, and Domestic Uranium Enrichment programs. The FY 2022 budget request of \$488.1 million for Secondary Capability Modernization is a \$31.1 million, or 6.8 percent, increase over

the FY 2021 enacted budget. All these programs support the nuclear stockpile and face infrastructure and lapsed capability concerns. NNSA is continuing its progress on the Uranium Processing Facility (UPF), which remains on budget. UPF construction will support 2,500 good-paying jobs in 2022 and 1,100 jobs in 2023. NNSA is also working with its partners to increase production of tritium and is in the early phases of designing the Tritium Finishing Facility (TFF), to replace a 1950s-era facility. The United States no longer maintains a lithium purification capability and relies on material recycling as its main source, which will be exhausted soon. These operations currently take place in a World War II-era building well beyond its design life, putting both operators and processing at risk. NNSA plans to modernize lithium purification and processing operations in a new Lithium Processing Facility (LPF) built to modern standards.

Non-Nuclear Capability Modernization includes programs to modernize production of non-nuclear components for multiple weapon systems. Non-nuclear components are a significant portion of the costs for the warhead modernization programs due to the number of parts, complexity, and testing required to establish confidence the components will continue to function over the required 20-to-30-year lifetime.

This ongoing successful capital project implementation is advancing at a critical time. As Commander Admiral Charles Richard from U.S. Strategic Command recently testified, *“We simply cannot continue to indefinitely life extend Cold War leftover systems...and successfully carryout our national strategy. A particular concern is the aging nuclear weapons stockpile and supporting infrastructure and we can reach a point where no amount of money will adequately mitigate the operational risks the Nation will face due to infrastructure and human talent capability losses.”* Put another way: time is money. Continued recapitalization is imperative, otherwise there will be a point at which no amount of money will be able to mitigate the operational risks and losses to infrastructure capabilities that accrued over time.

Stockpile Research, Technology, and Engineering

The FY 2022 budget request for Stockpile Research, Technology, and Engineering (SRT&E) is \$2.7 billion, a decrease of \$123.1 million, or 4.4 percent below the FY 2021 enacted levels. The decrease reflects a rebalancing of efforts within NNSA to focus on higher-priority deliverables to support the stockpile. Within SRT&E, focus will continue on implementation of the Enhanced Capabilities for Subcritical Experiments (ECSE) and various activities in preparation to accept and operate NNSA’s first Exascale high performance computing system for program use in 2023. Both capabilities are needed to support W80-4 LEP design validation and W87-1 Modification certification requirements. SRT&E provides the data and tools that underpin science-based stockpile decisions, including the knowledge and expertise needed to maintain confidence in the nuclear stockpile without the need for additional underground nuclear explosive testing.

SRT&E covers many critical programs for the nuclear security enterprise.

ECSE will produce experimental data enabling assessment of the current stockpile and certification of the future stockpile, minimizing the future need to return to nuclear testing. This capability is needed to help underpin confidence in the certification of the W80-4 LEP, W87-1

Modification, and future warhead acquisition programs. NNSA is requesting \$215.6 million in FY 2022 for the program, the same as the FY 2021 enacted level.

The Exascale Computing Initiative (ECI) will provide NNSA with next-generation simulation capabilities to support weapons design, warhead assessment and certification, and continued development of the underpinning science needed to support the nuclear stockpile long-term. NNSA remains on track to accept and operate NNSA's first Exascale high performance computing system for program use in 2023.

The Inertial Confinement Fusion (ICF) program provides high energy density (HED) science capabilities and expertise to provide the data needed to advance warhead performance and production science, and to inform design choices for warhead acquisition programs. In addition, activities like the pursuit of ignition provide not only important scientific understanding, but a unique training environment for the workforce. NNSA is requesting \$529.0 million in FY 2022 for the program, a decrease of \$46.0 million or 8.0 percent, from the FY 2021 enacted level. The decrease reflects a decision to rebalance priorities within the SRT&E portfolio.

These programs, along with our advanced computing and simulation, technology maturation, academic programs, and other SRT&E missions are essential to maintaining our confidence in the stockpile.

NNSA provides significant investment in grants and cooperative agreements with top universities across the country every year, through programs such as the Stewardship Science Academic Alliances Program and the Minority Serving Institution Partnership Program (MSIPP) to recruit the next generation of scientists and engineers for our nuclear security enterprise, and to conduct cutting-edge science in national security and nonproliferation. In support of the President's effort to eliminate inequities in Science, Technology, Engineering, and Math (STEM), MSIPP's mission is to create and foster a sustainable STEM-pipeline that prepares a diverse workforce of world class talent through strategic partnerships between Minority serving Institutions and the nuclear security enterprise. The FY 2022 budget request for Academic Programs, including MSIPP, is \$95.7 million.

Infrastructure and Operations

NNSA's infrastructure needs are greater than the production complex. NNSA's infrastructure includes office buildings, light laboratories, emergency operations centers, fire houses, roads, utilities, and the specialized equipment used to support our missions. Infrastructure is the foundation that supports all NNSA missions. Modern, efficient, sustainable, and resilient infrastructure is needed for the nuclear deterrent, nonproliferation, counterterrorism, emergency response, leading-edge research, and solving the climate crisis. NNSA's mission execution is threatened by deteriorating facilities built during the Manhattan Project and Cold War eras. Today, nearly 60 percent of NNSA's \$116 billion worth of real property infrastructure is beyond its design life, half of all facilities are in poor condition, and the average age of NNSA's facilities is 47 years old.

The FY 2022 budget request for Infrastructure and Operations is \$3.6 billion, a decrease of \$497 million, or 12.2 percent below the FY 2021 enacted level. The decrease largely results from the completion of funding for several line items construction projects in FY 2021, the prioritization of funding for programmatic plutonium construction funded within Production Modernization, the beginning of the ramp down of funding for the Uranium Processing Facility project, and the use of carryover balances to fund work within the Chemistry and Metallurgy Research Replacement project.

NNSA infrastructure must be resilient and provide the capabilities and capacities for executing its vital national security missions into the future. This requires an array of complementary strategies, including minor and major construction projects, short-term leasing, purchases, and timely disposition of excess facilities. We must modernize and upgrade antiquated infrastructure and address safety and programmatic risks through strategic, risk-informed investments that directly support our nuclear weapons and nonproliferation programs.

Also, key are the personnel needed to safely and securely operate and maintain all NNSA facilities. As NNSA mission scope increases, so does the demand for increased personnel to support new facilities and capabilities being brought on-line, and to support moving to 24/7 operations at many sites across the complex. These individuals are essential to minimizing unplanned outages and supporting safe and secure operations, particularly in high hazard operations.

Defense Nuclear Security Efforts

The Office of Defense Nuclear Security's (DNS) primary mission is protecting the facilities, people, and assets that are critical to achieving NNSA's important national security missions. DNS's FY 2022 budget request is \$847.6 million, an increase of \$58.55 million, or 7.4 percent, over the FY 2021 enacted amount. While NNSA faces challenges replacing and refreshing aging physical security infrastructure, it is making key investments to recapitalize this infrastructure through the Security Infrastructure Revitalization Program. Increased security requirements are associated with growth across the nuclear security enterprise, including plutonium pit production efforts. DNS is focused on countering the threat posed by unmanned aircraft systems and aims to complete the installation of counter unmanned aircraft systems at Y-12, the Pantex Plant, and the Nevada National Security Site.

Enhancing Cybersecurity

Information Technology and Cybersecurity enable every element of NNSA's missions. The FY 2022 budget request is \$406.5 million, an increase of \$40.3 million, or 11.0 percent, over the FY 2021 enacted level. To meet future requirements, NNSA must modernize its outdated and legacy technology. NNSA must undertake activities and projects that will improve the security of NNSA networks and data, including recapitalizing and modernizing aging infrastructure, executing the IT modernization strategy, and stabilizing inherited legacy networks, systems, and applications and finally, the Emergency Communications Network (ECN). In addition to modernizing legacy networks, NNSA is looking ahead at emerging technologies, which has propelled the convergence of IT and Operational Technology. As NNSA mission requirements expand in scope, IT and cyber programs require modernization, expansion, and innovation in a

commensurate fashion. Cybersecurity is a defense and deterrence mechanism and a powerful tool. In the current threat environment, NNSA cannot afford to neglect its cybersecurity capabilities, which serve as frontline assets that protect the information, systems, and networks on which NNSA depends to execute its mission.

Defense Nuclear Nonproliferation

NNSA's Office of Defense Nuclear Nonproliferation (DNN) is critical to implementing the President's call to "lock down fissile and radiological materials around the world." The FY 2022 budget request for the DNN account is \$2.3 billion, an increase of \$4.0 million, or 0.2 percent, over the FY 2021 enacted level.² DNN works worldwide with our partners to prevent state and non-state actors from developing nuclear weapons or acquiring weapons-usable nuclear or radiological materials, equipment, technology, and expertise. Around the globe, DNN has eliminated the need for weapons-usable material at over 100 civilian sites and removed over 7,200 kilograms of highly enriched uranium (HEU) and plutonium from almost 50 countries, achieving permanent threat reduction. DNN's unique capabilities are critical to America's national security and welfare: from promoting and supporting International Atomic Energy Agency (IAEA) safeguards agreements internationally; to supporting diplomatic arms control efforts such as the successfully extended New START treaty with Russia; to partnering with U.S. industry to support non-HEU based production of the vital medical isotope molybdenum-99, which is used in 40,000 procedures every day in the United States.

Nuclear Terrorism and Incident Response

The FY 2022 request for the Nuclear Counterterrorism and Incident Response (NCTIR) Program is \$370.8 million, a decrease of \$6.7 million, or 1.8 percent below, the FY 2021 enacted level. The FY 2022 request is lower due to the transfer of management responsibility and authority for IT and Cyber services and solutions for the Emergency Communications Network from NCTIR to the IT and Cybersecurity program within Weapons Activities.

NCTIR includes two subprograms: *Emergency Operations (EO)* and *Counterterrorism and Counterproliferation (CTCP)*.

EO provides both the structure and processes the Department uses to prevent, prepare for, respond to, recover from, and mitigate all-hazards emergencies that threaten life and property. In addition, EO provides the framework for building, assessing, and improving organizational resilience to ensure uninterrupted performance and delivery of the Department's Essential Functions under any circumstance.

CTCP provides capabilities to counter and respond to nuclear incidents and accidents worldwide. The foundation of NNSA's diverse missions is an unparalleled command of nuclear science, which is harnessed to understand and contend with global nuclear threats. CTCP's expertise influences a wide range of policies to keep nuclear material beyond the reach of terrorists, including security standards for the storage and transport of such material. The office shares

² The FY 2022 amount does not include the proposed cancellation of \$330 million of prior year balances from the Mixed Oxide Fuel Fabrication Facility project.

knowledge of nuclear and radiological threats with federal, state, local, and international partners by conducting training, exercises, and information exchanges to strengthen emergency preparedness and response. CTCP also develops tools to impede the efforts of proliferant states to obtain nuclear capabilities.

CTCP manages the Nuclear Emergency Support Team (NEST), a cadre of on-call technical specialists who are trained and equipped to respond to all manner of nuclear events. Notable NEST capabilities include mobile teams that can search for nuclear devices and technical personnel whose knowledge of nuclear weapons is used to characterize and defeat such threats. NEST features nuclear forensics capabilities to identify the origin of nuclear material outside of regulatory control or used in a threat device, allowing the United States to credibly threaten retaliation against any state that facilitates an act of nuclear terrorism – constituting an important element of the U.S. deterrence strategy.

Naval Reactors

The Office of Naval Reactors remains at the forefront of technological developments in naval nuclear propulsion by advancing new technologies and improvements in naval reactor performance. This preeminence provides the U.S. Navy with a commanding edge in naval warfighting capabilities. Naval Reactors has given the United States unmatched reach with an unparalleled record of over 169 million miles safely steamed on nuclear power and over 7,300 reactor-years of operation.

