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Before the

Subcommittee on Strategic Forces

COMMITTEE ON
ARMED SERVICES

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 THE DEFENSE AUTHORIZATION REQUEST FOR
FISCAL YEAR 2024 AND THE FUTURE YEARS DEFENSE
PROGRAM

Tuesday, April 18, 2023

Washington, D.C.

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

The subcommittee met, pursuant to notice, at 4:49
p.m., in Room 222, Russell Senate Office Building, Hon.
Angus S. King, chairman of the subcommittee, presiding.

Subcommittee Members Present: Senators King
[presiding], Gillibrand, Warren, Rosen, Fischer, Rounds,
and Cramer.
OPENING STATEMENT OF HON. ANGUS S. KING, U.S. SENATOR
FROM MAINE

Senator King: We call today's hearing to order. And I thank the witnesses for appearing, as well as their services to our nation. Before we get going, I want to thank Admiral Caldwell, the Director of Naval Reactors, who will retire after 42 years of service.

You are only the 7th Director of Naval Reactors, starting with Admiral Rickover in 1949. You stand in this fearsome giant's shoes upholding his unparalleled tradition of service and excellence that is second to none.

You are responsible for the force projection of our aircraft carriers and our submarines, which are the envy of every military in the world. In fact, under AUKUS, we know that they are trying to duplicate that capability.

For any nuclear-powered vessel that is ready for sea trials. You are the senior officer that goes to sea with her. I want to thank you and your wife, Kim, for your service. Our nation owes you a gratitude, a debt of gratitude that only six other Navy officers and their spouses can fully understand.

Today's hearing has two panels to review the budget request for defense nuclear activities in the Department of Energy and the Department of Defense. We are undertaking our third nuclear modernization.
The first two in 1960 and 1980, notice they were 20 years apart. The third this time some 43 years apart. Unlike the other two, we now have not one but two nuclear armed near-peer competitors.

This is an entirely new paradigm in the defense of our nation. Now more than ever, we are relying on modernizing our triad to perform the essential deterrence mission under this new two near-peer paradigm.

I expect not only to hear what is going right now in this modernization cycle -- what is going right, now in this modernization cycle. Admiral Rickover would expect no less. But importantly, I also expect to hear what is not going right and how Congress can help.

Mr. White, you perhaps have the toughest of all jobs with the largest backlog of clean up in the Federal Government from Cold War defense activities, which in 2020 was estimated at a cost of $512 billion.

I will want to know what you are doing to work your way through this backlog of clean-up, which is a commitment to the communities nearby these sites. After our opening statements from each of our witnesses, we will have five-minute rounds of questions. Senator Fischer.
STATEMENT OF HON. DEBRA FISCHER, U.S. SENATOR FROM
NEBRASKA

Senator Fischer: Thank you, Mr. Chairman. And thank
you to our witnesses for being here today. Admiral, I,
too, want to thank you for your many, many years of service
and commitment and dedication to this country. You are an
example of a true, true patriot and public servant.

All of you have a solemn responsibility of ensuring
that our nuclear deterrent remains safe, reliable, and
effective. Our nuclear deterrent, the weapons themselves,
and the delivery systems remains the indispensable backbone
of United States National Security.

The geopolitical threat environment has significantly
degraded since 2010, when our current nuclear force and
modernization plan was determined. We need to consider
whether the plan remains sufficient to address future
threats, and we have to rebuild the capability across the
nuclear enterprise to deliver faster.

The status quo is not tenable, and I look forward to
working with you all in the coming months to find creative
solutions to the significant challenges that we face.

Thank you, Mr. Chairman.

Senator King: Ms. Hruby.
STATEMENT OF HON. JILL M. HRUBY, ADMINISTRATOR,
NATIONAL NUCLEAR SECURITY ADMINISTRATION

Ms. Hruby: Thank you, Chairman King, Ranking Member Fischer, members of the subcommittee for the opportunity to present the President's Fiscal Year 2024 budget request for the Department of Energy's National Nuclear Security Administration.

Chairman King, a written statement has been provided and I respectfully request that it be submitted for the record. NNSA's Fiscal Year 2024 budget request is $23.8 billion, an increase of $1.7 billion over the Fiscal Year 2023 enacted level. This budget request responds to today's challenging global security environment.

The Weapons Activities budget request of $18.8 billion supports the five ongoing weapon modernization programs and continues significant investment in our infrastructure. Infrastructure needs are acute at our production plants as we continue to refurbish and reestablish capabilities.

In addition, the request supports two Phase 1 exploratory efforts, enhance physical and cyber security, and digital assurance of our weapons and enterprise. It also continues investment in our stockpile research and advances stockpile stewardship. We are actively addressing our biggest challenge in weapon activities, the cost and schedule delays, and large construction projects.
Supply chain delays, labor shortages, labor productivity, combined with inflationary pressures, have plagued the uranium processing facility and the plutonium pit production efforts, both at Los Alamos and Savannah River.

