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Subcommittee on Strategic Forces

COMMITTEE ON
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UNITED STATES SENATE

HEARING TO RECEIVE TESTIMONY ON THE DEPARTMENT OF ENERGY'S ATOMIC ENERGY DEFENSE ACTIVITIES AND DEPARTMENT OF DEFENSE NUCLEAR WEAPONS PROGRAMS IN REVIEW OF DEFENSE AUTHORIZATION REQUEST FOR FISCAL YEAR 2023 AND THE FUTURE YEARS DEFENSE PROGRAM

Wednesday, April 27, 2022

Washington, D.C.

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U.S. Senate
Subcommittee on Strategic Forces
Committee on Armed Services
Washington, D.C.

The committee met, pursuant to notice, at 4:30 p.m. in Room SD-G50, Dirksen Senate Office Building, Hon. Angus King, chairman of the subcommittee, presiding.

Committee Members Present: King, Warren, Rosen, Kelly, Fischer, and Tuberville.

OPENING STATEMENT OF HON. ANGUS KING, U.S. SENATOR FROM MAINE

Senator King: This is a hearing on the Department of Energy's atomic energy defense activity and Department of Defense nuclear weapons programs in review of the Defense Authorization Request for fiscal year 2023. This is a meeting of the Strategic Forces Subcommittee of the Committee on Armed Services of the United States Senate.

Senator Fischer is on her way over from the floor and will be here shortly, but I am going to begin the hearing and we will have a brief statement from her when she arrives.

First I want to thank all the witnesses for joining us today. The purpose of our hearing is to examine the fiscal year 2023 budget request for the defense portion of the Department of Energy's budget. This portion of DOE's budget involves primarily the National Nuclear Security Administration, or NNSA, and the environmental cleanup of the DOE's former defense sites.

Our NNSA witnesses will be Administrator Jill Hruby; the Deputy Administrator for Defense Programs, Dr. Marvin Adams; and the Deputy Administrator for Office of Naval Reactors, Admiral Frank Caldwell. For the DOE Office of Environmental Management our witness will be Mr. Ike White, the office's senior advisor.

The NNSA's fiscal year 2023 budget request is $21.4 billion, a 3.7 percent, or $754 million increase from the fiscal year 2022's enacted level of $20.6 billion. The DOE Office of Environmental Management's fiscal year 2023 request of $6.9 billion is up 3 percent, or about $205 million from the fiscal year 2022 enacted level of $6.7 billion.

This hearing will also examine the fiscal year 2023 budget request for the Air Force and Navy as it relates to atomic defense activities. For the Air Force, our witness is General Cotton, the Commander of the Air Force Global Strike Command, and for the Navy is Vice Admiral Johnny Wolfe, Director of the Strategic Systems Program Office.

In order to meet DoD requirements, the NNSA is the busiest it has been since the 1980s -- congratulations, Ms. Hruby -- with five major warhead programs and a number of large construction projects. I am hopeful we can understand the challenges that the NSA faces in dealing with DoD needs. Likewise, I am hopeful we can understand from our DoD witnesses what they see as the key hurdles facing NNSA as well as unique DoD requirements as they relate to the NNSA's modernization programs.

Today's hearing will involve two panels. The first will have Administrator Hruby, Admiral Caldwell, and Senior Advisor White. The second panel will have Deputy

Administrator Adams, General Cotton, and Vice Admiral Wolfe. After short opening statements we will proceed with questions from each member at 5 minutes each. And as I say, when Senator Fischer arrives we will give her a moment to make a brief opening statement.

But in the meantime, Administrator Hruby, why don't you begin. And I apologize for this awkward arrangement, but everybody is having meetings this afternoon, and this is room we drew, and this is the setup, understanding the circumstances.

Administrator, please proceed.

Ms. Hruby: Okay. I am waiting for a light. Yeah, it is on. All right.

STATEMENT OF THE HONORABLE JILL M. HRUBY, ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Ms. Hruby: Chairman King and Ranking Member Fischer to be, and members of the subcommittee, I am honored to present the President's fiscal year 2023 budget request for the National Nuclear Security Administration. Thank you for your enduring bipartisan support.

Chairman King, I have provided a written statement and respectfully request that it be submitted for the record.

Senator King: Without objection.

Ms. Hruby: The President's fiscal year 2023 budget request for NNSA is $21.4 billion. Informed by the 2022 Nuclear Posture Review, this request underscores both our expanded mission and the increasing pace required to meet program needs.

The weapons activity request is $16.5 billion, and includes nearly equal funding for stockpile management, about $4.9 billion, and production modernization, about $4.6 billion. This is an indication of NNSA's biggest challenge, to succeed in parallel weapons modernization and infrastructure revitalization.

This approach carries risk. However, it is our only feasible path to meet requirements, and we are making steady progress. The W88 Alt 370 for the sea leg of the triad and the B61-12 for the air leg have achieved first production

and are on track to meet DoD schedules. The W80-4 for the long-range standoff missile, the W87-1 for the Sentinel intercontinental ballistic missile, and the W93 for the sea-launched ballistic missile are in various phases of design.

On the infrastructure side, the uranium processing facility is enclosed and projected to be complete in 2026, and the 90 percent designs are underway for our two pit production facilities.

We continue stockpile sustainment, other production projects, and science, including establishing a program to strengthen stockpile digital resilience. Together these programs will fulfill the Administration's commitment to a safe, secure, reliable, and effective nuclear deterrent into the future.

The Defense Nuclear Nonproliferation budget request is $2.3 billion, and it aims to reduce global nuclear threats, and is essential in today's geopolitical landscape. Lowering nuclear risk with robust safeguards and stepping up cooperation with governments, international organizations, and the private sector help support the global expansion of peaceful nuclear use while managing proliferation. We continue to strengthen our ability to respond to nuclear and radiological incidents, and these capabilities have proved pivotal to inform the ground truths about nuclear threats in Ukraine. Admiral Caldwell is here to provide detail on the

naval nuclear reactor budget request.

The key to success is a high-quality workforce, and we are placing a high priority on attraction and retention throughout the enterprise.

In summary, NNSA faces difficult mission requirements in a difficult world. This budget request strikes the balance for NNSA to be responsive and responsible.

Thank you. I look forward to your questions.

[The joint prepared statement of Ms. Hruby and Mr. Adams follows:]

Senator King: Senator Fischer, I reserved time for you to make a brief opening statement if you would like.

STATEMENT OF HON. DEB FISCHER, U.S. SENATOR FROM NEBRASKA

Senator Fischer: Thank you very much, Mr. Chairman, and my apologies for being a few minutes late.

Overall I was very pleased to see that the budgets strongly support nuclear modernization that has been presented and embraced the renewal of our nuclear triad and nuclear infrastructure conceived during President Obama's tenure over a decade ago. However, I still have a number of concerns about the Administration's budget request.

In particular, I am concerned about the shortfall in funding for NNSA's budget and the impact this could have on plutonium pit production. While additional resources alone will not be sufficient to ensure pit production requirements are met, I believe we must do all we can to minimize the delay in delivering this critical capability.

Additionally, the Air Force's unfunded priorities list included several items related to our nuclear forces and nuclear command, control, and communications architecture, including $63 million in unfunded requirements for the Minuteman-III sustainment.

While we often focus heavily on modernization programs, we cannot forget that our current nuclear forces must be sustained and remain effective over the next decade until the replacements are fully operational.

I look forward to hearing more from our witnesses. I thank you all for being here. I thank you for the work that you do, and thank you, Mr. Chairman, for the hearing.

Senator King: Admiral Caldwell, please.