The FY 2022 budget for *Naval Reactors* is \$1.9 billion, an increase of \$182.7 million, or 10.8 percent, over the FY 2021 enacted level.³ The budget request supports Naval Reactors' three major projects – COLUMBIA-Class reactor plant development, the refueling overhaul of a research and training reactor in New York, and the construction of the Naval Spent Fuel Handling Facility in Idaho. Naval Reactors is committed to supporting the operational nuclear fleet, continue research and development efforts for future generations of nuclear-powered warships, and make progress on both the recapitalization of laboratory facilities and the environmental remediation of legacy responsibilities.

NNSA Workforce

NNSA cannot accomplish its mission without recruiting, training, and retaining a highly technical Federal and M&O workforce. In addition to the Federal and M&O workforce, NNSA's success depends on leveraging all parts of American society to bring the best quality ideas, products, and solutions to our shared challenges. NNSA relies on American businesses and labor to execute our national security programs. NNSA provided over \$3.5 billion in funding for contracting opportunities with small businesses and over \$789 million to socially and economically disadvantaged businesses in 2020. This created many high-paying, quality jobs for areas of the country where increased employment opportunities for disadvantaged communities

³ The FY 2021 Enacted level referenced here does not include the mandated transfer of \$91 million from Naval Reactors to Nuclear Energy for the operation of the Advanced Test Reactor. The FY 2022 amount does not include the proposed cancellation of \$6 million of prior year balances.

are greatly needed. These investments demonstrate that NNSA's national security missions provide opportunities for all Americans – in fact, our mission success depends on them.

The FY 2022 budget request for *Federal Salaries and Expenses* (FSE) is \$464.0 million, an increase of \$20.8 million, or 4.7 percent, over the FY 2021 enacted level. This budget will support an additional 151 Full Time Equivalent (FTE), a 2.7 percent pay raise, 5 percent benefit escalation, and funding for training, travel, support services, and field and headquarters security investigations, among other workforce needs.

Conclusion

NNSA's diverse and enduring national security missions are crucial to the security of the United States, the defense of its allies and partners, and global stability. NNSA appreciates the many years of bipartisan support from this Committee to our mission and looks forward to continuing to earn that support into the future.

Charles P. Verdon
Acting Under Secretary for Nuclear Security and NNSA Administrator, and Deputy Administrator for Defense Programs

Dr. Charles P. Verdon serves both as the Acting Under Secretary for Nuclear Security and the Administrator of the National Nuclear Security Administration (Jan. 20, 2021), as well as NNSA's Deputy Administrator for Defense Programs.

He was confirmed by the Senate on Sept. 18, 2018, as the Deputy Administrator for Defense Programs. Dr. Verdon was sworn in on Oct. 9, 2018.

As Acting Administrator, Dr. Verdon is responsible for the management and operations of NNSA in support of President Biden's nuclear security agenda. In Defense Programs, he leads the team that directs the Stockpile Stewardship Program, which is responsible for maintaining the safety, security, and reliability of the Nation's nuclear weapons stockpile.

Prior to joining NNSA, Dr. Verdon was the Principal Associate Director within the Weapons and Complex Integration Directorate at Lawrence Livermore National Laboratory. In this role, he was responsible for the management and coordination of all of the lab's weapons program activities.

Before that, Dr. Verdon served as the Directorate's Principal Deputy Principal Associate Director, Program Director for the Secondary Nuclear Design Program, and the AX-Division Leader. In these roles, he worked to maintain national and global security by maintaining scientific and technical leadership in all aspects of thermonuclear weapon physics design and operation. He was also responsible for the management of the scientific grand challenge effort of achieving ignition at the National Ignition Facility.

Dr. Verdon was selected as a Fellow of the American Physical Society in 1997. In addition, in 1995 the society awarded him the Excellence in Plasma Physics Research Award for outstanding theoretical work, computational design and analysis, and experimental work leading to quantitative and predictive understanding of aspects of high-energy density plasmas.

Dr. Verdon holds a doctorate in nuclear engineering from the University of Arizona.

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THE HOUSE ARMED SERVICES COMMITTEE
STRATEGIC FORCES SUBCOMMITTEE

STATEMENT
OF
VICE ADMIRAL JOHNNY WOLFE, USN
DIRECTOR, STRATEGIC SYSTEMS PROGRAMS
BEFORE THE
SUBCOMMITTEE ON STRATEGIC FORCES
OF THE
HOUSE ARMED SERVICES COMMITTEE
ON
FY 2022 BUDGET REQUEST FOR NUCLEAR FORCES AND
ATOMIC ENERGY DEFENSE ACTIVITIES
10 JUNE 2021

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THE SENATE ARMED SERVICES COMMITTEE
STRATEGIC FORCES SUBCOMMITTEE

Introduction

Chairman Cooper, Ranking Member Turner, and distinguished Members of the subcommittee, thank you for this opportunity to discuss the sustainment and recapitalization of the sea-based leg of the nuclear triad. It is an honor to testify before you today representing the Navy's Strategic Systems Programs (SSP) and the contributions the Navy provides to our national and global security.

The Nation's nuclear triad of intercontinental ballistic missiles, heavy bombers, and ballistic missile submarines (SSBNs) equipped with submarine-launched ballistic missiles (SLBM) is essential to the very foundation of our Nation's security and survival. The nuclear triad is the bedrock of our ability to deter aggression, to assure our allies and partners, to achieve U.S. objectives should deterrence fail, and to hedge against an uncertain future. While we are actively working to modernize our forces, U.S. modernization efforts lag behind those of our adversaries. As our Sea-Service leadership noted in December 2020's *Advantage at Sea*, "China's and Russia's aggressive naval growth and modernization are eroding U.S. military advantages. Unchecked, these trends will leave the Naval Service unprepared to ensure our advantage at sea and protect national interests within the next decade."

President Biden's Interim National Security Strategic Guidance reminds us that "[w]e must contend with the reality that the distribution of power across the world is changing, creating new threats. Both Beijing and Moscow have invested heavily in efforts meant to check U.S. strengths and prevent us from defending our interests and allies around the world." As ADM Richard testified before Congress, nuclear deterrence underwrites every US military operation and capability on the globe and serves as the backstop for both our national defense and the defense of our allies.

According to Secretary Austin's Message to the Force, "[t]he Department will prioritize China as our number one pacing challenge and develop the right operational concepts, capabilities, and plans to bolster deterrence and maintain our competitive advantage." Indeed, Great Power Competition has returned – and with it the need to recapitalize each essential and complementary leg of the nuclear triad.

The Navy provides the most survivable leg of the nuclear triad with the interdependent OHIO Class SSBNs and the TRIDENT II D5 Strategic Weapon System (SWS), which comprises both flight and shipboard systems. SSBNs are responsible for more than 70 percent of the Nation's operationally deployed nuclear warheads that are subject to the New START Treaty. As the Chief of Naval Operations stated in his 2021 NAVPLAN, "[o]ur ballistic missile submarines provide an assured response to any strategic nuclear attack on the United States. OHIO Class boats are nearing the end of four decades of service and must be replaced, making COLUMBIA Class program our top acquisition priority." Furthermore, "[p]rojecting power and influence from the seas is vital to deterring aggression and resolving crises on acceptable terms. Our power projection capabilities alongside our strategic deterrent provide the surest guarantee of security for America and our allies" – this starts with deterring a nuclear attack against our nation with our ballistic missile submarines.

Concurrent with the delivery of the COLUMBIA Class is the need to develop the next generation of TRIDENT II D5 SWS that will ensure the credibility of the sea-based strategic deterrent for the life of the COLUMBIA Class. SSP's core mission comprises two fundamental lines of effort: the safety and security of our Nation's strategic assets entrusted to the Navy; and the design, development, production, and sustainment of the Navy's SWS. We strive to maintain a culture of excellence, underpinned by rigorous self-assessment, to achieve the highest standards of performance and integrity for personnel supporting the strategic deterrent mission. We focus unrelentingly on our tremendous responsibility for the custody and accountability of our Nation's nuclear assets. The men and women of SSP, our Sailors, our Marines, our Navy Masters at Arms, our Coast Guardsmen, and our industry partners remain dedicated to supporting the strategic deterrence mission, to responding to the emerging needs of our warfighter, and to protecting and safeguarding our Nation's assets with which we are entrusted. We certainly could not do this without the support from this Committee.

The men and women of SSP have provided unwavering support to develop, sustain, and secure the sea-based leg of the triad for over 65 years. However, SSP's critical modernization bow wave is no longer part of the future – it is today. We are heading down a path from which we cannot turn away. Our workforce must evolve from years of sustainment efforts to the dual responsibilities of sustainment and development. Investment in critical workforce skills, the

industrial base, and complex technologies unique to strategic systems is essential to the Navy's ability to sustain not only today's sea-based strategic deterrent, but to respond to emerging warfighter needs with cost-effective, creative, and timely solutions through the life of the COLUMBIA Class SSBN.

As the fourteenth Director, it is my highest honor to serve as the program manager, technical authority, safety and security lead, regulatory lead, and U.S. Project Officer under the Polaris Sales Agreement (PSA) for the Navy's nuclear weapons program. Most importantly, I am honored to represent the men and women of SSP, comprising approximately 1,500 Sailors, 1,000 Marines, 300 Coast Guardsmen, 1,400 civilians, and thousands of contractor personnel. It is my most critical goal to ensure they are poised to execute the mission with the same level of success, passion, and rigor both today *and* tomorrow as they have since our program's inception in 1955.

SWS Sustainment on OHIO Class SSBN and Procurement for COLUMBIA Class SSBN

The fragile relationship between sustainment of our legacy systems and the development and production of their replacements is an ever-present factor in the calculus of effectively deterring adversaries. As previously stated, the Navy's highest priority acquisition program is the COLUMBIA Class submarine, which replaces the existing OHIO Class submarines. The OHIO Class SSBNs will begin decommissioning in the late 2020s, and the COLUMBIA Class must be ready to begin patrols no later than early FY31. Recapitalizing our SSBNs is a significant investment that only happens every other generation, making it critically important that we do it right and on time. Delays to the Navy's SSBN modernization plan are not an option. The continued assurance of our sea-based strategic deterrent requires not only a next class of ballistic missile submarines, but equally critical, a credible SWS – to include not just the weapon system itself, but the infrastructure and the people as well. The Navy is taking the necessary steps to ensure that the next generation deterrent is designed, built, delivered, and tested on time and provides flexibility and adaptability in the dynamic threat environment that ADM Richard mentioned before this committee at an affordable cost.

To lower development costs and leverage the proven reliability of the TRIDENT II D5 SWS, the COLUMBIA Class SSBN will enter service with the same functionality and performance of the

currently deployed TRIDENT II D5 SWS including the life extended TRIDENT II D5 missile, which resides on today's OHIO Class submarines. Maintaining a common SWS during the transition between existing and successor submarine platforms allows the Navy to leverage a mature material and knowledge enterprise, thus reducing programmatic costs and risks. Life extended missiles will be shared with both the OHIO and COLUMBIA Class submarines in the U.S. and, under the auspices of the PSA, with the United Kingdom (UK) VANGUARD-Class and DREADNOUGHT Class submarines into the 2040s.

Another major initiative to reduce risk associated with the overhaul of the sea-based strategic deterrent is the SSP Shipboard Modernization Program, which manages obsolescence and modernizes SWS shipboard systems through the use of open architecture design and commercial off-the-shelf hardware and software wherever feasible. The Shipboard Modernization Program refreshes shipboard electronics hardware and upgrades software, which will extend service life, enable more efficient and affordable future maintenance of the SWS, all while ensuring we continue to provide the highest level of nuclear weapons safety, security, and performance for the deployed SSBNs in order to meet U.S. Strategic Command (USSTRATCOM) requirements. The incremental upgrades to the SWS shipboard systems resident on the OHIO Class are also linchpins to the timely delivery of the COLUMBIA Class SSBNs. These upgrades are in progress and on track. Modernization of the SWS shipboard systems leverages engineering techniques and methodologies and embraces model-based engineering design practices in order to effectively respond to today's ever changing environment. The Navy's strategy of addressing obsolescence while simultaneously providing warfighter capability highlights the unique complexity of sustainment and modernization of our nation's nuclear deterrent.