As a result, we are implementing nationwide trade union recruiting, incentives for labor, housing, and transportation, early starts on long lead procurements, and introduction of new project management models.

The Defense Nuclear Nonproliferation budget request is $2.5 billion, and invest in our nonproliferation, emergency response, and counterterrorism programs. We continue important work to reduce global nuclear risk, progress international partnerships, and advance associated research.

To be prepared for the future, programs responsive to nuclear energy expansion and future arms control verification technologies are requested. We remain committed to the Ukraine incident response training and information sharing to detect and respond to a nuclear or radiological emergency.

Work to assure allies who might be thinking about the need for nuclear weapons -- we work to assure them that we will be with them and we keep our eye on threats from other weapons of mass destruction with our bio-assurance program.
The challenges for NNSA are real but not insurmountable. With your continued support, I am confident we will succeed. Thank you. I look forward to your questions.

[The prepared statement of Ms. Hruby follows:]
Senator King: Admiral.
STATEMENT OF ADMIRAL JAMES F. CALDWELL JR., USN,
DEPUTY ADMINISTRATOR FOR NAVAL REACTORS, NATIONAL NUCLEAR
SECURITY ADMINISTRATION

Admiral Caldwell: Chairman King, Ranking Member Fischer, first off, thank you for your nice remarks. It is an honor to serve. Distinguished members of the subcommittee, thank you for the opportunity to testify today.

Your consistent support of naval reactors allows my team to provide the Navy with unmatched power and capability of nuclear propulsion, which provides all of our submarines and all of our aircraft carriers the reliability, mobility, and endurance to carry out National Security missions around the world.

Today, nuclear powered warships are operating alongside allies and partners on a global scale, providing forward presence in a world that is increasingly polarized. We recently completed the AUKUS consultation period and have set out on a generational change in sharing critical technologies directly supporting U.S., UK, and Australia trilateral commitment to a free and open Indo-Pacific region.

Naval Reactors' investment in research and development over decades has enabled the advanced technology that gives our fleet a competitive advantage in the maritime
environment. Now we must step up our research and
development to sustain and exploit that advantage.

Our future will be built on a solid foundation of our
people, our technology, and our facilities. My budget
request for Fiscal Year 2024 is for $1.96 billion and
invests in each of these three key areas and two national
priority projects. First, my request supports our most
important resource, our people.

The talented and dedicated people at our headquarters
and our field offices are absolutely essential to the
strong centralized management and oversight of the
important work we do for the nation.

Second, the budget request reflects continued
investment in research and development to achieve our goals
of substantially lowering costs, reducing construction
timelines, and adding fleet capability.

My request also focuses on investments to modernize
our critical infrastructure at my Department of Energy
laboratories where this important work is executed and to
reduce our legacy environmental liabilities.

I am also seeking your support for two national
priority projects. The first is the continued development
of the reactor plant for the Columbia class ballistic
missile submarine, directly supporting the Navy's number
one acquisition priority.
The second project is the continued construction of the naval spent fuel handling facility in Idaho, which enables long term, reliable processing and packaging of spent fuel from the Navy's nuclear fleet.

In closing, your strong and enduring support allows me to carry out Naval Reactor's mission of delivering a nuclear-powered fleet that is unrivaled around the world. I respectfully urge your endorsement of our Fiscal Year 2024 budget request, and I thank you for your support.

[The prepared statement of Admiral Caldwell follows:]
Senator King: Mr. White.
STATEMENT OF WILLIAM WHITE, SENIOR ADVISOR FOR
ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF ENERGY

Mr. White: Chairman King, Ranking Member Fischer, and members of the subcommittee, it is an honor to appear before you today. The Environmental Management Mission reflects the commitment to cleaning up the environmental legacy of national defense programs that helped end World War II and the Cold War.

While our mission is tied to the environmental legacy of the past, we are also focused on the future. The cleanup program of today is empowered to support ongoing National Security and science missions, as well as strengthen local communities.

Cleanup accomplishments are boosting the clean energy economy in Tennessee and helping the Oak Ridge National Laboratory and the Y-12 National Security Complex prepare for expanding National Security and research missions. Our Idaho team just marked a historic achievement with the startup of a new tank waste treatment capability that has been decades in the making.

With support from Congress, the Integrated Waste Treatment Unit is now operational in Idaho. EM has treated over 400,000 gallons of tank waste at the Hanford site, and at Savannah River in South Carolina we are processing record amounts of tank waste.
More than 200 transgenic waste shipments from five generator sites were received last year at the waste isolation pilot plant. The budget request for this year positions us for success as we drive risk reduction, progress, skyline changes, and ramp up efforts to tackle tank waste.

EM will operate tank waste treatment systems in South Carolina, Idaho, and Washington State. Hanford's 56 million gallons of tank waste represent our greatest environmental risk and financial viability.