STATEMENT OF ADMIRAL JAMES F. CALDWELL, JR., USN, DEPUTY ADMINISTRATOR FOR NAVAL REACTORS, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Admiral Caldwell: Chairman King, Ranking Member Fischer, distinguished members of the subcommittee, thank you for the opportunity to testify here today.

Your consistent support for naval reactors allows my team to provide the Navy with the unmatched power and capability of nuclear propulsion. This gives our Navy the reliability, agility, and firepower to carry our national security missions around the world. Our investments in research and development over many decades have enabled the advanced technology in today's fleet. These investments have given the nation a competitive edge in the maritime environment.

Today we cannot do more of the same and expect that same advantage in the future. Our adversaries are pursuing military modernization programs across the spectrums of warfare aimed at eroding our maritime preeminence. Focusing on the future is a necessity, but that future needs to be built on the foundation of our people, our technology, and our facilities.

My budget request for fiscal year 2023 is for $2.08 billion and invests in three key areas of that foundation and three priority projects.

First, the budget request supports our most important resource, our people. The talented and dedicated people at our D.C. headquarters and our field offices around the country are absolutely essential to our strong, centralized management and oversight of the important work we perform for the nation.

Second, the budget request reflects the continuation of increased investment in research and development. Technology investment must be reinvigorated today to be ready for future shifts with the goals of lowering costs, reducing construction timelines, and adding capability to our fleet.

My request also focuses on investments to modernize our critical laboratory infrastructure and reduce our legacy environmental liabilities. Without this we will be unable to support fleet operations and vital research and development.

This year's request also supports the continued execution of three national priority projects. The first is the development of the reactor plant for the Columbia-class ballistic missile submarine, directly supporting the Navy's number one acquisition priority. Manufacturing the lead, life-of-ship reactor core is well underway. This year's request will allow my team to continue the work required for reactor plant testing and reactor plant delivery.

The second project is the refueling overhaul of our land-based prototype reactor in New York. Once complete, this reactor will provide 20 more years of student training and vital research and development.

The third project is the continued construction of the Naval Spent Fuel Handling Facility in Idaho, which will enable long-term, reliable processing and packaging of spent fuel from the Navy's nuclear fleet.

In closing, your strong support enables me to carry out Naval Reactors' mission. I respectfully urge your endorsement of our fiscal year 2023 budget request. Thank you very much.

[The prepared statement of Admiral Caldwell follows:]

Senator King: Thank you, Admiral. Mr. White, please.

STATEMENT OF WILLIAM WHITE, ACTING ASSISTANT SECRETARY OF ENERGY FOR ENVIRONMENTAL MANAGEMENT

Mr. White: Chairman King, Ranking Member Fischer, and members of the subcommittee, it is an honor to appear before you today to represent the Department of Energy's Office of Environmental Management.

EM is focused on its commitment to clean up the environmental legacy of the national defense programs that helped end World War II and the Cold War. This work helps address the government's responsibility to the communities that played such an important role in U.S. history, and more importantly helps position them to continue to grow and thrive in the future.

Today EM has completed cleanup activities at 92 of 107 sites, most recently competing legacy work at the Brookhaven National Laboratory in New York.

Even as EM has grappled with a global pandemic over the past 2 years, we have achieved a set of impactful accomplishments in the cleanup program. At Y-12 in Oak Ridge, EM demolished the biology complex so that this area can be used by NNSA for their modernization program.

Senator King: Could you get a little closer to the mic, please?

Mr. White: Of course, sir. At Y-12 in Oakridge, EM demolished the biology complex so that this area can be used

by the NNSA. More than 200 transuranic waste shipments were received last year at the Waste Isolation Pilot Plan, bringing the total to more than 13,000 shipments safely transported. That includes shipments from Los Alamos, where the team certified and completed 30 shipments to WIPP last year.

At the Hanford Site in Washington State, EM has begun large-scale treatment of radioactive tank waste in the Tank Side Cesium Removal system, another project completed ahead of schedule and under budget. We have treated around 200,000 gallons of waste since the system came online just a few months ago.

At Savannah River in South Carolina, EM is processing record amounts of tank waste, helping to address one of the largest environmental and financial liabilities there.

The EM team in Idaho recently completed its buried waste remediation project 18 months ahead of schedule. This high-priority cleanup project helps protect the Snake River Plain Aquifer and meets the commitment we made to the State of Idaho.

The fiscal year 2023 budget request will enable EM to further advance its mission, maintain national security priorities, and support those most impacted by the environmental legacy of the past. We will treat 1 million gallons of radioactive tank waste at the Hanford site and

advance work to begin vitrifying this tank waste by the end of 2023. After decades of support from Congress, this transformational accomplishment is well within sight.

As EM prepares to operate these facilities, it is also ramping up work on Hanford's high-level waste facility so that we are ultimately able to treat that portion of the tank waste too.

In South Carolina, EM will accelerate waste processing and tank closure activities, and at the Idaho National Laboratory we are advancing towards liquid waste treatment with the Integrated Waste Treatment Unit. The request will also allow us to address high-risk excess contaminated facilities and contaminated groundwater across the complex.

In addition to reducing environmental risks, the budget request supports broader national security and scientific research missions. The Waste Isolation Pilot Plant will be modernized and ensure that the facility is equipped to meet the needs of legacy cleanup activities and ongoing national security programs. And as the mission is carried out, we are committed to continuous improvement. GAO's latest high-risk report acknowledged the steps EM has taken to demonstrate this commitment, and we aim to go even further as we plan for the future.

The cleanup program depends on the talented men and women on the ground at our sites. That is why I am pleased

the budget request boosts support for workforce development and for building a pipeline of talent that promotes diversity, equity, and inclusion.

As EM makes steady cleanup progress and prepares for future mission needs, we remain committed to those most impacted by the environmental legacy of the past. Our sites are fortunate to be surrounded by diverse communities and tribal nations who are strong partners in advancing cleanup and planning for the future.

I appreciate the subcommittee's support for the EM mission. I thank you for your time, and I look forward to your questions.

[The prepared statement of Mr. White follows:]

Senator King: Thank you. We will have 5-minute rounds, and we will ask a few questions. We will probably have more than one round. We have a second panel.

Ms. Hruby, the budget request is about a 3 percent increase, but as I mentioned in my opening statement you are as busy as the agency has been in 40 years. Is 3 percent enough to meet the demands of the recapitalization, the Savannah River cleanup? I mean, we have got a whole host of problems. Is this amount sufficient?

Ms. Hruby: Yes, Senator King, thanks for that question. We think this is a budget that we can execute and that will keep us on track for requirements, on our requirements. It is true that it would be nice to complete our construction projects and have them ready to go for the rest of our modernization programs, but we simply cannot go any faster than we are currently going on those construction projects and have acceptable risk and get the products that we want.

So we think this is the right budget. It was fully informed by the Nuclear Posture Review, and it does, in fact, underscore the expanded mission and the accelerated pace. It comes on top of budget increases over the last several years that have been significant.

However, as I said in my opening statement, the parallel approach we are taking for modernization and

infrastructure revitalization carries persistent risks and includes things like single points of failure in our production complex, supply chain issues in construction projects, and workforce recruitment and retention across the complex. So we feel like this is a practical, accelerated budget, but it will carry risk because we are moving as fast as we can.

Senator King: Let me change the subject a minute to nonproliferation. One of the things that is not discussed much with regard to the Ukraine war is that Ukraine gave up its nuclear weapons in exchange for a guarantee of territorial integrity, which was signed by Russia. What has what has happened in Ukraine done to the whole theory and practice of nonproliferation? If you were Kim in North Korea, would you give up your nuclear weapons, having seen what has happened in Ukraine?