TRIDENT II D5 Life Extension and Life Extension 2

The TRIDENT II D5 SWS capability has been deployed on the OHIO Class ballistic missile submarines for nearly three decades and is planned to be deployed more than 50 years. This demand for service life from today's high-performing systems will require a missile life extension effort in order to match the OHIO Class submarine service life and, in concert with the Shipboard Modernization Program for shipboard systems, to serve as the initial SWS for the COLUMBIA Class SSBN. The D5 Life Extension (D5LE) will ensure an effective and credible

SWS on both the OHIO Class and COLUMBIA Class SSBNs into the 2040s. The initial life extension of missile and guidance flight hardware components was designed to meet the same form, fit, and function of the original system, maintain the deployed system as one homogeneous population, control costs, and sustain the demonstrated performance of the system. The Navy's D5LE program is executing on schedule to continue to meet deterrence requirements and will complete deployment by FY24.

As the Navy carefully manages the approach to end of life of our OHIO Class SSBNs, we must address the viability of the SWS throughout the life of the COLUMBIA Class SSBNs. Twelve COLUMBIA Class SSBNs will replace today's 14 OHIO SSBNs and beginning in FY30 D5LE missiles will support initial load-outs on COLUMBIA (Hulls 1-8). Production of additional D5LE missiles is not practical due to unavailable technologies and lack of an industrial base. The TRIDENT II D5 Life Extension 2 (D5LE2) program is required to modernize and replace D5LE to support later COLUMBIA Class missile inventory starting in FY39 (targeting COLUMBIA Hull 9 and will backfit Hulls 1-8 during their Extended Refit Period) to continue to meet USSTRATCOM requirements. D5LE2 will ensure the weapon system maintains demonstrated performance and remains survivable while facing a dynamic threat environment until COLUMBIA end of life.

D5LE2 is a hybrid of pull-through cost-effective technology (e.g., solid rocket motors, ignitors) and redesigned and updated components (e.g., avionics, guidance, system architecture). D5LE2 is structured to maintain today's unmatched reliability and demonstrated performance, while unlocking untapped system potential to efficiently respond to emerging needs and to maintain a credible deterrent throughout the life of the COLUMBIA Class.

In FY20 and continuing in FY21, SSP began system architecture studies to evaluate solutions to problems associated with emerging threats, supportability, and adaptability required to address challenges in an uncertain future. Additionally, these studies focused on missile and guidance technology to determine the effective composition of redesign, remanufacture, and pull-through of highly reliable components. This ensures longer-lead, unique SLBM subsystems are mature in FY28 and FY29 to then be able to support large facility proofing and flight testing off a manned platform in the mid-2030s and Low Rate Initial Production (LRIP) in FY34.

Unlike SLBM programs of the past, D5LE2 does not have the benefit of a healthy industrial base that comes from maintaining continuous development. These early efforts will be critical to reconstituting the SLBM industrial base to restart production on critical components whose production lines were shut down over the last decade. In short, full support of D5LE2 today is vital to achieving 2039 Initial Fleet Introduction (IFI) and to embarking on a path that maintains an SLBM deterrent capability through the service life of the COLUMBIA Class SSBN.

Warhead and Reentry Body Activities and NPR Supplemental Capabilities

The Navy is also working in partnership with the Department of Energy's National Nuclear Security Administration (NNSA) to refurbish our existing reentry systems and develop new reentry systems in response to USSTRATCOM requirements. The TRIDENT II D5 missile is capable of carrying two types of warhead families, the W76 and the W88. The W93/Mk7 warhead will be designed for use on both the D5LE and D5LE2 missiles, and is essential to supporting the UK's Continuous-At-Sea-Deterrent. In 2019, NNSA completed the W76-1 Life Extension Program, marking the U.S. stockpile's first full-scale warhead refurbishment program. The Navy is now working on modernizing integrated aeroshells that house these warheads through the Mk4B program with the inclusion of a Shape Stable Nose Tip, which reduces reentry variability and improves performance margins.

The W88 warhead continues to undergo its refurbishment program on a revised timeline based on capacitor component issues that did not meet reliability requirements. The Navy and NNSA coordinated on tightly coupled schedules for the fleet, the nuclear enterprise weapons complex, and production of affected non-nuclear components to propose an 18-month delay to the original schedule that was approved by the Nuclear Weapons Council (NWC). The program remains on track for reaching a First Production Unit in July 2021. I am confident that our teams will work together to manage the delay, as we have historically addressed refurbishment challenges with a mission-focused attitude and rigor. The Navy will continue to prioritize meeting our warfighters' requirements and minimizing disruption to the operational fleet to ensure that the sea-based leg of the triad continues to fulfill its deterrence mission. However, this program setback is indicative of the pervasive and overwhelming risk carried within the nuclear enterprise as refurbishment programs face capacity, historical funding, and schedule challenges.

In 2021, the Navy entered Phase 1 of the joint DoD-DOE Nuclear Weapons Lifecycle Process with NNSA for the W93/Mk7. This effort will address evolving ballistic missile warhead modernization requirements; improve operational effectiveness for USSTRATCOM; and mitigate technical, operational, and programmatic risk in the sea-based leg of the nuclear triad while simultaneously reinvigorating the atrophied industrial base and modernizing a Cold War era stockpile. W93/Mk7 is intended to provide flexibility and adaptability to meet future warfighter needs. With the near simultaneous age out of the deployed stockpile in the 2040s, the W93/Mk7 will help address production concerns in the weapons complex and ensure an uninterrupted at-sea deterrent for the sea-based leg of the nuclear triad. FY21 initial investment supports the reinvigoration of critical, niche national skillsets and capabilities uniquely associated with harsh reentry environments, and therefore, is applicable to both the Navy and Air Force future needs. Even with the addition of the W93 to the stockpile, we will not increase the deployed stockpile. The Navy will work in close coordination with the Department of Defense, NNSA, the NWC, and the Congress as this effort matures, but we cannot continue to life extend our leftover Cold War era weapons and systems and successfully carry out our national strategy.

Finally, SSP will continue to support the Navy's FY21 Analysis of Alternatives (AoA) for the 2018 NPR-directed nuclear-armed Sea Launched Cruise Missile (SLCM-N). The initial study for this AoA has been submitted to the DoD's Office of Cost Assessment and Program Evaluation (CAPE) to better inform decisions surrounding potential gaps in the full spectrum of deterrence.

Industrial Base and Infrastructure

The nation requires a fully modernized nuclear force and supporting infrastructure to execute our national strategy. Our modernization needs cannot succeed without investing in the research and development (R&D), critical skills, and facilities needed to produce, sustain, and certify our nuclear systems. Ensuring robust defense and aerospace industrial base capabilities—such as radiation-hardened electronics, strategic inertial instrumentation, and solid rocket motors—remains an important priority in conjunction with R&D investment. SSP has placed particular emphasis on the solid rocket motor industry and its sub-tier suppliers and appreciates the support of the Congress to allow for the continuous production of these vital components. Essential to

the nuclear deterrent is a national aeroshell production capability. The Navy has not delivered an integrated aeroshell since the 1980s and needs to reinvigorate a production capability that only resides in a small cadre of highly skilled experts in an exceptionally niche industry. Aeroshell investment supports the Navy but will also be cost-effectively leveraged by our colleagues in the Air Force – and also our strategic allies in the United Kingdom as they pursue their independent reentry program endeavors. Finally, R&D investment is critical to today’s nuclear modernization needs to ensure that we advance necessary technology ahead of design needs and to train our workforce during the early years of development. If the nation does not continue to address these concerns, no amount of money will be able to adequately mitigate the risks associated with key stockpile and infrastructure losses for as many as 5 to 10 years.

From an infrastructure perspective, our program is entering unprecedented times. Existing facilities are reaching their 30-year recapitalization windows while we simultaneously face weapons systems modernization periods in order to meet future requirements. Investing in facility sustainment and modernization is required for cradle-to-grave operations. Appropriate Military Construction (MILCON) and Facility Sustainment, Restoration, and Modernization (FSRM) resourcing is critical to the Navy maintaining a credible deterrence posture to include providing more than 70 percent of the Nation’s operationally deployed nuclear warheads. We will make smart investments to address through-put constraints and build in surge capacity to address requirements presented by new and emerging threats. The Navy relies on a limited footprint to process missiles and outfit the SSBNs. Maintaining and sustaining facilities is critical to meeting USSTRATCOM and Fleet mission requirements. Our nation, and the Navy, will continue to prioritize and resource the sustainment and modernization of its nuclear infrastructure enterprise to provide an effective and flexible deterrent now and into the future.

As the Navy executes the modernization and replacement of the SSBN and associated SLBM leg of the nuclear triad, DoD and NNSA’s infrastructure must be prepared to respond in tandem to the evolving needs of the Nation. Of most importance, we must have an effective, resilient, and responsive plutonium pit production capability. This capability can address age-related risks, support planned refurbishments, as well as prepare for future uncertainty. Additionally, tritium, lithium, and uranium, and high explosives and energetics, among other strategic materials, are vital to ensuring the Navy can continue to meet its strategic deterrent requirements. Efforts to

sustain and modernize deterrent forces must continue. Our strategic forces underpin every military operation around the world, and we cannot afford to delay given the increasing threats facing our nation.

Workforce

History reminds us that the swift, successful creation and execution of the Fleet Ballistic Missile program in the 1950s was truly a result of national commitment, congressional support, and cadre of hand-selected scientists, engineers, and inspirational leaders. Though process will always underpin our efforts, our dedicated predecessors—civilians, military, and industry partners alike—responded to the national need with focused determination and drove this program with a vision. People are as fundamental to our nuclear deterrent as the SWS itself. Today, SSP and its industry partners are focused on inspiring, growing, and retaining a generation of workforce that did not live through the darkest days of the Cold War. Connecting a new workforce to this fundamental global security mission remains an important task shared among the entire nuclear enterprise. A capable, credible, and affordable strategic deterrent for our Nation for the next 60 years requires not only technical, policy, management, and financial acumen—it requires passion and a commitment to making this our life's work.

Truly, 2020 was an unprecedented year. I would like to take this opportunity to highlight some of the outstanding work the SSP team has done to continue to execute on our mission despite the uncertain environment:

SSP took an aggressive COVID-19 Testing and Vaccination posture for our Security Force commensurate with Tier 1 units to ensure their availability and to maintain the Nuclear Weapons Security Standard (NWSS). Additionally, we developed contingency plans to reinforce our security teams in order to mitigate COVID19 impacts. To date, we have not had to implement any of the contingency plans. We worked with nuclear policy leadership for the Secretary of Defense and Chief of Naval Operations staff to provide relief to some of the administrative training and PRP requirements in order to allow the force to remain focused on maintaining the NWSS and minimize interactions required across the force. We worked with our Marine Corps counterparts to adjust our Concept of Operations to maximize social distancing and minimize transmission by addressing guard rotations, reduction of security posts where possible based on

operational requirements (e.g., reduction of entry / exit lanes and associated guards commensurate with reduction of operations and personnel due to COVID (more people teleworking, less people have to enter area)), barracks berthing assignments, cleaning cycles, Personal Protective Equipment requirements, and aggressive contact tracing that minimized interaction between individual cohorts. Finally, we maximized the use of virtual inspections or using personnel already at that geographic location with the appropriate subject matter expertise in order to minimize external vectors that could negatively impact the security force. The combination of common sense measures and innovative tactics have enabled SSP to continue to deliver results despite the pandemic, and I am confident we will emerge from these tragic and unprecedented events stronger and more resilient than we were a year ago.

Polaris Sales Agreement: Support to the UK

Development of the future SWS not only addresses known U.S. risks, it also supports the UK's critical need to recapitalize its nuclear deterrent. Given the UK deterrent's contribution and commitment to NATO, this recapitalization is essential to our NATO defense posture. A critical component of the COLUMBIA Class Program is the development of a Common Missile Compartment (CMC) with the UK under the auspices of the Polaris Sales Agreement. Similar to the U.S. Navy, the Royal Navy is recapitalizing its four aging VANGUARD Class SSBNs with the DREADNOUGHT Class SSBN. The CMC will support today's TRIDENT II D5 SWS, which the U.S. Navy sells to the Royal Navy for deployment aboard its VANGUARD Class of ballistic missile submarines, and that will be deployed as the initial loadout on both COLUMBIA and the UK DREADNOUGHT Class SSBNs. Our partnership with the UK also supports production of the CMC in both US and UK build yards. Ensuring that the COLUMBIA Class program remains on schedule supports not only our Nation's operational requirements, but also the ability of the UK, one of our most important allies, to maintain its Continuous-at-Sea Deterrent. For decades, US policy has recognized that the independent UK nuclear deterrent adds to joint efforts to deter aggression and attack against NATO and thereby positively contributes to global stability. Under the 1958 Mutual Defense Agreement and the 1963 Polaris Sales Agreement, the United States has provided decades of support and material, consistent with international law, to the UK deterrent program. Without this assistance, the cost and schedule

risk to maintain the UK's independent deterrent would rise significantly, thus creating additional challenges for the UK in sustaining its nuclear contribution to NATO alongside the US.