Treatment and disposal are the only way to permanently address the risks posed by this waste. Recognizing that additional delays bring greater risk, exacerbate the impacts of already aging infrastructure, and increase cost, we are focused on moving the entire Hanford tank waste mission forward.

We are advancing the system that will stabilize Hanford's low activity waste in glass. The request also ramps up work on the high-level waste facility so that we will be able to address that portion of the Hanford tank waste as well.

The waste isolation pilot plant will be modernized to meet the needs of legacy clean up and ongoing National Security programs. Waste shipments will continue and we will ensure there is no backlog of shipments from Los
Alamos National Laboratory.

We will address excess contaminated facilities and contaminated groundwater across the enterprise. This includes work in Nevada, where we will demolish four buildings this year and further reduce the clean-up footprint for Fiscal Year 2024.

As we deliver on these priorities, we are committed to continuous improvement, whether it is investing in R&D, analyzing options to save time and money, achieving regulatory alignment, upgrading infrastructure, or building a pipeline of talent for the future, we are preparing for the future.

The budget request for this year supports these efforts. It also supports communities and tribal nations impacted by the environmental legacy of the past. 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. Did you say you processed 400,000 gallons last year?

Mr. White: At Hanford through our tank side cesium removal system, which is the system we have in place to pre-treat the tank waste that is going into the direct feed low activity waste vitrification plant.

Senator King: But there is something on the order of 150 million gallons, isn't there -- in various tanks?

Mr. White: There are currently -- there are 56 million gallons of tank waste. But when you think about the processes required to treat the tank waste, it ends up resulting in about 150 million gallons of liquid needing to be treated over the course of the program.

Senator King: I will follow up on that for -- in a couple of minutes. Admiral Caldwell, a couple of questions. Back when the Navy stopped, or when we stop producing additional uranium for fuel back in the 90s, it was assumed that we had enough stockpiled until the 2060. Is that assumption still true in light of Columbia and other programs that are now underway?

Admiral Caldwell: Sir, the -- we have looked at this over many years and even recently as we have embarked on this AUKUS consultation period, and currently we have enough fuel stock to support the program out through the 2050s, mid to late 2050s.
That will depend, of course, on the Navy shipbuilding plan and we will continue to evaluate that going forward. And Ms. Hruby and I have frequent dialogs on this. It is going to be a topic we continue to talk about.

Senator King: But the projection hasn't changed radically?

Admiral Caldwell: Not radically, no, sir.

Senator King: A different question. Did I hear in your testimony you are developing a new reactor for the Columbia? Is this a brand-new reactor or is it a modification of existing?

Admiral Caldwell: Sir, to clarify, we have been working on the reactor for Columbia for many years now, and it is a reactor that has been funded by the support of this subcommittee. And it will have a -- the result is a 42-year reactor core to power Columbia through life. That --

Senator King: No refueling?

Admiral Caldwell: No refueling. And that is important. That allows us to do the mission with 12 versus 14 SPNs, and that fact alone saves refueling costs and saves the nation about $40 billion.

So, it is a remarkable achievement. We are building that core right now, and we are on track to deliver that core on schedule.

Senator King: But this is a developed technology.
You are not inventing something.

Admiral Caldwell: We are taking technology that has been built on decades worth of research and work. And in fact, we took the step to design the core for the S8G prototype, a training and research reactor up in Kesselring.

We took the step to develop some Columbia components for that core. This was a decision made over 10 years ago. That proved to be a very important decision because it allowed us to de-risk the manufacturing techniques and make sure we had that down before we actually started the Columbia core.

So those two projects are actually integrated and both supported by this subcommittee.

Senator King: I am sure there is an answer to this question. I also serve on Energy and Natural Resources, where all the talk is about small modular reactors. Why aren't the naval reactors models for that? Is there an utterly different technology or is it cost? What -- why couldn't you park a submarine in the bay and power the city?

Admiral Caldwell: Well, first off, the requirements for a warship are significantly different from the requirements for a commercial reactor. We have to be able to withstand shock. We have to be ready to operate in
battle damage conditions. We have to be responsive in speed.

A lot of the time the submarine or the carrier might be going relatively slow and we have to accelerate rapidly. For power generating reactors, the technology and the requirements for that are very different.

So, I don't think that the submarine core would be the right path for some of these small modular reactor concepts.

Senator King: Thank you. Mr. White, as I mentioned, there is plenty of work left to do. I understand in Savannah River there are going with a concrete solution as opposed to a glass solution. Is that proving to be feasible, a, and b, is it a more cost-effective solution that could be used at the Hanford site?

Mr. White: So, at Savannah River, the capability we have there can ultimately treat about 6 million gallons of the 9 million gallons of tank waste a year. So, I think it is something we should definitely be looking at, at Hanford.