Ms. Hruby: Senator King, this is an important question. The Ukraine guarantees, you know, people will look at around the world. I am confident of that. At the same time, we will do everything we can in NNSA to uphold the nonproliferation regime that we have today. We will reach out, and we are reaching out to our allies and partners as particularly the allies that we have a guarantee with, to make sure they understand how strong our commitment to that guarantee is. We will continue to support

activities in the nonproliferation area. But we must step it up in our ability to convince people around the world that nuclear weapons are not the best approach and hopefully not take the wrong lessons from Ukraine.

Senator King: Well, I hope you are right, but I think it is of significant concern.

Pit production. Are we facing a pit gap? In other words, is it likely that we are going to be able to meet the needs or are we going to be, in 5 years, talking about some emergency program to fill in the gap to meet the needs for the newly deployed weapons?

Ms. Hruby: We think -- look, we are not going to be able to make 80 pits per year by 2030.

Senator King: Is 80 a magic number? Is 80 the number that we project we will need?

Ms. Hruby: That is a good question. So we are working really closely right now with the Department of Defense, NNSA and the Department of Defense, to look at the outyear requirements and to see how we can satisfy the program of record in ways that we are all comfortable with, that mean a safe, secure, reliable, and effective weapon program, nuclear weapons in the United States. And we believe there will be a path through that, but we are still working closely together to define the details of that.

Senator King: I would rather you say we know there is

a path, rather than say "we believe."

Ms. Hruby: I would rather say that as well, but, you know, I am being honest with you, that we are still in the process of sorting that all out in the Nuclear Weapons Council.

Senator King: Well, to the extent you refine the estimates and realize there is a problem, let us know sooner rather than later so we can attend to this problem now rather than 5 years from now.

Ms. Hruby: Let me just say another word about this. We are establishing pit production as a hedge against plutonium aging and pit aging. Our pits are not, today, at any kind of an aging cliff. We can reuse pits. We just do not like that plan because we may have to take them out before the end of the life of the weapon system. But right now we are not at the cliff of aging program. We just would like to put new pits in because we want the weapons to stay in the stockpile for 30 years, and we do not have the 30-year confidence we would like to have.

Senator King: Thank you. That is helpful.

Senator Fischer: Thank you, Mr. Chairman.

Ms. Hruby, this year's budget talks about minimizing the delay in pit production and repeatedly emphasizes achieving the necessary rate of 80 pits per year, quote, "as close to 2030 as possible." Yet your letter to this

committee on your unfunded priorities states that additional resources would allow NNSA to begin additional activities at the Savannah River plutonium processing facility. Would the additional resources referred to in your letter help minimize the delay in pit production?

Ms. Hruby: Senator Fischer, thank you for that question. The answer is yes. We would like to bring money forward from out years on the Savannah River pit production facility to do some early buys -- glove boxes, nuclear-quality piping, other shortages that we are seeing in the supply chain. We would also like to build a training facility at Savannah River to get the workers ready to get to rate production once construction is complete. So we would like to try to accelerate how fast we can go with construction, once our design is complete, and how fast we can get to rate production after the construction is complete. And that is what the unfunded request letter is about, is the money that we would like to pull forward into the 2023 budget request from our future years request.

Senator Fischer: In our discussion this morning you said we are looking at a 2032 to 2035 time frame for achieving the 80 pits per year rate that I believe we need to have, and it also will likely be another 2 years before we have a good idea of how to get there. I think I need to be clear. The additional resources you are referring to

make achieving full production by 2032 more likely. Is that correct?

Ms. Hruby: Yes.

Senator Fischer: So are in a position now, would you say, to be able to shape events so that we can reach that desired outcome of 2032, if we take the correct steps now?

Ms. Hruby: That is what we think. I just want to foot-stomp that we did get the money that we need to complete the 90 percent design, so a significant amount of money, $700 million. This additional request would allow us to position ourselves to make sure once we are done with the design we can go as fast as possible.

Senator Fischer: Okay. Earlier today we also discussed the goal of having nuclear infrastructure that is truly responsive to the changing security landscape that we are facing. When we talk about a responsive nuclear enterprise we usually think of facilities and production capabilities. But do you think that our processes are set up to allow us to move quickly? Do we need to take a fresh look at things, like the Phase X process, to see if we can go faster, where we can go faster?

Ms. Hruby: Yeah, thank you, Senator Fischer, for that question. Our processes are set up to ensure we get to the end state we want, and that is important. They are not set up to go fast. And I do think we have to begin to look at

how we can move faster without undermining the intent of staying, you know, on schedule and on budget and get what we want and how we can manage the risk with changing those processes and moving faster.

Senator Fischer: One thing we have seen on this committee, when it comes to the Department of Defense, is that over the last several decades they have structured their processes I think to minimize risk. And now as we see our security environment changing, I believe we need to prioritize speed and also innovation, but that sometimes means that we develop new approaches instead of relying on legacy development processes that are already in place.

Do you think that the NNSA faces a similar challenge?

Ms. Hruby: Absolutely, and for probably largely the same reasons. So we will look for ways to learn from what the DoD is finding. We will look for ways to make our processes more streamlined. We have had some success on smaller construction projects where we cut out pieces of the processes. We saved a lot of money. We have gone faster. So we are doing some experiments on lower-risk systems, but we have to carry that forward. I appreciate the question.

Senator Fischer: Thank you. Thank you, Mr. Chairman.

Senator King: Senator Rosen.

Senator Rosen: Well, thank you, Chairman King, Ranking Member Fischer, for holding this hearing. It is very

important. I would like to thank each of the witnesses for testifying today. Thank you for the service to our country.

I want to talk a little bit about the long-term funding strategy for the Nevada National Security Site, because since its inception, NNSS -- I do not know which one is easier to say, Nevada National Security Site or NNSS. It is a tongue-twister. But it has relied on its large and remote area to conduct missions for the nation's nuclear weapons and nonproliferation programs as well as other elements of our national security community.

It is larger than all other NNSA sites combined, and it is an equivalent size to the state of Rhode Island. NNSS has a vast amount of infrastructure, a vast amount of infrastructure to maintain, and I am delighted that you and Secretary Granholm each visited the site recently. We welcome the excitement and the attention that your visits have brought to the important and really unique work that we are doing there.

However, over the past few decades NNSS has faced unstable and unpredictable program funding. It is leaving the site with degraded infrastructure, despite being a facility of national importance responsible for the certification of our nuclear stockpile.

So I am pleased to hear the programmatic situation is now changing in a positive direction, but I remain concerned

that we address this infrastructure funding issue so that NNSS can continue to be a center of excellence for the enterprise.

Administrator Hruby, are you considering innovative approaches to assure that NNSS infrastructure is supported, recapitalized, including base funding to guide future investment planning?

Ms. Hruby: Yeah, Senator Rosen, it is nice to see you and thanks for your continued interest and support of the Nevada National Security Site. I will say that the Secretary's visit and my visit were actually separate visits but a week apart. I think I influenced her by calling in every day saying, "Oh, it was a great visit to Nevada."

Senator Rosen: It is a great site, is it not?

Ms. Hruby: It is a great site, and I have been there many, many times, but I have not been there for a few years. And I will tell you I was very impressed by the progress that has been made in Nevada, in the infrastructure and in the collaboration with the laboratories to do experiments there underground.