Conclusion

In keeping with the Administration's Interim National Security Strategic Guidance, "the United States must renew its enduring advantages so that we can meet today's challenges from a position of strength." Our Nation's sea-based strategic deterrent has been a critical component of our national security since the 1950s and must continue to assure our allies and partners and to deter potential adversaries well into the future. SSP ensures a safe, secure, effective, flexible, and tailorable strategic deterrent, with a steadfast focus on the proper stewardship, custody, and accountability of the nuclear assets entrusted to the Navy. Sustaining and modernizing the sea-based strategic deterrent capability is a vital national security requirement. I am privileged to represent this unique organization as we work to serve the best interests of our great Nation. I thank the committee for the opportunity to speak with you about the sea-based leg of the nuclear triad and the vital role it plays in our national and global security.

Vice Admiral Johnny R. Wolfe, Jr.
Director, Strategic Systems Programs

Vice Adm. Johnny Wolfe is a native of Somerset, Texas. He graduated from the U.S. Merchant Marine Academy, Kings Point, New York, in 1988 with a Bachelor of Science in Marine Systems Engineering. He earned a Master of Science in Applied Physics from the Naval Postgraduate School in 1994, where he was also selected for transfer to the engineering duty officer community.

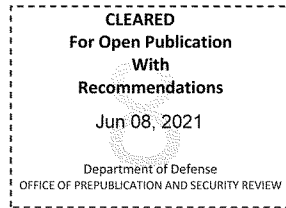
At sea and on deployment, he served as the assistant weapons officer on USS Lewis and Clark (SSBN 644) from 1988 to 1992, and was part of a forward-based team that led the rebuilding of courthouses and prisons in Iraq in 2007. In 1994 he was assigned as the lead systems engineer on a Ballistic Missile Defense Office (BMDO) joint skunkworks project ran by the U.S. Air Force at Kirtland Air Force Base, New Mexico.

From 1995 to 1996, he was assigned to Strategic Systems Programs (SSP) as the liaison to the Deputy Assistant Secretary of the Navy Command Control Communications Computers & Intelligence (C4I). From 1996 to 2000, he served as the assistant section head for fire control and guidance at SSP. In July 2000, Wolfe was assigned to the Program Management Office, Strategic Systems Programs (PMOSSP), Sunnyvale, California, where he served as the technical division head. During this tour, he was assigned additional temporary duties as a technical investigator for the Columbia Accident Investigation Board where he served as a lead for foam loss testing and orbit impact analysis. From 2003 to 2014, Wolfe was assigned back to SSP Headquarters. While at SSP he served in many positions, including the deputy chief engineer, branch head for Fire Control and Guidance Branch, the nuclear weapons security coordinator and SSGN coordinator, and branch head for Missile Branch.

In 2012, Wolfe assumed duties as the technical director and deputy director reporting program manager for Strategic Systems Programs. Wolfe was promoted to Rear Admiral October 1, 2014, and assigned as the program executive for Aegis Ballistic Missile Defense, Missile Defense Agency.

Wolfe was promoted to Vice Admiral on May 4, 2018 and assumed the duties as director, Strategic Systems Programs.

Wolfe's awards include the Defense Superior Service Medal, Legion of Merit, Bronze Star, Meritorious Service Medal with gold star, Joint Services Commendation Medal, Navy Commendation Medal with gold star, Navy Achievement Medal with three gold stars, Air Force Achievement Medal and various other service awards.



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COMMITTEE STRATEGIC FORCES
SUBCOMMITTEE

STATEMENT
OF
LIEUTENANT GENERAL JAMES C. DAWKINS, JR., USAF
DEPUTY CHIEF OF STAFF FOR STRATEGIC DETERRENCE & NUCLEAR INTEGRATION
BEFORE THE
SUBCOMMITTEE ON STRATEGIC FORCES
OF THE
HOUSE ARMED SERVICES COMMITTEE
ON
PRIORITIES FOR
DEPARTMENT OF DEFENSE NUCLEAR FORCES
JUNE 10, 2021

INTRODUCTION

Thank you for the opportunity to testify and provide a 2021 status update on the United States Air Force (USAF) nuclear enterprise. I also want to acknowledge and thank our industry and government partners who integrate across the spectrum to ensure the U.S. nuclear enterprise remains the most credible in the world. Finally, a special thank you to the Airmen who work tirelessly day in and day out to ensure the U.S. maintains the safe, secure, reliable, and credible nuclear deterrent the nation demands. They are trusted with safeguarding the credibility of the U.S. nuclear deterrent every single day while expertly operating, maintaining, and defending our systems, most of which are 30 years older than they are.

I am happy to report over the last year, the Department of the Air Force (DAF) has achieved many key nuclear goals including significant milestones in the Ground Based Strategic Deterrent (GBSD) program, Long Range Standoff missile (LRSO), B-21 Raider, as well as Nuclear Command, Control, and Communications (NC3). In September 2020, the GBSD program completed Milestone B leading to the Air Force awarding the \$13.3B Engineering and Manufacturing Development (EMD) contract to Northrop Grumman. GBSD is the next generation Intercontinental Ballistic Missile (ICBM) incorporating increased safety, security, and reliability features that will replace the aging Minuteman III (MMIII). The GBSD will be capable of addressing the rapidly growing threat posed by Russia, the People's Republic of China (PRC), and North Korea. The Air Force is also on the brink of completing Milestone B for the LRSO, which will replace the Air Launched Cruise Missile (ALCM) fielded in 1982. The LRSO's capabilities are critical to deterrence, as they will complicate the adversary's defense calculus by leveraging stealth and standoff range, while providing the primary hedge for the other two legs of the triad. Finally, the B-21 Raider program is on schedule and on budget, with the first two test aircraft in production now.

Among their many other achievements over the last year, the current bomber, ICBM, and airborne NC3 force maintained the high standards for nuclear readiness during the COVID-19 pandemic. The unwavering professionalism of the men and women of the DAF who operate these systems continue to ensure the foundation of our national security remains strong. Despite the recent successes, there is a constant reminder we must continue to move forward on modernization and recapitalization of the nuclear enterprise. Our potential adversaries and pacing threats present the most technologically advanced military capabilities the U.S. has ever faced, yet we are competing with outdated systems that have never been older.

THE THREAT

Long-term strategic competition with Russia and the PRC are the primary challenges for the Department of Defense (DoD). As stated in President Biden's Interim National Security Strategic Guidance, both Russia and the PRC have invested heavily in their capabilities with the intent to check U.S. strengths and prevent the U.S. from defending its interests and allies around the world. For the first time in our Nation's history, we are on a trajectory to face two nuclear capable, strategic peer adversaries.

Russia continues to modernize both its nuclear and conventional forces and is leading the world in the development and deployment of hypersonic weapons. Russia has not only modernized every leg of its triad, but is expanding its nuclear stockpile to include novel strategic systems. In addition, Russia has multiple types of non-strategic nuclear weapons (NSNW) deployed or in research and development—including, short- and close-range ballistic missiles, cruise missiles, and anti-ship

missiles. Three of Russia's novel strategic systems and its NSNW are not subject to the New START Treaty's limits and verification regime.

The PRC represents the largest long-term threat to the U.S. as it increases its offensive and defensive warfighting capabilities at an alarming and unprecedented rate; striving to quickly complete its nuclear triad. Their nuclear stockpile is advancing technologically, and is projected to at least double this decade. The PRC's nuclear forces are expected to significantly evolve over the next decade as it modernizes, diversifies, and increases the number of its nuclear delivery platforms. In addition to the land- and sea-based capabilities, the PRC announced its development of a new nuclear-capable strategic stealth bomber. This increase in capability, combined with improvements in the readiness of its nuclear forces and advancement of the airborne leg of its triad, could significantly increase the responsiveness, survivability, and lethality of the PRC's nuclear deterrent.

Meanwhile, North Korea and Iran are pursuing destabilizing capabilities and technologies. North Korea continues its ballistic missile development and testing, threatening regional stability in the Pacific. Iran's posture continues to show they are willing to challenge U.S. regional operations by harassing or engaging our forces on land, sea, and air.

At a time when our nuclear-armed adversaries are becoming their strongest, it becomes increasingly challenging to maintain and sustain nuclear deterrence weapon systems and infrastructure from the Cold War. The multiple challenges to the international order requires increased and sustained investment across the spectrum of military capabilities to compete with our adversaries at levels below armed conflict while continuing to deter, and if necessary, dominate escalation in a crisis. We must hedge against what our adversaries are capable of accomplishing based on their technical knowledge and industrial capacity. Therein lies the challenge we face as we develop defense priorities to account for the totality of the global strategic environment.

STRATEGY & THE NUCLEAR TRIAD

The current National Defense Strategy seeks to *compete, deter, and win* by building a more lethal force, strengthening alliances and partnerships, encouraging American technological innovation, and developing multi-domain capabilities enabling decisive, sustained advantages for the 21st Century.¹ The Interim National Security Strategic Guidance provides the way forward to strengthen alliances, amplify U.S. power, and ensure threats never reach our shores. While this guidance notes that we will take steps to reduce the role of nuclear weapons in our national security strategy, it also highlights the need to ensure that our strategic deterrent remains safe, secure, and effective while ensuring our extended deterrence commitments to our allies remain strong and credible.² Modernization of our Cold War-era systems enables the U.S. to meet the above objectives.

The triad has been the cornerstone of U.S. defense strategy for decades. The triad, two-thirds of which the Air Force operates, brings together the capabilities of the bomber, ICBM, and submarine-launched ballistic missile (SLBM) forces. Each leg of the triad provides unique and mutually supportive attributes that hedge against unexpected technological problems or operational vulnerabilities. The triad's very nature allows U.S. planners to not rely on one specific weapon system thus reducing risk. Along with our U.S. Navy and the Department of Energy's National Nuclear Security Administration

¹ 2018 National Defense Strategy

² 2021 Interim National Security Guidance

(NNSA) partners, the triad and the NC3 enterprise has stood the test of time since the 1960s.

The triad is also a key part of our allies' defense strategy through U.S. extended deterrence assurances. Our allies and partners watch what we say and do as much as our adversaries do. The U.S. does not only deter potential adversaries from aggression against the homeland; extended deterrence assures our allies and encourages non-proliferation. The North Atlantic Treaty Organization (NATO) alliance has provided for the common security of our European Allies since 1949, and Air Force and NATO dual-capable aircraft are integral to NATO's overall deterrence and defense posture. Additionally, in the Indo-Pacific, U.S. nuclear capabilities play a vital role in maintaining peace and stability.

REQUIREMENTS, MODERNIZATION, AND RECAPITALIZATION

The DAF continues to maintain a strong, mutually supportive partnership with the NNSA to ensure our modernization and recapitalization programs remain on time and on budget. It is critical that each of these programs deliver on schedule to reduce the risk of capability gaps in our nuclear deterrent near the end of this decade and into the next. To that end, the Fiscal Year (FY) 2022 President's Budget request supports sustainment efforts for MMIII, ALCM, UH-1N helicopter, and nuclear-capable bombers. All major recapitalization programs, including the B-21, GBSD, LRSO, and the MH-139 helicopter are also supported. The goal of our nuclear enterprise programs continues to focus on ensuring an effective and credible deterrent while remaining on budget and on time to meet Combatant Command requirements as directed by Presidential policy.