And in fact, we are doing that. One of the things that we just did was move forward with the test bed initiative, something that Congress funded over the last couple of years. So as part of that effort, we made a waste determination of about 2,000 gallons of tank waste at
Hanford that we are planning to treat commercially offsite with grouting technology and then dispose of it at a commercial facility.

Right now, we are working on putting a permit together to submit that to the State of Washington, and then once they have approved that, about a year after that, we should be able to move forward with this pilot effort.

If you think about the cumulative amount of waste we have at Hanford, the vitrification capabilities we are putting in place with the low activity waste vitrification plant and the high-level waste plant, would treat about 40 percent of the tank waste that we have at Hanford to treat.

That leaves about 60 percent of the supplemental waste that we don't have a clear path forward on. In large part at the urging of this subcommittee, we have had the national laboratories studying the best alternative for treating that supplemental waste, that 60 percent of the waste that isn't covered by those vitrification plants.

The National Academies recommended that we consider grouting, that the technology is effective at treating the waste, and it is by far the most cost effective and timely way to deal with the waste, the bulk of the waste at Hanford.

So, as we move forward on the vitrification capabilities that we need for the parts of the waste
streams that have to be vitrified, while simultaneously
working on options to expand our grouting capabilities as
well to deal with the bulk of the waste.

Senator King: Thank you. Senator Fischer.

Senator Fischer: Thank you, Mr. Chairman. Welcome,
Administrator. While the NNSA has many competing missions,
delivering nuclear weapons to the Department of Defense
remains the top priority. With narrowing window time for
our current wave of modernization, can you identify your
largest source of concern? How are you going to meet those
milestones?

Ms. Hruby: Yes, thanks for the question. They are --
undoubtedly our most challenging programs are our large
nuclear construction projects. So, and I say that because
our weapons programs are certainly challenging, but we are
on track.

We understand the long lead, the places where we
really need to increase, you know, our regular timelines,
start timelines to meet those. But the construction
activities have been more fluid in terms of what the issues
are, and in part because we started them, you know, pre-
COVID and have needed to come out of that, and it is the
first time in many generations that we -- this is really
the first rebuild of our enterprise since the Manhattan
Project.
And so that -- to answer your question, we are pulling out all the stops. We are having external reviews. We are implementing recommendations from those reviews. We are changing our approach to procurements to make -- to not only start them earlier, but to have them move along faster.

We are breaking projects into chunks. We are pausing some projects in order to focus on others. We have a long list of things that we are doing to try to bring those as far to the left, if you will, as we can.

Senator Fischer: If you have any suggestions on how Congress can help you do that to meet those requirements, please let us know.

Ms. Hruby: Thank you. I would just, I know this is a big ask, but the most important thing on some of these projects is going to be timely budget appropriations.

Senator King: Yes. It shouldn't be a big ask. It will be routine.

Senator Fischer: It should be what we do, yes.

Meeting the requirement of 80 plutonium pits per year remains a challenge. And can you provide us with an update on NNSA's efforts to achieve that full production is as close to 2030 as possible?

Ms. Hruby: Absolutely, thanks. We, as you know, we are proceeding with our two-site solution at Los Alamos and
Savannah River. Los Alamos is the first up, if you will. We started it earlier, but also is an existing plutonium facility that we are modifying for the pit production activity that we have.

And that, we have completed a lot of equipment installation. We are aiming to get to -- the first project we are calling 30 base, making 30 pits per year. We have done about 40 developmental pits over the time we have been doing this project.

We are getting closer to WR certification, to weapon certification --

Senator Fischer: You say, developmental pits. So those aren't certified?

Ms. Hruby: Those are not yet certified and they are not going to get certified for --

Senator Fischer: How long a process to get them certified? What do you have to do --?

Ms. Hruby: We are expecting that we will have our first certified pit at the end of 2024. And so then let me also cover Savannah River. So, we are about 50 percent way through the design of the Savannah River pit production facility.

We are also doing parallel activities to modify the MOX facility and take out equipment that we don't need. We are doing site preparation work. We are preparing to build
a high-fidelity training center there.

The point of the training center is to make sure that as soon as we have the construction complete, we can go as fast as possible to get to making certified pits. That will be a few years, even if we are really fast.

And so, and we are doing a lot of pre-buys of equipment. So, we are staging our design so that the equipment is designed first so we can get those out for procurement while the rest of the facility design is being done.

Senator Fischer: Has the -- the pre-buying equipment, has that been an effective tool for you to be able to have that capability and to continue to move along so you don't have to wait months or a year or two and a half years for --?

Ms. Hruby: Yes, absolutely. It is particularly important for gloveboxes, which is, there is a limited capability in the United States and all of our facilities need them.

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

Senator King: Senator Cramer.

Senator Cramer: Thank you, Mr. Chairman. Thank you to the witnesses. Administrator, first of all, thank you for this morning's briefing as well. Very, very informative. Appreciate the detail of it all.
But when we talk about modernization, we always talk about, of course, our own, and then we talk about our biggest adversaries, but we rarely talk about allies or other places other than Russia and China and the United States.