So to answer your question, I think we have a really great plan for the Nevada National Security Site, and the plan, from my perspective, looks like get our infrastructure to a state that is really bringing important contributions and is a good place for people to work, and then fund those

new capabilities to do important experiments for us going forward. So we are spending a lot of time and money now on construction. That will lead to a new demand in Nevada that will bring that base funding that you are looking for.

Senator Rosen: Well, thank you. I want to build on that because the Nevada National Security Site oversees our Stockpile Stewardship Program, principally at the U1a facility, the underground lab where the science is conducting subcritical experiments to verify the reliability and effectiveness of our nuclear stockpile. As you were just there, U1a is undergoing major construction.

So could you provide us -- I know we are not in a classified setting, but as much as you can -- provide us an update on the upgrades and how these advancements really are going to make a difference for those subcritical experiments that are really going to improve our stewardship program?

Ms. Hruby: Sure. I would be happy to. There is this program, another acronym mouthful, called Enhanced Capability for Subcritical Experiments, ECSE, that includes upgrades to the U1a tunnel complex, which is the tunnels that we do science experiments in. It also includes new tools, especially the sort of centerpieces, a radiography tool that allows us to watch implosion, also critical, of course.

And this this back to Senator King's question in an

interesting way. We need to understand how plutonium ages. This facility, with the radiography, will allow us to watch implosion in real materials, realistic geometries, which we have not been able to do before.

If we believe that we can get a good, excellent estimate of plutonium lifetime it allows us all kinds of -- actually pit lifetimes -- it allows us all kinds of options going forward, and we do not have to use head strategy of making sure we can make pits while we study aging.

Senator Rosen: Well, thank you. My time is up. I am going to submit some questions for the record about the Remote Sensing Lab that is also part of the Nevada National Security Site and plays a critical role to our community as well.

Thank you so much.

Senator King: Senator Tuberville.

Senator Tuberville: Thank you, Mr. Chairman. Thank you, panel, for being here today and your time.

Mr. White, are you familiar with Uranium-233?

Mr. White: Yes, sir.

Senator Tuberville: Yeah, I figured you were. Your office was tasked with downblending Uranium-233 in 2001. As you may know, the U.S. pioneered thorium reactor technology in the 1960s. These reactors cannot melt down and actually consumes nuclear waste and do not rely on high-assay low-

enriched uranium, which all the Department of Energy's next-generation reactors rely on.

Mr. White, what is the chief problem with the HALEU? Do you know? It comes from Russia. Correct?

Mr. White: Yes, sir.

Senator Tuberville: Thank you very much.

Not only is 233 proven to create safe and clean power, its grandchildren isotopes are also valuable to fighting cancer. A May 2008 DOE report found that the destruction of Uranium-233 threatened the supply of these lifesaving treatments. The DOE's 2010 audit report said that destroying Uranium-233 would blunt scientific research and weaken National Security Administration's test readiness program.

Mr. White, how many kilograms of this Uranium-233 remain to be blended? Do you know?

Mr. White: I do not know that exact number off the top of my head, but I will be happy to take that for the record and get it back to you.

Senator Tuberville: I will give it to you real quick -- 450 that we have left, which is worth millions and millions of dollars. Do you know how much it costs us to downblend this U-233?

Mr. White: Our budget request for this year is for $55 million.

Senator Tuberville: Fifty-five million. Correct. Fifty-five million to destroy something that is worth hundreds of millions of dollars, that we also can use for other things.

Do you find it odd that your agency is tasked with destroying something while, at the same time, the DOE gave this technology to China? I mean, it is kind of odd. Does it not seem odd to you?

Mr. White: The Environmental Management Program has a number of conversations with other programs across the Department as we look at whether facilities or material are excess and ready for disposition. Those conversations are often very difficult, and from an environmental management perspective what we really look at is once other programs have decided they no longer need the material, how we would prioritize the disposition of the material or the facilities within the scope of the larger cleanup program.

But the material that you are talking about at Oak Ridge, this is a high priority from a disposition perspective for the Environmental Management Program for a number of different reasons. The material, as it is currently stored at Oak Ridge National Laboratory, is one of the more significant safety and security risks that we have at Oak Ridge National Laboratory.

It is also material that is very expensive to safely

store and secure. The laboratory spends over $50 million a year to safely store and secure this material, and it is being stored in some of the oldest operating facilities that we have in the Department of Energy, so the cost of continuing to store the material in these facilities is going to go up over time.

At the moment we also have a very unique opportunity, working with a public-private partnership, to make use of some of the benefits that you just described. We have a partnership that allows our contractor, Isotek, to extract the thorium from the material. That is provided to another company, TerraPower, which uses the thorium to extract isotopes for lifesaving cancer research. And in the process some of the cost of our disposition activity is covered by that agreement between Isotek and TerraPower.

Senator Tuberville: Yeah. I would hope that we would really look at this to make sure that while we are destroying something that in the future we are not going to have to turn around and try to either buy it from China, buy it from Russia, or whatever, at the end of the day. I know it is probably dangerous, and we do store it in Tennessee. I am sure we could find a better place, that if they are not wanting it there, heck, we will take it in Alabama and put it in the Redstone Arsenal and protect it with our lives.

But I just hate that we are destroying something, that

we are paying to have destroyed, that we might use in the future.

Mr. Chairman, I would like to submit these for the record. I have got a 2008 Department of Energy Audit Special Report, a 2010 Department of Energy Audit Report, and a 2012 Summary Meeting Report between the Chinese Academy of Sciences and the U.S. Department of Energy. I would like to submit these for the record.

Senator King: Without objection.

[The information follows:]

[SUBCOMMITTEE INSERT]

Senator Tuberville: Thank you very much.

Senator King: Senator Warren.

Senator Warren: Thank you, Mr. Chairman, and thank you to our witnesses for appearing here today.

So we are modernizing our nuclear weapons program including constructing new plutonium pits which produce the radioactive raw material that we need for nuclear weapons. Resuming pit production is a huge undertaking for NNSA, and I have been a critic of some of NNSA's work because the agency has a pretty lousy record of waste and mismanagement that has cost taxpayers billions of dollars over the years.

Back in 2015, Congress set a requirement of producing 80 plutonium pits per year by 2030, and we are not off to a great start on that. The estimated budget for this work, at just one pit production site, doubled over the course of just a couple of months.

So, Ms. Hruby, what is the best current estimate for what 80 pits per year will cost?

Ms. Hruby: thank you, Senator Warren. I know this is a topic that you are care a lot about. We are, I think as you know, in the process of completing the 90 percent design of the Savannah River production facility and the Los Alamos pit production project. Until those are done we will not have a cost estimate that we can stand behind. It is true there are always numbers floating around out there, but our

processes are such that we are really trying to get a firm estimate and then come in on costs. So it would be premature for me to give you a number for that.

Senator Warren: Premature? So NNSA budget estimates put the figure at $15 billion, I have seen press reports at $18 billion, and you cannot even tell me what neighborhood this is in?

Ms. Hruby: I can tell you neighborhoods that it is in, and it is going to be -- if I give a number then I am going to be held to it, so with that caveat we do think it is going to be more than $10 billion.

Senator Warren: Well, I just got to say, that is a lot of money.

Ms. Hruby: I understand. It is a lot of money.

Senator Warren: Whether it is $10 billion or $15 billion or $18 billion. But even this astonishing number is probably not enough to build these pits.

You know, when NNSA's Deputy Administrator was before the committee a few weeks ago he said the 2030 goal is likely unachievable, and I am going to read you what he said. He said, "We can't get to 2030 by throwing more money at it," unquote.