GROUND LEG - INTERCONTINENTAL BALLISTIC MISSILES

The ICBM force remains a ready, responsive force to deter strategic attack while greatly complicating the targeting calculus of any potential adversary. Through the combination of accuracy and short response time, an adversary must consider our ICBM force in any decision to act aggressively with nuclear weapons. Additionally, the quantity and dispersion of the ICBM force make it a nearly insurmountable targeting problem.

Minuteman III: The MM III remains an indispensable part of the nuclear triad. However, the Air Force is quickly losing the ability to cost-effectively sustain it, and emerging threats will reduce its effectiveness in the future. The Air Force deployed the first MM III missile in 1970, into launch facilities built in the 1960s. The MM III weapon system is now more than 40 years beyond its designed service life and more than 20 modernization and sustainment programs are required to keep it viable until replaced by GBSD beginning in FY27.

The MM III Depot Maintenance Program will continue sustaining this legacy weapon system throughout the deployment of its replacement. The Air Force continues to work across multiple lines of effort to ensure the legacy ICBM force remains safe, secure, and effective until the planned replacement with GBSD. We know that nuclear weapons must be as good on their last day, as they are on their first—anything less is unacceptable.

The MM III sustainment efforts cannot change the reality that this legacy platform will not be able to close capability gaps or evolve to meet future strategic requirements—we are out of time. Additionally, sustainment efforts cannot solve the increasing costs generated by persisting infrastructure issues and parts obsolescence. These issues include a lack of engineering drawings, parts manufacturing capability, corrosion, and increased challenges with water intrusion within the Launch Control Centers and Launch Facilities. A 2014 comprehensive Analysis of Alternatives, 2019 congressional reporting requirements, as well as a number of DoD- and DAF-level studies published

over the past seven years conclude that MM III life extension is not the most viable or cost-effective solution in light of the challenges listed above.

Ground Based Strategic Deterrent: The GBSD is the replacement program for the entire MM III weapon system and has met every major milestone for the past five years. In September 2020, a \$13.3B EMD contract was awarded to Northrop Grumman to continue this model program. The GBSD program includes the recapitalization of the legacy MM III Launch Control and Missile Alert Facilities. Replacing the 1960s-era infrastructure, which is suffering from shortcomings in several areas to include blast door resilience, water intrusion, and cabling degradation, is equally critical to the replacement of the missile itself. Digital engineering, modularity, and open mission system architecture, along with government ownership of data rights, will allow GBSD to remain viable against emerging threats and more easily integrate future NC3 systems. Just as important is the increase in safety, security, reliability, and cyber resiliency that is being incorporated from the start.

As a critical national security priority, continued funding remains essential to ensure the time-certain delivery of the GBSD system. The GBSD program will begin fielding in 2027 to meet full operational capability (FOC) in 2036. The system will initially utilize the W87 and Mk21 until the W87-1 and Mk21A are fielded. This deployment schedule will maintain minimal margin between the required transition from the MM III and the fielding of the GBSD, while meeting the on-alert requirements of the Commander, United States Strategic Command. In FY22 the DAF plans to invest \$2.65 billion dollars into the GBSD program as it continues the EMD phase. These investments will allow the program to continue to mature critical weapon system technologies and software while developing Vandenberg SFB test capabilities and infrastructure. The GBSD program remains on schedule for Initial Operating Capability (IOC) in FY29 and FOC in FY36.

AIR LEG – BOMBERS AND ASSOCIATED NUCLEAR WEAPONS

To deter nuclear attack while protecting the nation and our allies from nuclear coercion and blackmail, the Air Force must possess the capability to hold legitimate and valuable military targets at risk while facing 21st century threats. Consisting of nuclear capable bombers and their associated standoff and gravity weapons, the air leg provides the flexible response demanded by our Functional and Geographic Combatant Commanders in order to meet the modern demands of a regional and tailored deterrent. While the nuclear mission of the bomber force is critical, the capabilities bombers bring to conventional operational plans are no less important. This is especially true given the USAF is not only our nation's only bomber force, but also our Allies' only bomber force.

The bomber force provides visible messaging to both our Allies and adversaries. It is capable of employing the full range of combat power across the entire spectrum of conflict, giving Combatant Commanders the flexibility and necessary reach if deterrence fails. To accomplish this, the air leg requires both stand-off (i.e. LRSO) and stand-in (e.g. B-21 bombers with gravity weapons) capabilities—these are not interchangeable. The nuclear-capable bomber force consisting of the B-2 and B-52, represents the most flexible leg of the nuclear triad. Our future bomber, the B-21 Raider, is fully executing in the EMD phase and the Air Force is closely monitoring the production of the first two test aircraft, with first flight expected in 2022.

The B-2 bomber continues to serve the country well and will do so until it is replaced by the B-21. Several efforts are needed to ensure the B-2 remains relevant, including communications upgrades and integration of the B61-12 nuclear gravity weapon. The B-2 remains the only penetrating bomber able to hold any target in the world at risk. The B-21 will carry this legacy forward. Investments in

the B-21 and modernization of the B-52 maintains America's capability to deter adversary aggression, assure allies, and project combat power across the full spectrum of conflict. The B-52 is executing the most comprehensive modernization in history, to include major programs such as the commercial engine replacement program and radar modernization program, both of which remain on track. These modernization programs ensure the venerable B-52 remains relevant through the 2050s. With a future two-bomber fleet of B-21s and modernized B-52s, the ability to reach any potential target, anytime, anywhere in the world remains intact.

In the face of modern defenses, the need for a stand-off delivery capability makes LRSO essential. The LRSO provides the most survivable and sustainable means of holding heavily defended targets at risk. By being able to launch multiple weapons at once, the U.S. can complicate adversary defenses by creating an exponential number of targets that air defenses must find, fix, track, target and engage simultaneously from multiple axis of attack, thus increasing deterrence. The current stand-off missile, the ALCM, is operating 29 years past its design life, and must be sustained to remain effective until it is replaced with the LRSO.

The LRSO program, including the NNSA's W80-4 warhead life-extension program (LEP), is on track to meet the original planned IOC date in FY30 and is targeting an EMD contract award as early as June of 2021. The Air Force plans to invest \$609M in FY22 for the continued design and development of the LRSO. As the nuclear hedge for unforeseen issues in the GBSD and COLUMBIA SSBN programs, it is more critical than ever that the LRSO program remains funded and on schedule.

Over the next decade, the Air Force will be under significant pressure to ensure our triad modernization and recapitalization remains on time because there is no margin for delay. Every new program is delivering just in time for retirement of its legacy counterpart. The Air Force maintains the surest way to prevent a gap in our strategic deterrent is to ensure stability of funding and requirements for our nuclear programs as equally critical pillars of success in this intricate recapitalization environment.

NUCLEAR COMMAND, CONTROL, AND COMMUNICATIONS

The DAF operates and maintains approximately seventy-five percent of the NC3 capabilities providing the President control of U.S. nuclear forces at all times, without fail. NC3 is the central nervous system of the nuclear triad linking national leaders to the forces all day, every day, under all conditions. NC3 is a system-of-systems designed to ensure senior leaders the ability to *detect* nuclear attacks, *decide* on a response, and *direct* nuclear forces. Today, the NC3 system is a legacy of the Cold War, and the DAF continues to invest heavily in order to modernize, sustain, and protect NC3 interconnected elements.

Like other legacy weapon systems designed to be resistant and resilient to Cold War era threats, the NC3 system must be modernized to remain effective against emerging threats in multiple domains. Of particular concern are expanding threats in space and cyberspace, and adversary strategies of limited nuclear escalation. Weapon system modernization is underway across the entire set of capabilities. In FY22, the Air Force plans to invest over \$1B in 32 NC3 programs, including Next Generation Overhead Persistent Infrared (OPIR), Evolved Strategic Satellite Communications (SATCOM), and Survivable Air Operations Center (SAOC) as the aging E-4B National Air Operations Center (NAOC) replacement. The SAOC ensures national leadership a highly survivable NC3 platform in the event ground command and control, and associated centers are at risk or cease to function during national emergencies. The SAOC program is anticipating acquisition strategy

approval in FY21 and Milestone B in FY23 to begin delivering aircraft in the early 2030s.

INFRASTRUCTURE & WEAPONS GENERATION FACILITIES

While the modernization of the bomber and ICBM weapons systems remains critical to the nuclear enterprise, the supporting infrastructure contributes equally to the success of the missions these weapon systems support. In many cases, the facilities our nuclear forces operate from are obsolete and hinder operations. To support modernized ICBM and bomber weapon systems, transitioning from decades old Weapons Storage Areas to modern Weapons Generation Facilities (WGF) is required. The Air Force has made significant progress on evaluating requirements to account for modern weapon designs, thus driving costs down to ensure WGF affordability. This is a necessary step in further integrating safety and security into nuclear operations while allowing the bomber leg to be more responsive to Presidential direction in a crisis. The Air Force continues planning for the construction of WGFs supporting nuclear capable bombers providing the Air Force necessary dispersal capability that enhances survivability. The Air Force plans to make all B-21 WGFs fundamentally alike, providing a hardened facility to facilitate generation, maintenance, and storage functions for nuclear weapons. The first WGF is under construction at F.E. Warren AFB in support of the ICBM mission. This project received initial appropriations in FY16 and is nearly 40% complete. Planning for additional WGFs supporting the ICBM mission at Malmstrom AFB and the B-52 mission at Barksdale AFB is on-going. In the FY22 President's Budget, the DAF is requesting an initial authorization of \$272M for the WGF at Barksdale AFB, along with a corresponding appropriations request of \$40M for the first increment of this project.

CONCLUSION

The U.S. nuclear triad remains the primary military means by which the DoD provides deterrence against existential threats to our homeland and allies. However, if we try to defer nuclear modernization further, we will be increasingly challenged to maintain the safety, security, and reliability of these systems to meet current and emerging requirements. We recognize that the strategic reviews will look at modernization plans and we look forward to participating in that process.

The U.S. must remain diligent to ensure there is no advantage to gain by our adversary's pursuit, employment, or proliferation of weapons of mass destruction. To accomplish this, the DAF, along with the NNSA, will continue to aggressively execute the programs of record that sustain, modernize, and recapitalize our triad. The Air Force is committed to providing stable requirements and funding for the current programs across the enterprise, as we have in the FY22 President's Budget request. However, we cannot do this alone, and we ask for the continued support of Congress to provide stable authorization and appropriation across both the DoD and NNSA enterprises. We owe these things not only to our nation but also our Airmen who are, in some cases, manning the same missiles and flying the same aircraft tail-numbers as their grandparents did. Yet, we demand, and in fact, depend, on their success in a very different world and against threats that are far more lethal and sophisticated than their grandparents could have imagined; to accomplish a mission that is vital to our nation's survival.

Lieutenant General James C. Dawkins Jr.

Lt. Gen. James Dawkins Jr. is Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, Headquarters U.S. Air Force, the Pentagon, Arlington, Virginia. The general is responsible to the Secretary and Chief of Staff of the Air Force for focus on Nuclear Deterrence Operations. He provides direction, guidance, integration and advocacy regarding the nuclear deterrence mission of the U.S. Air Force and engages with joint and interagency partners for nuclear enterprise solutions.

Lt. Gen. Dawkins was commissioned in 1989. He has held a variety of operational and staff assignments, including command of Eighth Air Force at Barksdale Air Force Base, Louisiana; the 5th Bomb Wing at Minot AFB, North Dakota; the 509th Operations Group at Whiteman AFB, Missouri; and the 338th Combat Training Squadron, an intelligence, surveillance and reconnaissance training squadron at Offutt AFB, Nebraska. His staff assignments include positions at the Joint Staff, U.S. Strategic Command, Headquarters International Security Assistance Force Joint Command, the Department of Energy and the National Security Council.

Prior to his current assignment, he served as Director, Global Power Programs, Office of the Assistant Secretary of Acquisition, Technology & Logistics, at the Pentagon.

Lt. Gen. Dawkins Jr. is a command pilot with more than 3,000 flying hours in fighter, reconnaissance and bomber aircraft.