Can you enlighten us a little bit with what might be going on in other places, if anything, that, you know, might be instructive to how we view the future with regard to us, plus, if that makes sense?

Ms. Hruby: Well, I will say that by far our closest ally on things nuclear is the UK. And not only are we doing what Admiral Caldwell talked about in terms of the AUKUS program with them, we are also working on the W93 program with them, and we are working on materials availability with them.

And so that -- by far our strongest ally. We do work nonproliferation programs with all of our other allies, both NATO allies and Pacific allies. And that is useful not only for the purpose of the nonproliferation program, but it keeps us in close coordination and communication with those allies in terms of their nuclear capabilities, so I consider those very important programs.

Senator Cramer: You know, along those lines, and maybe you could comment or you, Admiral, for that matter too, on how, with regard to that relationship that you just
outlined -- I guess I can say I worry a little bit about the reputational risk that has been associated with the events of the last, you know, some say a couple of years, us being seen as once the reliable umbrella ally that we are -- am I wrong to be concerned about that or -- and again Admiral, maybe you want to speak to that a little bit as well.

Ms. Hruby: I will start and then let Admiral Caldwell talk about the naval part. I am fond of saying if everybody -- if anybody ever asked you if you want a Russian, a Chinese weapon, or a U.S. weapon, say U.S.

We still have, despite -- we are very transparent about our issues, but we still have an incredible capability in this country. And our, you know, our weapons are second to none and we are making sure that they stay that way. So, I would say, you know, the NATO allies are actually here this week.

They will be at Lawrence Livermore on Friday. I will be with them for that meeting. So, we are doing a lot of assurance meetings and they are always very impressed to see what capabilities we have and to see the commitment to the enterprise that we have.

Senator Cramer: Admiral, anything you would add to that?

Admiral Caldwell: Sir, I want to make sure I
understand your question. Is your question about our sharing and relationship with the UK in particular, or how our allies and partners view the viability of our nuclear -?

Senator Cramer: Yes, so I think it is -- I would add a third category and that is that their trust that we have the political will as well as the capabilities to continue to be -- to provide that umbrella that helps you control some of the issues you have talked about, Administrator.

Admiral Caldwell: I don't have as many interactions maybe as some of the other Navy leaders with those key allies. I can tell you we have a strong interaction with the UK. I think there is absolutely trust there.

I just returned from a trip to Japan where I spoke with Japanese leaders. And clearly, if you look at their National Defense Strategy and National Security strategy, the U.S. plays a huge role in their future as they have laid it out in clear language.

And so, I think there is a lot of faith and confidence in the U.S. war plan, and our ability and commitment to follow through on that.

Senator Cramer: Maybe, Mr. Chairman, I am more concerned about our ability to persuade our own constituents sometimes of this. But thank you, both of you, for your answers. Thank you, Mr. Chairman.
Senator King: Senator Gillibrand.

Senator Gillibrand: Thank you. Admiral Hruby --
Administrator Hruby -- yes, just, sorry. It would be nice
to be an Admiral. Administrator Hruby, inertial
confinement fusion facilities, including the Omega Laser
facility at the University of Rochester's Laboratory for
Laser Energetics have not had major infrastructure
investment since the 2000s.

The demand on these world's leading high energy
density science facilities continues to grow. Is the
Fiscal Year 2024 budget request sufficient to cover
critical sustainment activities while meeting increased
operational demand on the facilities? And are you
including sustainment costs in your five-year future budget
plan?

Ms. Hruby: Well, thank you for that question. The
Omega facility, the Laser Energetics lab, is a very
impressive facility and frankly, has made just very
important contributions to our programs, including ignition
at NIF, because we are able to do many experiments faster
there and try things out.

We have produced a report which we have submitted that
talks about all the investments we need to make at all of
our fusion sites in the U.S., and it is a significant
amount of money.
We are trying to execute that plan in this budget and our five-year budget, our request for Rochester is higher this year than it was last year. But we will -- it will be a journey, a long-term journey to make the investments in science and technology that we need, including at this facility.

Senator Gillibrand: Thank you. Admiral Caldwell, the breakthroughs in December at the National Ignition Facility have significant implications for nuclear energy production. What are the implications of inertial confinement fusion on the future of the U.S. nuclear fleet?

Admiral Caldwell: My team pays close attention to development in the nuclear field, but as we see it, the viability of nuclear fusion is still many decades away.

And as we think about putting ships to sea, I need to make sure that the reactors and the components and things we build into the submarine are absolutely reliable. We are a proven technology.

And that, when you when you build a ship and you put the reactor in and it is going to stay there for 30 plus or 40 years for Columbia, it has got to work correctly first time and every time. We are just not there with fusion. But we keep close tabs on what is going on in science and technology throughout the United States.