So let's talk about why things are going so poorly. Last year the Department of Energy cost estimating shop conducted an independent review of the Los Alamos facility's

pit production plant. They found, quote, "There are significant risks in staffing, program management, production activities, supporting infrastructure, waste management, and other program requirements," unquote. You know, the biggest problem is there was not a single integrated plan in place to manage costs and schedule and performance.

So, Ms. Hruby, is there now a single integrated program management plan for pit production at Los Alamos?

Ms. Hruby: Yes.

Senator Warren: Yes. That is the good news, right? Yes, there is, and I appreciate that. This was the answer I wanted you to give. Yes, there is a plan in place. And I appreciate that NNSA is trying to address the problems with pit production. But there are no guarantees that this program will ever be successful, no matter how much money we spend. In fact, the pit production program has been drawing comparisons to a previous program called the Mixed Oxides Fuel Fabrication Facility, or MOX, which was designed to dispose of surplus weapons-grade plutonium. MOX was always technologically dubious and was finally cancelled after wasting $8 billion.

So here is my question, Ms. Hruby. Are you confident that we are not going to end up sinking billions of dollars, maybe tens of billions of dollars, into pit production

before finally pulling the plug, like we did with MOX?

Ms. Hruby: Yes, Senator, I am. Let me just say about this. This is a very important programmatic objective. We cannot fail.

Senator Warren: Well, I have to say I do not share your confidence that this is going to work. As I told Dr. Adams last month, I remain very concerned about this program. I think we need to seriously assess whether our goals whether the timeline we are all working on is realistic. NNSA cannot keep wasting billions of dollars of taxpayer money. This just has to stop. So thank you.

Ms. Hruby: Thank you.

Senator Warren: Thank you, Mr. Chairman.

Senator King: Thank you, Senator Warren.

Let's have our second panel join us please.

[Pause.]

Senator King: Welcome to our second panel. Dr. Adams, will you begin?

STATEMENT OF THE HONORABLE MARVIN L. ADAMS, DEPUTY ADMINISTRATOR FOR DEFENSE PROGRAMS, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Mr. Adams: Yes. Thank you. Chairman King, Ranking Member Fischer, and --

Senator King: Please get a little closer to the mic.

Mr. Adams: Will do. Chairman King, Ranking Member Fischer, and distinguished members of the subcommittee, thank you for the opportunity to discuss the President's fiscal year 2023 budget for NNSA. I thank the committee and the Senate for your support during my recent confirmation process. I am honored to serve as Deputy Administrator for Defense Programs, and I am committed to working closely with you and others in Congress, along with our partners in DoD, to advance the nuclear security mission.

The fiscal year 2023 budget request for weapons activities is $16.5 billion, which is about 3.6 percent more than what was enacted in fiscal year 2022. This request, informed by the 2022 Nuclear Posture Review, will enable NNSA to keep our nuclear weapons stockpile safe, secure, and effective.

NNSA is simultaneously executing five warhead modernization programs. Two are in production and three are following closely behind. Drivers for these programs include technical issues with warheads, changes in DoD

delivery platforms, and emerging capability gaps.

Warhead modernization requires reinstatement or replacement of lost manufacturing capabilities. With support from current and past administrations and Congresses, NNSA is modernizing and recapitalizing the production complex while simultaneous using both old and new infrastructure to manufacture modernized warheads.

Our highest infrastructure priority is reconstitution plutonium pit production capabilities. We are executing a two-site plan to produce plutonium pits at Los Alamos National Laboratory and the Savannah River site. We assess that this is the best way to reliably produce at least 80 war-reserved pits per year as soon as possible.

NNSA is also modernizing capabilities to process uranium and lithium to produce tritium, to manufacture and produce trusted rad-hard electronics, and to manufacture non-nuclear components.

As we focus on the time-urgent delivery of modernized warheads and an infrastructure that is modernized as well as we must also develop and nurture capabilities to meet future challenges. Continued investments maintain NNSA experimental and computational capabilities that address important stockpile questions, and importantly, that attract outstanding scientists and engineers, and let them develop into the experienced experts that the stockpile needs.

For example, ongoing investments support major experimental facilities at all three NNSA laboratories, it supports the enhanced capabilities for subcritical experiments projects at the Nevada National Security Site, supports exoscale computing that is coming, to be housed at Lawrence Livermore National Lab, and much more.

I am confident that with support of Congress and in partnership with DoD our dedicated workforce will meet these unprecedented challenges that we face to maintain, modernize, and sustain our nuclear deterrent into the future.

Thank you for this opportunity to testify. I look forward to your questions.

[The prepared statement of Mr. Adams follows:]

Senator King: Thank you, Dr. Adams.

Admiral Wolfe, please.

STATEMENT OF VICE ADMIRAL JOHNNY R. WOLFE, JR., USN, DIRECTOR, NAVY STRATEGIC SYSTEMS PROGRAMS

Admiral Wolfe: Chairman King, Ranking Member Fischer, distinguished members of the subcommittee, thank you for the opportunity to testify on the Department of the Navy's fiscal year 2023 budget priorities for nuclear forces. I respectfully request that my written statement be accepted for the record.

Senator King: Without objection.

Admiral Wolfe: For over six decades, the Navy has provided unwavering support to the sea-based leg of the nuclear triad. Since I briefed this committee last year, I would like to share with you some of SSP's accomplishments that build on this remarkable history.

In an effort to deliver a reliable and credible strategic weapon system to the fleet we have successfully completed a demonstration and shakedown operation onboard the U.S.S. Wyoming, certifying this Ohio-class submarine to return to alert patrol after a midlife refueling overhaul, demonstrating to the world the continued performance and reliability of this platform and the Trident II D5LE strategic weapon system.

In coordination with our partners at NNSA, the W93/Mk7 program continues, and the W88/Mk5 ALT370 program has achieved initial operating capability, further demonstrating

our commitment to responsible stewardship of our nuclear stockpile. And although not nuclear but of particular interest to this committee, I am incredibly proud of the milestones our hypersonics team, responsible for the Conventional Prompt Strike Program has achieved. These milestones include successful experiments to demonstrate the maturity of the common hypersonic glide-body technology; three static fire tests of the Navy-developed 34 1/2-inch missile booster; and a successful sounding rocket campaign, demonstrating that our advanced communications capability is sufficient mature to field our navy platforms.

The Navy continues to manage the Nuclear Strategic Weapons System across three main mission priorities: sustaining the current weapon system through Ohio end of life, developing the strategic weapon systems of the future for sea-based strategic deterrence on Columbia through 2084, and safeguarding our special relationship with the United Kingdom embodied in the Polaris Sales Agreement.

First and foremost, we must maintain the current D5LE missile inventory and provide the necessary operational support to sustain Ohio-class submarines and today's strategic weapon system through its end of life in the early 2040s. This is being accomplished through an update to all of our sub systems. All of our life extension efforts remain on track, and our current program will support the

deployment of all existing warheads. We must recapitalize all of our supporting Navy nuclear deterrence mission infrastructure to support and sustain nuclear weapons and SSBN operations.

Secondly, we must continue to ensure the transition between Ohio-class and Columbia-class submarine stays on schedule. For SSP, this requires a seamless transition of the current D5LE weapon system and missile inventory onto the new Columbia-class.

We have already started the work on the next variant of Trident and its corresponding weapon system, D5LE2. D5LE2 will yield multiple benefits in missile performance while providing flexibility in the system to meet future warfighter requirements. To achieve these requirements, we must design, develop, produce, and test this next-generation Trident over the coming decade, with the first flight test in 2033.

Finally, 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, we will continue to support the UK'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 NATO, and indeed global, stability.