EDUCATION

1988 Bachelor of Business, Baylor University, Waco, Texas
 1994 U.S. Air Force Weapons School, Nellis Air Force Base, Nev.
 1995 Defense Language Institute, Presidio of Monterey, Calif.
 1995 Squadron Officer School, Maxwell AFB, Ala.
 2000 Master of Aeronautical Science, Embry-Riddle Aeronautical University, Daytona Beach, Fla.
 2004 Army Command and General Staff College, Fort Leavenworth, Kan.
 2005 School of Advanced Air and Space Studies, Maxwell AFB, Ala.
 2009 Air War College, Maxwell AFB, Ala.

ASSIGNMENTS

November 1988–March 1989, Student, Officer Training School, Lackland Air Force Base, Texas
 April 1989–April 1990, Student, Undergraduate Pilot Training, Columbus AFB, Miss.
 May 1990–July 1990, Lead in Fighter Training, 433rd Fighter Training Squadron, Holloman AFB, N.M.
 August 1990–December 1990, Student, F-111 training, 389th Fighter Squadron, Mountain Home AFB, Idaho
 January 1991–January 1995, Instructor Pilot, F-111, Chief of Squadron Weapons and Tactics, 522nd and 428th Fighter Squadron, Cannon AFB, N.M.
 February 1995–January 1996, German Language Training, Defense Language Institute, Presidio of Monterey, Calif.
 February 1996–June 1996, Student, F-16 training, 308th Fighter Squadron, Luke AFB, Ariz.
 July 1996–February 1999, Flight Commander, F-16, 22nd Fighter Squadron, Spangdahlem Air Base, Germany
 March 1999–March 2002, Instructor Pilot, B-2, Chief of Wing Weapons and Tactics, 393rd Bomb Squadron, Whiteman AFB, Mo.
 April 2002–June 2003, Operations Officer, Deputy Directorate Global Operations (J-3), Joint Chiefs of Staff, Washington, D.C.
 July 2003–June 2004, Student, Army Command and General Staff College, Fort Leavenworth, Kan.
 July 2004–June 2005, Student, School of Advanced Air and Space Studies, Maxwell AFB, Ala.
 July 2005–May 2006, Director of Operations, 13th Bomb Squadron, Whiteman AFB, Mo.
 October 2006–January 2008, Commander, 338th Combat Training Squadron, Offutt AFB, Neb.
 January 2008–July 2008, Deputy Director, Global Innovation and Strategy Center, U.S. Strategic Command, Omaha, Neb.

July 2008–May 2009, Student, Air War College, Maxwell AFB, Ala.
 June 2009–May 2010, Commander, 509th Operations Group, Whiteman AFB, Mo.
 June 2010–January 2011, Director, International Security Assistance Force Joint Command Joint Operations Center, Kabul, Afghanistan
 February 2011–May 2011, Vice Commander, 509th Bomb Wing, Whiteman AFB, Mo.
 May 2011–January 2013, Commander, 5th Bomb Wing, Minot AFB, N.D.
 January 2013–September 2014, Principal Assistant Deputy Administrator for Military Application, National Nuclear Security Administration, Department of Energy, Washington, D.C.
 September 2014–July 2016, Director, Strategic Capabilities Policy, National Security Council, Washington, D.C.
 July 2016–August 2018, Deputy Director for Nuclear, Homeland Defense and Current Operations, (J-33) Joint Staff, the Pentagon, Arlington, Va.
 August 2018–June 2020, Commander, Eighth Air Force and Joint-Global Strike Operations Center, Barksdale AFB, La.
 June 2020–September 2020, Director, Global Power Programs, Office of the Assistant Secretary Acquisition, Technology & Logistics, the Pentagon, Arlington, Va.
 October 2020–present, Deputy Chief of Staff, Strategic Deterrence and Nuclear Integration, Headquarters U.S. Air Force, the Pentagon, Arlington, Va.

SUMMARY OF JOINT ASSIGNMENTS

April 2002–June 2003, Operations Officer, Deputy Directorate Global Operations (J-3), Joint Chiefs of Staff, Washington, D.C., as a major
 January 2008–July 2008, Deputy Director, Global Innovation and Strategy Center, U.S. Strategic Command, Omaha, Neb., as a lieutenant colonel
 June 2010–January 2011, Director, International Security Assistance Force Joint Command Joint Operations Center, Kabul, Afghanistan, as a colonel
 January 2013–September 2014, Principal Assistant Deputy Administrator for Military Application, National Nuclear Security Administration, Department of Energy, Washington, D.C., as a brigadier general
 September 2014–July 2016, Director, Strategic Capabilities Policy, National Security Council, Washington, D.C., as a brigadier general
 July 2016–August 2018, Deputy Director for Nuclear, Homeland Defense and Current Operations (J-33), Joint Chiefs of Staff, the Pentagon, Arlington, Va., as a brigadier general
 August 2018–June 2020, Commander, Joint-Global Strike Operations Center, Barksdale AFB, La., as a major general

FLIGHT INFORMATION

Rating: command pilot
 Flight hours: 3,007 (combat: 267)
 Aircraft flown: F-111, F-16CJ, RC-135, B-2, B-52, B-1

MAJOR AWARDS AND DECORATIONS

Air Force Distinguished Service Medal
 Defense Superior Service Medal with two oak leaf clusters
 Legion of Merit with oak leaf cluster
 Defense Meritorious Service Medal with oak leaf cluster
 Air Force Meritorious Service Medal with three oak leaf clusters
 Air Medal with two oak leaf clusters
 Air Force Commendation Medal with oak leaf cluster
 Joint Service Achievement Medal
 Afghanistan Campaign Medal
 Humanitarian Service Medal

EFFECTIVE DATES OF PROMOTION

Second Lieutenant March 17, 1989
 First Lieutenant March 17, 1991
 Captain March 17, 1993
 Major July 1, 2000
 Lieutenant Colonel April 1, 2005

Colonel Oct. 1, 2008
Brigadier General Feb. 7, 2014
Major General Aug. 2, 2017
Lieutenant General Oct. 1, 2020

(Current as of October 2020)

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

JUNE 10, 2021

QUESTIONS SUBMITTED BY MR. LANGEVIN

Mr. LANGEVIN. In your testimony regarding LEU research, you indicated that the NNSA is continuing to look at the viability of LEU. However, you also said that one of the main hurdles will be balancing non-proliferation requirements with the Navy's operational requirements while you work with the administration on this issue. If in the end, the R&D program does not validate acceptable LEU fuel density and higher assay fuel must be substituted to achieve a life-of-ship core, what is the technical and performance risk of designing next-generation vessels to accept a core sized for an aggressive LEU design?

Dr. VERDON. The technical and performance risk of designing next-generation vessels to accept a core sized for an aggressive low-enriched uranium (LEU) design is high. As discussed in DOE/NNSA's 2016 report to Congress, Conceptual Research and Development Plan for Low-Enriched Uranium Naval Fuel, naval reactor plants must be compact to be cost-effective. The size of a submarine directly affects the power required to propel the ship. The reactor core must fit within the space and weight constraints of a warship, leaving room for weapons and crew, while still being powerful enough to drive the ship at tactical speeds for engagement or rapid transit to an operating area while carrying sufficient fuel to last for decades. Decades of technological advancements with highly enriched uranium (HEU) have enabled life-of-ship cores for Navy submarines, including the COLUMBIA-Class, each of which will serve in excess of 40 years without the need for refueling. The replacement of HEU with LEU reduces the energy in the uranium fuel by more than a factor of four. Implementation of LEU is a major technical challenge, and is expected to result in ships that are less capable militarily, more expensive, and that require at least one refueling over the life of the first ship class to use LEU fuel, regardless of reactor size. If refueling were reintroduced, force structure requirements and costs would increase. An example of the costs associated with refueling impacts on force structure requirements can be shown with the COLUMBIA Class SSBN. This submarine will not require a mid-life refueling because it is designed with a 40-year life-of-ship core. Introducing such a need for mid-life refueling in the COLUMBIA Class would require the strategic deterrent mission to be accomplished with more ships (14 versus 12), significantly increasing acquisition and lifecycle costs by over \$40 billion dollars. We do not deem it practical to work on designs of naval vessels around an unproven advanced LEU fuel concept, nor to accurately project the effects of an advanced LEU fuel, because neither the ship performance requirements nor the fuel technology needed are established. However, even without working on a design, we assess that attempting to design a ship to accommodate sufficient LEU for potential life-of-ship operation would lead to a larger submarine diameter and/or length. Developing a new ship capable of later acceptance of an LEU reactor core would involve insertion of substantial margin—resulting in increased hull size—that would be difficult to estimate and costly to implement.

Mr. LANGEVIN. For both the carrier and submarine applications, what is the estimated impact on the vessel performance and dimensions of using LEU fuel, assuming a full power core sized for life-of-ship, under range of plausible LEU fuel densities that might be validated by an aggressive R&D program? At what point in the Navy's planning process must these decisions be made?

Dr. VERDON. As discussed in DOE/NNSA's 2016 report to Congress, Conceptual Research and Development Plan for Low-Enriched Uranium Naval Fuel, an advanced LEU fuel system concept might satisfy performance requirements for an aircraft carrier without affecting the number of refuelings (current NIMITZ and FORD class carriers require one mid-life refueling), though at higher acquisition cost. The conceptual plan for an advanced LEU fuel design would include manufacturing and testing that would span 15 years and, based on cost estimates in the 2016 Report to Congress, require at least \$1 billion in fiscal year (FY) 2016 dollars to establish whether the fuel is viable for use in a naval reactor design. Subsequent funding would be needed to mature this conceptual plan and bring it to reality. Assuming successful fuel system validation and aggressive parallel engineering and manufacturing development, the estimated cost to deploy an advanced LEU fuel system in submarines and aircraft carriers is in excess of \$20 billion. Not included in this esti-

mate are additional significant costs associated with (1) additional operating and support costs at shipyard facilities, (2) increases in manufacturing costs of advanced fuel, and (3) the increase in force structure that may be required to offset the loss in operational availability of submarines undergoing refueling overhauls. For submarines, the reactor plant must be very compact to be militarily effective. The reactor core must fit within the space and weight constraints of a warship, leave room for weapons and crew, be powerful enough to drive the ship at tactical speeds for engagement or rapid transit, and carry sufficient fuel to last for decades. An LEU-based fuel capable of meeting modern U.S. Navy submarine requirements has not been established, and, therefore we do not deem it practical to work on designs of naval vessels around an unproven advanced LEU fuel concept. The Navy would not consider a newly-designed reactor core using LEU until a new fuel system could be developed and shown to be effective in a prototypical environment. Decades of technological advancements with HEU have enabled life-of-ship cores for Navy submarines, including the COLUMBIA-Class, each of which will serve in excess of 40 years. The replacement of HEU with LEU reduces the energy in the uranium fuel by more than a factor of four. Implementation of LEU is a major technical challenge, and is expected to result in ships that are less capable militarily, more expensive, and that require at least one refueling over the life of the first ship class to use LEU fuel, regardless of reactor size. If refueling were reintroduced, force structure requirements and costs would increase. For example, introducing such a need for mid-life refueling in the COLUMBIA Class would require the strategic deterrent mission to be accomplished with more ships (14 versus 12), significantly increasing acquisition and lifecycle costs by over \$40 billion dollars.

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. When can we expect to see the SLCM-N AOA? Despite the Acting SECNAV memo on the FY2023 PRB the committee requests to be briefed on the AOA at the earliest possible date.

Ms. DALTON. The Analysis of Alternatives (AOA) was conducted by the U.S. Navy and is now complete. I will refer you to our Navy colleagues who I understand are prepared to brief the Committee on the classified results of the AOA in the near future. While we are aware of the Acting Secretary of the Navy memo you reference, the submarine-launched cruise missile—nuclear (SLCM-N) program will be examined during the upcoming review of U.S. nuclear posture and policy.

Mr. TURNER. When you provided testimony before the SASC last month, it was stated that GBSD will be \$38 billion less than a Minuteman III LEP. Could you please specifically outline what went into those numbers and what was excluded, so that the committee can have confidence it was an apples-to-apples comparison?