Senator Gillibrand: Thank you. Mr. White, we are
increasingly looking towards expanded nuclear capacity and small modular reactors for energy production as we try to meet our net-zero goals.

At the same time, we are still struggling to figure out how to manage existing radiological waste. As we balance our energy needs and our defense needs, what policies or mechanisms do we need to adopt to ensure that we are properly disposing of nuclear waste products?

Mr. White: Certainly, when I think about the importance of the clean-up program -- and I mentioned earlier that, you know, I think it is extraordinarily important for our National Security and scientific research missions.

And part of the reason for that is, I think our ability to safely and effectively dispose of nuclear waste and treat that waste underlies our ability to also move forward in the nuclear security and nuclear energy realms.

From a policy perspective, certainly for the clean-up program, the biggest thing outstanding is our ability to dispose of high-level waste. We have an inventory of high-level waste in the cleanup program that we manage for the Energy Department, and the absence of a capability for disposal of that waste certainly impacts our cleanup program.

Senator Gillibrand: Thank you. And, Administrator
Hruby, your agency is tasked with the managing nonproliferation efforts. Where do you foresee nonproliferation efforts trending in the next decade now that Russia has withdrawn from the New Start? What effect will China's expansion of nuclear capabilities have on our current nonproliferation regime and the Nonproliferation Treaty?

Ms. Hruby: Yes, well, the nonproliferation efforts, and this is a little bit to the question addressed earlier, we are doubling down with our allies on nonproliferation activities to make sure that we are collectively supportive of nonproliferation programs, including the programs around the hot zones right now.

Obviously, Ukraine, but there are other regions that we want to make sure that we still have detection of materials that could be lost or stolen from countries that have nuclear materials. With Russia and China, you know, we would really like to be in strategic stability dialogs, but we aren't.

So, what we are doing in the Department, in NNSA is working on verification technologies so that when we -- for these new weapons, many new weapon systems, so that when there is a window open again for discussion, which hopefully someday there will be, there won't be a barrier associated with not having proper verification technologies
developed.

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

Senator King: Senator Rounds.

Senator Rounds: Thank you, Mr. Chairman. And thanks to all of you for your service to our country. This is an unclassified discussion and I appreciated the opportunity that we have had to have classified discussions on this. I kind of got to thinking, you know, the vast majority of folks that are probably watching or listening to this discussion, they are wondering kind of maybe some of the basics. And I would like to take a few minutes, just kind of work our way through the basics of why this is so important to our country.

And I must start with Administrator Hruby. Let's talk about, you know, we are talking our national defense is really based upon a nuclear deterrence. But the nuclear deterrence means not just land based. It means submarine based, and it means air carried weapons that have a nuclear weapon on them, whether it be a bomb or a missile tip.

Can you talk a little bit about what it means when we -- we are talking here about plutonium pits and so forth. Can we just take a minute here and perhaps explain a little bit about the concern that we have got about the number of plutonium pits that we actually do per year and so forth?
Talk to us a little bit and maybe explain that in a level that I could understand, about third grade level or so, here.

Ms. Hruby: Well, I know you understand more than that, because I know you -- I have been in our model room with you and you asked great questions. So, but let me try to address your question.

To make a nuclear weapon, which is the core of our deterrence in the United States, we have to be able to work with nuclear materials, both plutonium and enriched uranium, and many other materials that are difficult to work with.

And we have to be able to have physics packages that we are absolutely confident will work when we want them to and not work at any other time. And that requires a lot of engineering of non-nuclear components.

And these -- we use in the United States a captive production complex where we do buy parts from commercial supplies, but mostly these materials -- this is something we have to do ourselves. And it is perhaps the only captive production complex in the United States, make sense, the way you make nuclear weapons.

And so, we have to have a very strong understanding of the science. We have to turn that into manufacturing capabilities and we have to deliver weapons on time to the
Department of Defense.

Senator Rounds: So, but the different weapons that we have, they basically have a system inside of them that, when triggered, create a nuclear reaction that is the bomb or the missile tip.

What sizes -- can you talk a little bit about what that means to somebody in the American public about the size? How huge these weapon systems are?

Ms. Hruby: The physical size of the weapon system --?

Senator Rounds: Not so much the physical size, but the impact -- the size of the blast, sort to speak.

Ms. Hruby: Yes. Well, we have weapon systems that have yields from tens of kilotons --

Senator Rounds: Tens of kilotons, meaning in high explosive, like a big bomb that you would -- a conventional bomb --

Ms. Hruby: Right, right --

Senator Rounds: That would be the size of how big of a bomb? Ten kiloton?

Ms. Hruby: Let's -- maybe the easiest way to say this is our lowest yield weapons today are about the size of the weapon at Hiroshima.

Senator Rounds: Our smallest. And they move up from there.

Ms. Hruby: And they move up from there.
Senator Rounds: And these are both fission and fusion.

Ms. Hruby: They are thermonuclear weapons, right.