Nuclear modernization will take time to complete, so sustained resourcing and enterprise effort is absolutely essential. It is only through your continued support that the Department's top modernization program priorities can be achieved and the Navy can deliver reliable sea-based strategic deterrence to 2084.

As the 14th director, it is my highest honor to represent the men and women of SSP. My number one priority is to assure that these men and women are poised to execute this mission with the same level of success, passion, and rigor as they have since our program was founded.

Thank you for the opportunity to testify today on behalf of the team that makes deterrence of major power conflict their life's work, and I look forward to your questions.

[The prepared statement of Admiral Wolfe follows:]

Senator King: Thank you, Admiral. General Cotton?

STATEMENT OF GENERAL ANTHONY J. COTTON, USAF, COMMANDER, AIR FORCE GLOBAL STRIKE COMMAND

General Cotton: Good afternoon, Chairman King, Ranking Member Fischer, and distinguished committee members. Thank you for the opportunity to be here today and represent the 32,000 men and women of Air Force Global Strike Command.

I would like to express our gratitude for your incredible support as we modernize the ICBM and bomber legs of the nuclear triad and remain on pace and on time with all of our efforts. As a force provider of strategic and long-range strike, I am proud of the excellence and efforts of our personnel as we deliver safe, secure, reliable nuclear deterrence to this nation.

Today's global environment does not allow for a diminished strategic deterrence. China has modernized at breathtaking speeds, and we expect them to have over 1,000 nuclear warheads by 2030, nested within a modern triad. As the Commander of STRATCOM has asserted, they have achieved strategic breakout. Meanwhile, Russia has recapitalized over 80 percent of their nuclear forces and are developing new weapons capabilities as we speak.

While near-peer competitors garner significant attention, we must not lose sight of the actions of other potential adversaries. North Korea continues to conduct missile tests, invest in hypersonic glide vehicle

technologies, manufacture physical materials, and operate a sophisticated cyberattack capability as they maintain the requisite infrastructure to conduct nuclear weapons testing. Make no mistake: we are locked in an age of long-term strategic competition, informed now by two nuclear-capable peers and the advent of non-nuclear strategic weapon systems.

Throughout all of this, our strategic deterrence continues to hold, as the cornerstone of national security. As the air and leg force provider to STRATCOM, I am constantly balancing the sustainment of legacy equipment with the acquisition of new weapon systems, ensuring deterrence remains credible throughout modernization. To maintain this balance as we build an enduring deterrent for decades to come, we rely upon many partnerships inside and outside the Department of Defense, including our partners in the Department of Energy, the National Nuclear Security Administration, and the Department of Navy.

I must always be ready to present credible and viable forces, and for this reason we maintain constant readiness 24 hours a day. From our missile crews on alert and our bomber crews accomplishing global bomber task force missions, we remain ready to hold our nation's adversaries at bay.

To guarantee continued deterrence into the future, it

is imperative that we remain on schedule as we bring new weapon systems online within the triad. I am happy to share we continue to make tremendous progress across our portfolios. We are moving forward from legacy sustainment to modernization and further into operationalizing our new systems.

The scope and scale of this modernization effort cannot be overstated. We must be diligent to remain on track as we evolve through all these phases. Any schedule or cost delays would have a cascading effect on the entirety of our modernization efforts and, in turn, on the credibility of our deterrence force.

I know you understand the historic situation we find ourselves in as we modernize this nation's nuclear triad, and I am confident for the future, as long as we continue to receive the support and funding necessary to remain on schedule. We have a strong foundation of dedicated people, we have thorough and deliberate plans in place, and we have the systems and development necessary to safeguard our nation for years to come.

We are grateful for our partnership with Congress and especially for the continual support of the defense committees. Air Force Global Strike Command remains committed to sustaining our bombers and ICBM forces as we bring Sentinel and a B-21 Raider online.

We also remain focused in investing and developing the people of our force with great care, to the enduring legacy of our mission. Our heritage inspires us into the way forward, and we will always be ready to provide convention or nuclear strategic long-range strike anytime, anywhere.

I look forward to your questions. Thank you very much.

[The prepared statement of General Cotton follows:]

Senator King: Thank you all, and I want to address a question to our general and our admiral, and advise you that what we are looking for at this committee is your best military judgment, not an answer that is tailored to the desires of any particular administration.

Two changes in the Nuclear Posture Review. One is the elimination of the sea-launched cruise missile, and the other is the elimination of the B-83-1, the heavy gravity bomb.

Admiral, let's talk about Ukraine and the threat that we are all aware of, of Putin using tactical nuclear weapons. Are we making a mistake by cancelling the sea-launched cruise missile, which gives us a comparable tactical weapon in response to potential use? I worry that we could be in a situation where it is mutually assured destruction or no response. Give me your thoughts on the cancellation of the sea-launched cruise missile.

Admiral Wolfe: Yes, Senator, thanks for the question. So here is what would say. Sir, I would tell you that in my position I do not advise on requirements to USSTRATCOM nor do I advise OSD on policy, or the Administration. As the acquisition lead, my job actually is to execute any program that the Administration and the Department --

Senator King: Yeah, you are the customer. I want to know what you think you need.

Admiral Wolfe: Actually I am not the customer, sir. USSTRATCOM is the customer. I am the acquisition leg that once STRATCOM requests their requirements and once policy decides what it is we are going to execute, I actually execute those programs as they Navy's acquisition lead and technical lead on how we would meet those requirements.

Senator King: So you do not want to express an opinion on the cancellation of this weapon system.

Admiral Wolfe: Sir, my personal opinion would not be something that I would want to share, because again, that is not my role in the United States Navy of advising either one of those organizations on either policy or requirements.

Senator King: General Cotton, are you going to give me the same answer on the B-83-1, or do you have a military opinion as to whether we need a bunker-buster of that nature?

General Cotton: Senator King, what I would tell you, as the Joint Forces Air Component Commander to STRATCOM --

Senator King: Could you speak up a little, General?

General Cotton: As the Joint Forces Air Component Commander to the Commander of STRATCOM, what I would like to do is, I would be able to present him with a portfolio of weapon systems of which he can choose. So if that is not in the portfolio, then that is one weapon system that he would be able to choose for planning purposes.

Senator King: I think we are going to have to have a different set of generals and admirals.

I understand. I am not criticizing you all but I am trying to get at an important policy question, and if you are not the right people to answer then we will have to have another hearing to try to get at that question.

Admiral Wolfe, how are we doing on the development of the Columbia-class? For example, have they solved the missile encasement issue, the welding issue that was slowing things down some time ago?

Admiral Wolfe: Yes, sir. I would tell you the Columbia program is moving forward. They remain on schedule. To your specific question about the welding issues that we saw early on with the missile tubes, they have made progress. Those tubes are coming out as we predicted. The amount of rework that is required on those tubes continues to go down, and Admiral Scott Pappano, who is PEO SSBN, continues to push that program forward. Yes, sir.

Senator King: General Cotton, a similar question. You are going to be engaged in an enormous project in developing the new ground-based deterrent. Give me a picture of where that project stands, what the progress is, and what the calendar looks like.

General Cotton: Thanks for the question, Chairman. I

am happy to say that GBSD, now known as Sentinel for the weapon system, is in a really, really good place. So I will say it is a megaproject. It is a megaproject. So I do not want to overstate the fact that what we are talking about is not just the replacement of a missile. We are talking about the replacement of the entire weapon system, the Minuteman weapon system.

The good news is F.E. Warren is the first base that we have already started to break ground in regards of what we are doing for F.E. Warren, Francis E. Warren in Cheyenne, Wyoming. Everything is on time, on schedule. I am not concerned of what we are seeing right now in regard to the program. The prime contractor is doing a tremendous job in regard to using digital engineering, as far as using open mission systems, as far as digital twins, that they are actually using from the B-21 program as well, and being able to carve out some of the best practices seen there.