General DAWKINS. The Department of the Air Force estimated the cost of a Minuteman III (MM III) Service Life Extension Program (SLEP) to 2075 as \$302B. The Office of the Secretary of Defense, Cost Assessment and Program Evaluation estimated in their Milestone B Independent Cost Assessment for the Ground Based Strategic Deterrent (GBSD) that GBSD will cost \$264B to 2075, \$38B less than the MM III SLEP estimate. The MM III SLEP estimate includes replacement efforts for booster, guidance, post-boost, ground system, and command and control elements. Both estimates include required Research, Development, Test and Evaluation; Procurement; Military Construction; Military Personnel; and Operation and Sustainment costs. Neither estimate includes any fuze or warhead modernization; including this cost would add \$24B to each estimate. Finally, neither the MM III SLEP estimate nor the GBSD estimate include costs for the deactivation, demilitarization, and disposal of the MM III.

Mr. TURNER. Earlier this year this committee heard testimony from Admiral Richard that if the ICBM leg of the triad is allowed to atrophy further, he'll need to put bombers and refuelers back on alert. How much would this cost?

General DAWKINS. Cost estimates to put bombers and tankers back on alert are not fully mature at this time, as this course of action is not necessary given the current nuclear triad construct. However, United States Strategic Command provided a rough cost estimate of returning bombers to alert in its April 2021 "Potential Delays to Nuclear Modernization" Report to Congress, to which the Air Force contributed. While this document is classified and cannot be quoted in this unclassified response, returning bombers to a continuous alert posture would require major infrastructure improvements, as well as increased security and manning requirements. Additionally, returning bombers and tankers to alert status would negatively impact conventional readiness by reducing the availability for Bomber Task Force missions, which are currently in high demand by Combatant Commanders. Finally,

returning bombers to alert would likely drive requirements for additional new tanker and bomber aircraft and associated manning in order to support Strategic Command's deterrent mission requirements as well as other day-to-day conventional requirements.

Mr. TURNER. GBSD will not only be a cost saver but will also provide an upgraded capability over the MMIII. Can you please explain this upgraded capability and how it will better allow you to address the Russian and Chinese threat?

General DAWKINS. Our potential adversaries are rapidly advancing both their offensive and defensive capabilities. The currently fielded Minuteman III ICBM was designed in an era when the cyber-domain did not exist and anti-ballistic missile capabilities were in their infancy. The Ground Based Strategic Deterrent (GBSD) will not only provide an increase in survivability and accuracy, but will be safer, more secure, more reliable, and offer enhanced operational flexibility. GBSD utilizes model-based systems engineering, a Modular Open Systems Architecture and a modular system interface allowing technology insertions at a lower cost and implementation at the speed of relevance. These methodologies will enable the weapon system to quickly adapt to and counter new, emerging, and currently unforeseen threats while reducing operations and sustainment costs throughout its lifecycle. As a full system recapitalization effort, GBSD will address the complete spectrum of current and future threats in the realms of electronic, electromagnetic pulse, antiballistic missile, cyber, and nuclear pre/trans/post attack environments. The Air Force welcomes the opportunity to provide the Committee further details in a classified setting.

Mr. TURNER. Isn't it true that GBSD will have safety upgrades? Can you please explain what these are and why they're important?

General DAWKINS. Like the currently fielded Minuteman III (MM III), Ground Based Strategic Deterrent (GBSD) will contain positive control measures to prevent the deliberate pre-arming, arming, launching, or release of nuclear weapons, except upon execution of the President's orders. Compared to MM III, GBSD will drastically reduce human proximity to the weapon by limiting the need to access and/or transport the missile for routine maintenance. GBSD missile components are being designed for greater time spans between routine maintenance, reducing exposure while increasing physical security, weapon surety, and safety. Additionally, GBSD will include positive physical measures against unauthorized access through a combination of enhanced entry and access measures, as well as administrative, technical, and cyber security provisions to protect access to sensitive areas and materials.

Mr. TURNER. The FY22 request included a modest increase in the request for LRSO. Can you please explain how this increase was arrived at and how it will be spent?

General DAWKINS. The FY22 increase in LRSO Research, Development, Test, and Evaluation from the FY21 President's Budget is primarily due to an accelerated Engineering and Manufacturing (EMD) contract award in July 2021 instead of February 2022. Pivoting to a sole source vendor enabled EMD acceleration based on Raytheon's maturity of design. The FY22 increase accounts for maintaining manning levels constant across all of FY22 in order to smooth the transition between the Technology Maturation and Risk Reduction phase and EMD (\$30M/month x 5 months = \$150M). Additionally, the increase accounts for procuring hardware for testing not originally planned in FY22, such as radiation hardening testing (\$42M), and inclusion of performance incentive fees (\$21.5M) as identified in the Acquisition Strategy (AS). Other prime contract cost drivers include updated costs for conducting flight tests (\$5M) to begin clearing the B-52 envelope with a design of experiments approach, and an increase due to Digital Engineering efforts (\$3M), which will provide greater insight into the design as required with the AS.

Government costs include warhead hardware purchases (\$18M) through the National Nuclear Security Administration, which are required to maintain the synchronization with the warhead development effort. Government costs also include range costs and survivability ground tests (\$10.8M).

Mr. TURNER. Can you please articulate for the committee the capability LRSO will provide over the current ALCM?

General DAWKINS. The AGM-86B Air Launched Cruise Missile (ALCM) was first fielded in 1982 and was designed for a 10-year service life against air defenses of that era. Now 29 years past its designed service life, the LRSO is needed to replace the ALCM. The need for LRSO is partially driven by ALCM's over-extended service life, however, the true driver for LRSO is to ensure that a penetrating nuclear cruise missile capability is retained given the rapidly advancing adversary integrated air defense system capabilities. The LRSO will impose higher costs on adver-

saries' air defenses, requiring large investments and advances in detection, tracking, command-and-control, and area defenses to challenge each LRSO.

The Air Force welcomes the opportunity to provide the Committee further details in a classified setting.

Mr. TURNER. Is there potential for the USN to leverage the USAF LRSO program for SLCM-N?

General DAWKINS. Yes, there is potential for the Navy to leverage the Air Force's Long Range Standoff Weapon (LRSO) program for the Sea-Launched Cruise Missile-Nuclear (SLCM-N). LRSO and its associated warhead are part of the Navy's SLCM-N Analysis of Alternatives (AoA). The Navy's TRIDENT II Life Extension 2 (D5LE2) and the Air Force's Ground Based Strategic Deterrent (GBSD) programs have forged a strong relationship, using an Under Secretary of Defense for Acquisition & Sustainment Memorandum of Understanding (MOU), and information is shared between the programs regularly. If SLCM-N becomes a program of record, the MOU construct developed for D5LE2 and GBSD could be utilized as a model to create a similar relationship for LRSO and SLCM-N.

Mr. TURNER. I'd like to express my appreciation that full funding was included to achieve the military requirement of producing 80 plutonium pits per year by 2030. This is specifically \$475 million for the Savannah River Plutonium Processing Facility (SRPPF) and \$350 million for Los Alamos Plutonium Facility 4 (LAPF-4). Can you please describe in detail just how much more expensive it would be to do all 80 pits per year at LANL?

Dr. VERDON. Producing all 80 pits per year at Los Alamos National Laboratory (LANL) would involve greater risks than NNSA's current two site strategy for plutonium pit production and would have higher acquisition costs. The additional acquisition expense of producing all pits at LANL is driven by the need to construct a new nuclear facility at Los Alamos, rather than repurposing a nuclear facility that already exists at the Savannah River Site. In terms of mission risk, a Congressionally-mandated independent study conducted by the Institute for Defense Analysis (IDA) concluded that producing 80 pits per year at LANL was a "very high risk" approach. Section 3120(c) of the Fiscal Year (FY) 2019 National Defense Authorization Act (NDAA) directed NNSA to provide a detailed plan for designing and carrying out the entire 80 pit per year (ppy) production mission at LANL. As part of the 2018 Plutonium Pit Production Engineering Assessment (EA), a team of subject matter experts and Enterprise Construction Management Services contractors evaluated pre-conceptual design drawings for an option to achieve 80 ppy in LANL's Plutonium Facility 4 (PF-4) in tandem with new production module construction. The Department of Energy (DOE) and the Department of Defense (DOD) affirmed the EA conclusion that a strategy to produce 80 ppy at LANL in PF-4 or newly constructed production modules had the highest risk of all options examined, and installation of additional equipment in PF-4 to achieve 80 ppy could disrupt ongoing operations to achieve 30 ppy. DOE/NNSA concurs with the risks identified by the EA and IDA studies regarding the use of PF-4 to achieve 80 ppy. In addition, PF-4 is currently the only U.S. facility capable of pit production and other missions, and the facility will reach its assumed 50-year design life before 2030. Although DOE/NNSA continues to invest in facility sustainment projects to extend the life of the facility and reduce public, safety, and operational risks, any long-term commitment to achieve and sustain 80 ppy at LANL would require additional production capacity in a new nuclear facility. Beyond the additional acquisition cost and risk associated with an investment to produce more than 30 ppy at LANL, there is a potential production risk associated with concentrating all pit production in a single location. Two geographically separated plutonium pit production facilities bolsters resilience from external threats and hazards and enables flexibility to mitigate impacts of shutdowns, incidents, or other factors that may suspend operations at a single site.

Mr. TURNER. Can you please outline NNSA's track record for meeting CD-1 cost estimates since 2012 with specific examples of projects that have come in both under and over budget from CD-1 to CD-4.

Dr. VERDON. Since the beginning of Fiscal Year 2012, NNSA has approved Critical Decision (CD)-1 for and completed six (6) projects or subprojects. All projects were completed under budget (i.e. below their CD-2 baseline cost estimates). Comparing the CD-2 Total Project Cost (TPC) to the estimated cost at CD-4 (or final closeout cost where available), the 6 projects had a collective underrun of \$159 million (27%). The table below includes information about the six projects, including the top end of the cost range approved at CD-1. It should be noted that the two projects that finished above the top end of their CD-1 range started as general plant projects (GPP) and as such were managed outside of the DOE O 413.3B proc-

ess. They reached CD-1 and established their cost range before nearly all of the reforms in place today were initiated.

Mr. TURNER. Do you have everything you need in this budget to bring the W88, W80-4, W87-1, and the W93 in on-time and on-budget.

Dr. VERDON. Yes, the FY 2022 President's Budget Request provides NNSA the necessary resources to meet the timelines and requirements associated with these programs.

Mr. TURNER. Some have argued that there are too many single points of failure in the NNSA complex. What are some single points of failure that give the you most concern?

Dr. VERDON. While DOE/NNSA's priorities are modernizing the weapons complex and executing all programs of record, there are sub-tasks critical to meeting these requirements that are single points of failure. These sub-tasks are Canned Sub-assemblies and plutonium pit production; if we fail to manufacture or assemble these critical components we will be forced to implement mitigation strategies which challenge our ability to maintain the nation's nuclear deterrent while enhancing the safety, security, and effectiveness of the U.S. nuclear weapons stockpile. Single-point infrastructure failures create undue mission risk. DOE/NNSA's aged, fragile production and testing facilities are reliant on safety systems and utilities that require increased maintenance and upgrades to avoid shutdowns. DOE/NNSA is in the process of replacing the Y-12 National Security Complex's obsolete Criticality Accident Alarm Systems and is preparing to install a secondary electrical feed at the Pantex Plant to provide backup power to the site's data nerve center. Sufficient manufacturing space at the Kansas City National Security Campus is a significant risk which we are addressing through short-term leases and longer-term real property acquisition. Investment is needed in PF-4's fire suppression water loop, which is a major safety system for pits, to eliminate a high-risk, single-point failure. Additionally, failing building systems must be replaced at Sandia National Laboratories' Building 894, which is the sole producer of power components for the enterprise, until the Power Sources Capability is operational. Fully funded maintenance and extended life programs help mitigate the risk of single-point failures, but even the best maintained systems require major replacement decisions every 15-20 years. For timely and unexpected infrastructure failures, minor construction projects are vital for a quick response. Additionally, aged, high-risk facilities carry significant risks to sites and surrounding populations. Aggressive risk reduction programs to prepare these facilities for demolition as soon as possible is extremely important to addressing some of our most concerning infrastructure challenges.

Mr. TURNER. Where in the NNSA FY2022 budget are we accepting the greatest risk.

Dr. VERDON. By letter dated August 16, 2021, the Administrator certified that the FY 2022 President's Budget Request for NNSA of \$19.7 billion is sufficient, and there are no unfunded priorities that would preclude NNSA from meeting FY 2022 Department of Defense requirements or FY 2022 internal NNSA deliverables.