Senator Rounds: And now, I think there is a question out there about what that means. Let's just -- I have got a minute left, but let's walk our way through that a little bit.

Ms. Hruby: The physics.

Senator Rounds: Yes, let's talk about that.

Ms. Hruby: Yes, the plutonium pit and the weapons is imploded by high explosives. It produces a blast that is captive inside the weapon that goes to the secondary, and implodes the secondary, and the secondary makes the large yield from the weapon.

Senator Rounds: And when you just say the secondary, you mean the actual material that surrounds a -- or that is next to a plutonium pit. The plutonium pit is really the trigger mechanism.

Ms. Hruby: The plutonium is a trigger mechanism. The secondary is a uranium base.

Senator Rounds: And when we do that, we are concerned about plutonium pits because we have to have those in order to make every one of these new weapons systems, these modern weapons systems that we want to deploy.

Ms. Hruby: Right.
Senator Rounds: And we can't make a lot of those per year, can we?

Ms. Hruby: No, but we do have pits that are -- can be reused. Not all of them, but some of the pits that we already have can be reused.

Senator Rounds: But it is still -- that is a critical component --

Ms. Hruby: Absolutely.

Senator Rounds: In terms of our national defense, when we are talking about new facilities to modernize or to be able to do those, it is a critical part of our national defense in terms of deterrence.

Ms. Hruby: Yes.

Senator Rounds: Thank you. My time has expired.

Thank you, Mr. Chairman.

Senator King: Senator Warren.

Senator Warren: Thank you, Mr. Chairman. And thank you to our witnesses for being here today. Thank you for the work you do. So, a key component of modernizing our nuclear weapons involves the construction of new plutonium pits. And these pits are the central cores of nuclear weapons that are used to trigger the nuclear explosion.

Congress mandated that NNSA produce at least 80 of these pits by 2030. However, it is clear, perfectly clear that NNSA will not be able to meet this requirement. NNSA
has a terrible track record of waste and mismanagement over the years and failing to come even close to budget estimates.

So, it is important to me that we not see taxpayer dollars wasted again. Now, the Government Accountability Office, GAO, recently released a report in January. They found that NNSA has still failed to establish even a cost estimate for the production of these pits.

Administrator Hruby, last year, when you came before the subcommittee, you may remember you and I had this conversation. We talked about how there were no clear cost estimates for this program.

The GAO is now estimating that at least part of the program will cost $18 to $24 billion, and that the total program will be much higher if, and I want to underline the word if, it ever even ends up being completed.

So, I am glad that GAO is working hard to try to keep you honest on this, but it is NNSA's job to estimate these costs. So why have you not established a lifecycle cost estimate for this program?

Ms. Hruby: Well, thanks for your question. The -- we agree with the GAO report, and we also have agreed in our response to the GAO report that by April of this year we will have our initial lifecycle cost estimate. This is the cost for everything. That is the whole point of --
Senator Warren: Wait, April of this year? That is like two more weeks?

Ms. Hruby: Oh, April -- I am sorry, April of '24. I am sorry, April of '24 -- April of '24, we will have -- we are in '24 budget request. So, it is April of '24, we will have the initial cost estimate. And then in '25, we will have an improved cost estimate.

Senator Warren: Okay. So let me just say, you didn't have the numbers last year. You don't have the numbers this year.

And the best answer I can get is we are going to have them a year from now, which means that Congress and the public has to wait just for another year before we even get a basic cost estimate on what this program is going to cost?

Ms. Hruby: There are many elements of the overall plan. Most of those elements have had cost estimates released. The life cycle cost estimate referred to in the GAO report is the total cost for everything involved with making pits. Some of those are still pretty immature designs and therefore it is very difficult to do the entire cost estimates --

Senator Warren: Okay, so I get it. This is hard. I understand that it is hard, but this is a long time and we keep allocating money into this program.
So, it looks like we are not going to know how much this staggeringly expensive program is going to cost us for a while, so let me ask you a different question. Let's look at whether NNSA has a good plan to control costs in the meantime.

So best practice for budgeting these types of complex programs is to develop what is called an integrated master schedule, an analysis that is going to break down the project into steps, resources, and budget needed to complete it. Sort of budgeting 101.

The GAO first raised this in 2020, that is three years ago, and found that NNSA did not have such a plan in place. GAO now put out a new report saying that NNSA still does not have such a plan in place. According to GAO, the plan you do have is, "not a reliable plan."

So, we see here again that NNSA is not following just basic budgeting standards and planning for this program. So, with total program costs running somewhere in the tens of billions of dollars, we are talking about significant cost risks if things get off schedule or run into problems.

And the plan you have doesn't even tie budget resources to activities. So, Administrator Hruby, when will NNSA have an IMS that meets budgeting 101 requirements?

Ms. Hruby: Again, on the individual projects we have
IMS. We -- the GAO report is looking at their overall plan. We have been doing -- we have improved our overall planning for the items that we know there is a tight connection like gloveboxes.