So I think we are in a really, really good place, sir.

Senator King: Are original budget -- not original, but are recent budget estimates holding up?

General Cotton: It is, sir. So it is on time and on schedule and on budget at this point. I am very happy about that.

Senator King: Thank you, General. Senator Fischer.

Senator Fischer: Thank you, Mr. Chairman, and I want

to thank all of you gentlemen for the work that you do each and every day, and please thank those that work with you on this. You keep our country safe and you keep our allies safe and secure as well.

I am going to give it a shot, what the chairman tried to do. Admiral, I think we know that Admiral Richard, the combatant commander at STRATCOM, has been very forthright in speaking about a deterrence gap and being able to provide his job of providing the President with options that would be at his disposal to counter or to address the threats that we face as a country. And he has been supportive of the option of SLCM. You are aware of that, sir, right?

Admiral Wolfe: Yes, ma'am, I am aware of that.

Senator Fischer: I will not put you in a bad spot. General Cotton, I will save that for you. You and I had a conversation this morning and I think you answered the chairman in saying that those options are valuable for any commander in chief to have at their disposal in making wise decisions on the defense of our security. Would you agree with that?

General Cotton: Yes, ma'am, I would.

Senator Fischer: Okay. Thank you. Admiral Richard talks about that deterrence gap and assurance gap, and General Cotton, this morning you were visiting with me about our deterrent and stressing how important it was to have a

credible deterrent. I appreciate your emphasis on that, because that really boils it down to being able to have those options for our commander in chief so that he or she can make wise decisions. So I am going to steal that "credible deterrent" from you for the rest of my time here in the United States Senate.

General, you know that I am an advocate for recapitalizing our E-4B fleet, and I was very glad to see the Air Force's budget significant resources to developing a replacement. This is an issue that has been studied well over a decade, and the challenging of maintaining an outdated airframe are only getting harder as time passes.

Can you talk about the Air Force's plan to replace the E-4B with the Survivable Airborne Operations Center and give your perspective on how important it is that we replace that system?

General Cotton: Senator Fischer, that you for the question. It is absolutely critical. As you know, the National Airborne Operations Center, of which the E-4B, the airframe is an older airframe, of which we only have four. Based out of Omaha, Nebraska, now at Lincoln, Nebraska, until the runway is completed. Incredible men and women that fly that mission every single day.

I happy to say I think we are in a pretty good place on where we are going to move forward in regard to SAOC, its

replacement. I know that it has just recently went through a JROC, as we had kind of restudied what the requirements are. I am happy with the adjustments to the requirements. I think the final product of what we are going to see as far as fleet size is going to be very manageable for the President, for the Secretary, as well as the Chairman, moving forward. So I think we are in a very good place in regard of what we are going to see for the SEOC, ma'am.

Senator Fischer: Great. It is a good mission that we have there at Offutt. And when the runway is completed there at Offutt I know that in the future that is an opportunity that we have to expand that mission right there at Offutt Air Force Base as well. So I look forward to working with you on that.

As I mentioned in my opening statement, the $63 million for Minuteman-III sustainment on the Air Force's list of unfunded mandates, that $63 million. Can you talk about the importance of sustaining the Minuteman-III, both the system and the facilities, and how that helps reduce risk associated with transitioning to the Sentinel?

General Cotton: Thank you for the question, Senator. What is very unique is where we are with the nuclear portfolio. Where we are with the nuclear portfolio is we are going to have to maintain our legacy systems until we transition into the new. So that being said, I need to make

sure that I have a safe, secure, effective, and credible legacy weapon system as we transition into Sentinel, and that is what the sustainment request is in regard of making sure that we sustain our legacy system, known as the Minuteman-III. We just celebrated its 50-plus years on alert.

So by able to do that, we are safeguarding, as a bedrock the for the nation, for our allies and our partners to understand that they have a credible deterrent, one that is still safe, secure, and effective, until we get to the full transition of GBSD Sentinel in the 2036 time frame.

Senator Fischer: Thank you. Thank you, Mr. Chairman.

Senator King: Dr. Adams, not so long ago I visited Oak Ridge and I came away with two impressions. The people are fantastic. The facilities are pretty tired, and we using, I understand, manufacturing capabilities that literally go back to the '40s. As we move into these major, new projects and the upgrade across the nuclear enterprise, are there plans afoot, and are there activities underway to modernize the manufacturing process at places like Oak Ridge and Los Alamos?

Mr. Adams: Thank you. Thank you, Chairman King, for the question. The short answer is yes, we are working on that. The more nuanced answer is we have processes that we know work. They are qualified. They are proven. They

produce the product that we know we need. In many cases that product was a warhead that was tested underground.

If you change a process to one that, by all measures, looks better, there is a stringent quality standard and certification standard that has to be met, and we have to convince ourselves and skeptical observers that this thing will still work if it we make it a different way.

We are doing that, though. We are doing that work to convince ourselves that these things will still work when we make them different ways that are more efficient and that will ultimately give us a greater capacity.

Senator King: This is one of the collateral effects of not being able to test. We have to be sure, as you say, that what we are doing, even though it may be a more modern manufacturing capability, will produce equivalent quality results, and that is the direction you are moving in.

Mr. Adams: That is the direction we are going.

Senator King: General Cotton, in the fiscal year 2021 National Defense Authorization Act we required that the new B-21 be capable of hosting a long-range standoff missile to replace the 1980s cruise missile. Is that still in the planning stages? Is that part of a requirement that you accept as part of the B-21 process?

General Cotton: So as you mention, as LRSO comes online, of which you mentioned, for the air launch cruise

missile replacement, it will be a threshold weapon on the B-52 as well as, since we are going to a two-bomber fleet, as well as have its capability on the B-21 down the road as well.

Senator King: I have had several classified meetings on the status of the B-21 process. In an unclassified setting can you give me a bird's eye view? Are we still making good progress, still on budget, and do you feel confident about that process?

General Cotton: Sir, I think it is a model acquisition program for the Department. What we are doing and where it is, it is on time. I would love to host you to a couple of facilities so you can kick the tires yourself and see what is happening in regard to its development. I am very satisfied with where we on the progress of the B-21 program. It is on time and on budget.

Senator King: One additional question on the B-21 and that is, to what extent are we developing good estimates, solid recognition of sustainment costs? As you know, one of the problems with the F-35 has turned out to be very high sustainment costs into the indefinite future. Is that a factor in the design and manufacture and contractual relations that are part of the B-21?

General Cotton: Absolutely, sir. So we looked to see what kind of did not work there and tried to eliminate all

of those for the B-21 program. One is the fact that the modern technologies that we are seeing in the development of this platform, even when compared to how the B-2 was designed, everything is kind of captured in the new, modern ways of how our acquisition partners are developing this platform. So we took all of that into consideration so we would not restage into the past. So that was all taken into consideration for the B-21 program, and I am very satisfied that we will not replow that ground, on what you are talking about with the other weapon systems.

Senator King: With the concurrence of my co-chair I am going to cede myself an extra minute. You will get it too, yes.

Question for both the admiral and the general, and that is, intellectual property with regard to the B-21 and the Columbia. To what extent will the Department of Defense own the intellectual property so that in the future we can 3D print or otherwise acquire parts rather than having to go through the OEM process? I foresee a day, and hope there is a day when every depot, every hangar, every military facility has its own 3D printing capability, which would be an enormous availability boost. So are we buying the intellectual property on those two programs to the extent that we will be able to create our own parts without having to go back through the manufacturer? General?