Mr. TURNER. We've heard Secretary Granholm and Dr. Hruby state that they fully support the two-site solution for pit production. Can you please articulate the importance of resiliency in the system? Has COVID played into your resiliency calculation?

Dr. VERDON. The need for a capability to produce 80 pits per year was identified by the Secretaries of Defense and Energy in 2008 and has been echoed through multiple administrations. Our Nation is at a point where we can no longer accept the risk of a single-point failure in the ability to produce pits needed to meet the military requirements. Having two geographically separated plutonium pit production facilities supports resilience from external threats and hazards and enables flexibility to mitigate impacts of shutdowns, incidents, or other factors that may suspend operations at a single site. These conclusions were supported by a Congressionally-mandated independent study conducted by the Institute for Defense Analysis (IDA), which found that using Los Alamos National Laboratory as the sole production site for the full 80 pits per year was a "very high risk" approach. Disruptions to global supply chains caused by the COVID pandemic both illustrated and underscored the need for robust and resilient manufacturing capabilities in vital production sectors. Plutonium pit production is a vital manufacturing sector for national security missions.

Mr. TURNER. How will LANL and SRS work together to ensure lessons learned at one site are shared at the other?

Dr. VERDON. The Los Alamos National Laboratory (LANL) and the Savannah River Site (SRS) have been actively sharing lessons learned since the Nuclear Weapons Council endorsed DOE/NNSA's two-site strategy for pit production in 2018. The Preliminary Project Execution Plans (PPEPs) for both the Los Alamos Pit Produc-

tion Project (LAP4) and the Savannah River Plutonium Processing Facility (SRPPF) state that DOE/NNSA and DOE field offices—including the Los Alamos Field Office (NA-LA), Savannah River Field Office (NA-SR), Lawrence Livermore Field Office (NA-LL), and the Carlsbad Site Office—will provide inputs to the overall requirements and project execution activities. The SRPPF PPEP specifically states that: “During conceptual design and CD-1 development, the SRPPF team sought out and used all available lessons learned for similar nuclear projects, to ensure that decisions are made using knowledge gained from past projects and innovative approaches and good work practices can be incorporated into the SRPPF Project.” This process will continue with the preliminary and final design and the CD-2 development, especially coordination with the LAP4. In addition, Senior Management Teams (SMTs) are led by NNSA’s Office of Production Modernization and are comprised of Senior Executive Service members from NNSA’s Office of Acquisition and Project Management, NA-LA, NA-SR, and support offices, including but not limited to nuclear safety, security, and the Chief Information Officer for both projects. The SMTs for both the LAP4 and SRPPF projects provide another opportunity to ensure lessons learned at one site are shared at the other. LANL, the Lawrence Livermore National Laboratory, and Sandia National Laboratories are collaborating to support SRPPF, with Integrated Project Teams (IPTs) that maintain a high level of awareness of the project to ensure integration between the work at each site. LANL has established a single associate lab director organization responsible for plutonium delivery which allows for a single point of coordination and integration. DOE/NNSA has also provided incentives in the Corporate Performance and Evaluation Plan for contractors at these sites to coordinate, integrate, and execute both projects at LANL and SRS in the most advantageous manner in support of the overall mission. In addition to routine collaboration on activities involving manufacturing process design, equipment selection, technology readiness assessments, nuclear and criticality safety strategies, and pit production workforce development initiatives, LANL and SRS have established a formal Knowledge Transfer Program. Under the auspices of the Knowledge Transfer Program, personnel from SRS relocate temporarily to work and train in LANL’s Plutonium Facility-4, performing actual pit production operations. Continued expansion of the Knowledge Transfer Program is vital to the success of NNSA’s two site strategy for plutonium pit production.

Mr. TURNER. Can you please sum up your understanding of Russian nuclear-capable SLCMs.

Admiral WOLFE. Congressman, thanks very much for your interest in this area. I can’t adequately answer your question in this venue, but I will work with your staff to provide you a more comprehensive response via classified channels.

Mr. TURNER. Is there potential for the USN to leverage the USAF LRSO program for SLCM-N?

Admiral WOLFE. Yes, there is certainly potential for the USN to leverage the USAF LRSO program for SLCM-N. The USAF LRSO and its associated warhead are part of the SLCM-N Analysis of Alternatives (AoA). The USN’s TRIDENT II Life Extension 2 (D5LE2) and the USAF’s Ground Based Strategic Deterrent (GBSD) programs have forged a strong relationship and we share information between the programs (technical exchanges, hardware, testing, etc) regularly.

QUESTIONS SUBMITTED BY MR. MOULTON

Mr. MOULTON. On the importance of recruiting, developing, and retaining a highly technical workforce, how do you measure your progress in recruiting and retention? We are losing too much talent today. Can you please share some of the statistics and the ways you track this so we can see measurable progress?

General DAWKINS. The Air Force carefully monitors recruiting goals and retention metrics to ensure we have a sufficient force of highly skilled and experienced Airmen to support the National Defense Strategy. Additionally, some of the additional authorities granted to my position as one of the six cross-functional authorities in the Air Force enable me to gain additional insight into all career fields supporting the Air Force nuclear enterprise and the ability to provide feedback into the overall Air Force process. Furthermore, the Air Force is developing a continuous assessment capability of the nuclear enterprise as part of the Nuclear Mission Assessment (NMA), which was established by the Fiscal Year 2016 National Defense Authorization Act. The overall vision of the NMA is a continuous, comprehensive, data-driven assessment capability to provide insights and trend analysis of underlying issues within the nuclear enterprise to senior leaders and decision makers. The analysis model being developed with our partnership with Johns Hopkins University’s Applied Physics Laboratory will incorporate human capital metrics such as retention

rates to better address the health of those career fields within the nuclear enterprise. The Air Force as a whole achieved its FY20 recruiting goals of 26,398 regular component Enlisted (100% of goal) and regular Officers of 4,553 (100% of goal). We also met our Air National Guard combined officer and enlisted goal by recruiting 11,620 members (108% of goal), and our Reserve combined officer and enlisted goal of 7,000 (100% of goal). Additionally, the Air Force is on target to reach our FY21 recruiting goals. While we are doing well in recruiting, we understand there is a growing competition for talent and expect the recruiting environment to become more challenging. As important as recruiting is, retention within our high-tech force is equally important. While the Air Force is experiencing unprecedented high retention rates in both the enlisted and officer corps, the aggregate success may hide areas with retention challenges. To help improve these retention challenges, the Air Force continues to offer targeted monetary incentives as well as non-monetary incentives focused on quality of life and quality of service programs.

Mr. MOULTON. On the importance of recruiting, developing, and retaining a highly technical workforce, how do you measure your progress in recruiting and retention? We are losing too much talent today. Can you please share some of the statistics and the ways you track this so we can see measurable progress?

Admiral WOLFE. [No answer was available at the time of printing.]

QUESTION SUBMITTED BY MS. STEFANIK

Ms. STEFANIK. The FY2022 President's Budget requests \$640,684,000 for Naval Reactors Development (NRD), which focuses on research and development to ensure the current and future fleet is the most advanced, well-maintained, and capable nuclear fleet in the world. Which technologies are NRD working on to maintain our nuclear force's capability overmatch over our great power adversaries in China and Russia?

Dr. VERDON. Naval Reactors Development (NRD) funds the development of advances in the unique nuclear propulsion technical capability that the Navy relies on to operate, build, and maintain nuclear-powered ships. Included in this line is funding that enables the Naval Nuclear Propulsion Program to manage operations of the current fleet, perform analysis of current reactor performance, and support construction of nuclear-powered warships. The FY 2022 budget request also increases investment in the research and development of new technologies, including those intended to support the Navy timeline for SSN(X). Investment in mid- to long-term advanced research and development has been deferred over the past decade to support major recapitalization efforts across the Program. The increase in NRD in FY 2022 will support the following efforts:

- Performing cutting-edge research to develop new technologies and manufacturing methods that significantly improve the capability, effectiveness, performance, and cost of future naval nuclear propulsion plants to maintain our strategic maritime superiority. Examples include added focus on:
 - Advanced instrumentation and control technology and equipment: Current digital control and power management equipment is becoming obsolete and will need to be replaced. Naval Reactors is working with commercial industry on replacements that take up less space, run cooler and with less power, enable more effective use of electrical power in the ship, are more secure against cyber-attack, costs less and can efficiently acquire and process a broad range of plant data.
 - Plant Data and Automation: Advanced sensors, artificial intelligence, and data analytics are being pursued to automate current manual data collection, and process that data into information that gives the operator a clearer picture of plant status, with goals to simplify operation, enable confident condition-based maintenance, increase ship operational availability and ease the burden on our sailors.
 - Core manufacturing development: Naval Reactors has started an effort to change how we manufacture reactor cores, with technology that promises to provide a more capable reactor for the next ship, while also allowing that reactor to be smaller and cost less. The new approach employs advanced, high precision robotics and machine learning methods for automated in-process inspection that can quickly find and correct potential production process issues much earlier than is possible today, reducing our fabrication costs and risks.
 - Component manufacturing technologies: Naval Reactors sees practical potential for using certain advanced manufacturing approaches in building major plant components. These advanced capabilities include hot-isostatic pressing and metal additive manufacturing, and based on industry experience, promise

to delivery propulsion plant components at reduced cost and schedule, in addition to enabling performance-enhancing designs with unique or complex geometries. These advanced manufacturing approaches can supplement, or in some cases replace, traditional forging and casting methods, some of which have changed little since World War II.

- Developing technology for reactor plant components that will provide substantial improvements in quieting capability and performance for future submarines. There is real potential to make a meaningful improvement to submarine stealth. Achieving an improvement involves work in reactor technology areas using existing specialized laboratory test facilities and state of the art flow and heat transfer computer methods, as well as targeted improvements to key reactor plant components.
- Recapitalizing facilities and equipment for inspecting and characterizing naval spent nuclear fuel; efforts that have the potential to provide increased operating capability of nuclear submarines and aircraft carriers.

QUESTIONS SUBMITTED BY MS. CHENEY

Ms. CHENEY. The nominee for NNSA Administrator recently testified in her confirmation hearing that it was longstanding U.S. policy that any enriched uranium used for national security applications, such as for NNSA's tritium program, must be fully "unobligated"—that is, mined, converted, and enriched in the United States, using U.S. technologies. Do you agree with that position?

Dr. VERDON. Yes. Under longstanding U.S. policy and international agreements, peaceful use obligations are imparted on uranium processed by certain foreign technologies or transferred under a 123 Agreement. DOE/NNSA maintains that these peaceful use obligations restrict the material from being used for tritium production and therefore unobligated material must be used for this mission.

Ms. CHENEY. While not a national security mission, the Office of Nuclear Energy is under a congressional mandate from Section 2001 of the Energy Act of 2020 to be able to provide a new type of nuclear fuel—high assay, low enriched uranium (HALEU)—to the commercial advanced reactor industry no later than 2026. Currently the only commercial producer of this specialty material is Russia. Shouldn't NNSA be working to support the Office of Nuclear Energy in meeting their commercial HALEU needs, so as to use American-produced HALEU rather than material imported from a strategic adversary?

Dr. VERDON. Yes. DOE/NNSA's Office of Defense Nuclear Nonproliferation is working closely with the Office of Nuclear Energy to identify HALEU within the DOE complex that can be used to support near-term commercial advanced reactor industry needs. Some of these inventories will require processing into a form that can meet industry's needs. While there is not enough HALEU available within the DOE/NNSA complex to meet all of industry's anticipated near-term needs, NNSA is committed to making available as much HALEU as possible for advanced reactors without negatively impacting existing national security and nonproliferation programs.

Ms. CHENEY. Why did NNSA not include funding for the uranium reserve in its FY22 request?

Dr. VERDON. NNSA did not request funding in FY 2022 for two reasons. First, the Uranium Reserve program was originally proposed as a program to support civilian nuclear industry and not defense needs. DOE/NNSA has sufficient quantities of unobligated uranium to sustain defense missions through the early 2040s. Second, funds appropriated in FY 2021 will be executed in FY 2022.