General Cotton: Chairman King, I am glad you asked that question. That is what makes us very, very proud of the B-21 program. We own the baseline. We own the baseline. So what that does for us, it gives us open architecture. It allows us, understanding that we are designing a weapon system that is going to last for decades, that you can, by having open architecture and owning the baseline, that you do not have to kind of re-haggle, if you will, to do some improvements as the weapon system progresses in its timeline.

So I am happy to say that yes, we do own the operational baseline for the B-21.

Senator King: Excellent. Thank you. Admiral, how about Columbia?

Admiral Wolfe: Sir, although I do not know to the level of how much IP is actually known, because again, that is not in my portfolio, but let me answer it in a different way because I think your question about are we able to get the data that we need to 3D print and do some of that stuff, I would tell you already in the United States Navy and in the Submarine Service we are to the point where we are starting to use 3D printing and we are starting to understand what is available to all of our depot facilities and even to our individual platforms to be able to do that type of real-time maintenance that I think you are really

getting at.

So I would like to take a question for the record on the actual amount of IP that we are going to own for Columbia. But we are getting after that in many areas.

Senator King: I think that ought to be the standard for whenever we are buying something, we get the IP along with the platform.

Admiral Wolfe: Yes, sir. I would tell you, in the strategic program that I do manage, back to what General Cotton said, it is the same way. We do own the technical baseline. As a matter of fact, in our program we are the systems integrator. So we do not have a separate entity that does all of the system integration for the entire system. That is the U.S. Navy and that is our program.

Senator King: Good. Thank you. Thank you very much. Senator Fischer.

Senator Fischer: Thank you, Mr. Chairman. General Cotton, earlier today we spoke about the importance of modernizing the B-52, in particular the CERP, the engine replacement, and the radar modernization programs. It is my understanding the Air Force has changed its acquisition structure for the re-engineering effort. How confident are you that we will be able to complete that project on time?

General Cotton: Ma'am, I am very confident. Thank you for the question. What is unique about the program is what

I am seeing from the prime. As you know, we have just let that contract for the engine replacement for the B-52, the Civilian Engine Replacement Program, known as CERP, and Rolls-Royce was awarded that contract.

The integration efforts that we are already beginning to see with our contractor, Boeing, on being able to integrate that engine as well as the other upgrades that will come along with that engine upgrade is short of fantastic. You probably have even seen on the news where we were able to take a bird from the boneyard. They actually split it in half, from nose to tail, and kept the left side of the jet. It is in a warehouse in Tinker right now, where they can form-fit as they do integration with -- no kidding -- a jet. So that is the innovative thinking that they are thinking through, because even using 3D technology on your computer does not replace having an airman or a maintainer kind of say, "Hey, engineer, that is probably not the right place to put that component, because now I do not have access to it," as they are doing the integration piece. So I am very, very satisfied in what I am seeing with the CERP program.

You also mentioned the radar modernization program. Radar modernization program is also going to be very, very instrumental for the B-52 as it gets at some of our faults that we see in our radar systems currently and upgrades the

radar system there.

I would like to talk a little bit about CERP, if you do not mind, on what it brings to the fight.

Senator Fischer: Can I first ask you a question about the radar system that you are modernizing?

General Cotton: Yes, ma'am.

Senator Fischer: I do not know if you can discuss it in an unclassified setting, but can you share the mean time between failure for the current radar system?

General Cotton: Yes. It should around 300 and it is sitting around 46 right now.

Senator Fischer: Okay. And then if you want to just do briefly on CERP so I can ask the admiral and Mr. Adams questions as well.

General Cotton: Well, part of the two-bomber fleet that we are going to have here in the United States Air Force with the B-21 and the B-52, the B-52 is going to be a formidable standoff, long-range strike weapon through 2050, and I am very confident, as much as folks talk about the B-52 and its age, once we do this upgrade she is going to be a very formidable weapon system through 2050.

So I am really looking forward. I just need to make sure that the funding stays steady so we can get that done, because the limiting factor for the B-52 is its current engines that are sitting on it right now. So we must

replace the engines on the B-52. Thank you, Senator.

Senator Fischer: Good. It is important to know that we not only stay on schedule but the funding, like you said, is steady and we do not see the peaks and valley. Thank you.

Admiral Wolfe, thank you for everything that you, as I said earlier, that you do and that your team does. I would like to revisit some of our discussion yesterday about your life extension efforts with the LE2, for the Trident missile. Can you talk about how reductions to the program increase long-term risk and make your ability to meet the delivery date more challenging?

Admiral Wolfe: Yes, Senator. Thank you for the question. I will expand a little bit to our discussion from yesterday.

Every time we do not get budgeted to our request we have a very tight timeline. We understand the technologies that not only we need to re-invigorate today to make sure that our system and LE2 gets to where we need to get but there are also technologies that we need to develop. Because as we all talked about, our strategic competitors have changed -- we have gone from one to two -- how we look at these systems, some of the requirements that we talked about.

Every time that we take a decrement it causes us to

either give up on a technology, which means we are going to rely on something that is not going to be cutting edge because we have got to maintain schedule, because we are very tight in making sure that we continue to support our portion of the triad, or we push that, when then reduces the amount of time we have to really develop that technology, develop the workforce to understand that.

So the most important thing to us is keeping the stability so that we can stay on schedule, we can develop the technologies to meet not just today's requirement but where we need to be in the future as we continue to watch things evolve.

Senator Fischer: We certainly do not want to underfund these programs and have it end up like a lot of modernization programs that we are looking at right now, where there is no room. There is no room for delay. And we all know that things can happen that would put production into delaying situation, and I certainly do not want it to be because we have not funded at the proper levels. So thank you.

Mr. Adams, we have focused primarily on plutonium pit production over the last few years. Can you update on NNSA's other challenges with respect to strategic materials and discuss what you see as the next major challenge after pit production?

Mr. Adams: Thank you for the question, Senator Fischer. I do not know that I would say "after" because we have to do these things simultaneously. So the lithium facility at Y-12 comes to mind. Of course, we have to finish the uranium processing facility. There is a tritium facility that is needed at Savannah River. There are high-explosive facilities that are needed at Pantex. All of these things are underway. They are all in flight now, and we have to have all of them in order to do the modernization work that we are asked to do, and deliver the warheads that DoD needs.

Senator Fischer: When we look at the expansion, I believe it is production at the TVA's Watts Bar Unit 2. Is that expansion going to be sufficient to meet our long-term needs?

Mr. Adams: Thank you for that question. That is where we make our tritium. It is actually Watts Bar Unit 1 and Unit 2 now. We have both of those going. We put 1,792 tritium-producing, burnable absorber rods in each core. We can go up to that much at this point. And that will meet the needs of the program for tritium as long as there are not serious interruptions.

So we have a good thing going. We have demonstrated all the way through the extraction at Savannah River and the placement of the tritium into gas transfer systems. So my

view is that that program is doing a great job right now. We could use more margin, and our team is now looking at putting more burnable absorber rods in each of those cores in Unit 1 and Unit 2. We are looking at licensing amendments that would allow that in case we need it later.

Senator Fischer: Okay. Thank you very much. Thank you, Mr. Chair.

Senator King: I want to thank all of our witnesses. This has been a very informative hearing. I appreciate the testimony both from our first panel and our second panel, the answer to our questions. Thank you very much. We looking forward to continuing to work with you on these important topics.

The hearing is adjourned.

[Whereupon, at 6:01 p.m., the subcommittee was adjourned.]

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