But within -- so within the Los Alamos pit production facility plan, it is very -- it is a highly integrated plan. We are still working on developing the plan across the entire --

Senator Warren: So, I am sorry. So, what was the answer to my question? When will NNSA have an IMS that meets basic budgeting requirements -- when?

Ms. Hruby: The plan -- it will go along the -- around the same time as the life cycle plans, because we are still -- we are still in the design phase of the Savannah River pit production --

Senator Warren: Can I just suggest that it is not a plan if you are making it up as you go along and just kind of integrating this. You know, you have information on this program because you are making budget requests for it.

So, you must know something because you are coming to us asking us for money. But the current plan doesn't even have the information on the resources that you will be using for the few activities that you have included and asked for money for.

And I just have to say, I am concerned that this looks
like it is just hiding information from the public and from Congress. Either you don't know or you do know when you are not telling us and that is a problem. So, I will just wrap up because I know I am over time.

But I just want to say here that the Defense Department is full of a lot of really high-priced items. But even in that rarefied environment, NNSA run some of the most shockingly expensive programs. So, it is deeply concerning when just basic budgeting is out of whack here.

At a minimum, we need to know how much resources we need for a project before we start implementing it. And I am deeply concerned that we are just going to use this as an excuse to drag out the timeline even further and jack up the cost overall.

It is not unreasonable for Congress to ask you to tell us how long a project is going to take and how much it is going to cost in exchange for our forking over billions of dollars. And I suggest that that is what NNSA be required to do before we give them another penny. Thank you. Sorry for going over.

Senator King: Thank you, Senator. I would point out that Northrop Grumman has given us a fixed price contract for the entire rebuilding of the Sentinel program, one of the most complex undertakings in the history of the world.

And I understand the point that the Senator is making,
that having this vague assurances with no real firm cost estimates or timeline is not -- this is a difficult challenge, I understand, but I don't think it is more complicated than rebuilding the entire Sentinel program.

Any further questions on this round? Yes, sir, Senator Rounds.

Senator Rounds: When you submit the budget for the production facilities, does it go through Energy or does it go through DOD? Where does that come through at?

Ms. Hruby: The appropriations go through Energy and Water.

Senator Rounds: I am sorry?


Senator Rounds: Yes. So, it would come under the Department of Energy. But the products that you are producing are critical to the national defense because this is the location where the pits, a significant number of these pits would be produced for the Department of Defense.

Ms. Hruby: Well, the responsibility for making nuclear weapons is with the Department of Energy. Has been since the Atomic Energy Commission, since the Manhattan Project. And philosophically, the reason for that is so the weapons are not produced by warfighters.

They are produced by people with deep scientific and technical knowledge of the weapons and the materials in
them.

Senator Rounds: So, and if I could just -- I will wrap up. If the Department of Energy had a similar access or could use a management plan similar to what was designed for the Sentinel program, but also for the B-21, where there was a fixed price basically involved in it, has that been something that has been discussed within the Department of Energy?

Ms. Hruby: We discussed this with the Department of Defense all the time. So, we do have cost estimates and independent cost estimating capabilities. We review this with the Nuclear Weapons Council in detail on a regular basis.

We are quite transparent in what we know and what our uncertainties are. What we don't have in the GAO report is the total cost to -- for the entire enterprise, because we are still in the process of designing a major part of that enterprise.

So, we have cost ranges and we have completion date ranges because we don't yet have the amount of information, we need to nail down a projected cost.

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

Senator King: One quick follow up question, Mr. White. Are we processing waste on an ongoing basis, or are we adding to the backlog? In other words, is the waste
that is being produced being processed as it comes, or is the backlog growing larger?

Mr. White: Make sure I understand your question, Senator. For a specific site or just in general?

Senator King: No, just in general, the waste that is being produced by the entire enterprise. There is waste being produced on a year-to-year basis. Is it being processed or is it being processed on a current year to year basis, or is it going into a repository for processing at some later date?

Mr. White: So, when we look at this, the terms we use are newly generated waste and our legacy waste. And so, for the most part, I think we are keeping on top of our newly generated waste at the same time that we are bringing down the inventory of our legacy waste.

Senator King: So, we are not digging the hole deeper.

Mr. White: Right.

Senator King: Correct.

Mr. White: Right.

Senator King: Thank you. Go ahead, Senator Fischer.

Senator Fischer: Thank you, Mr. Chairman. Admiral, I am curious on the AUKUS, the agreements that we are reaching there and really the outstanding potential, I think, that we are going to see. It is a tremendous opportunity that we can increase the capabilities of one of
our closest allies.

It, I believe, also strengthens deterrence in the Indo-Pacific, that we are able to do that. Can you provide us with an update on how discussions with the Aussies and the Brits are going, and how that looks since this 18-month consultation period is concluded?

Admiral Caldwell: Yes, ma'am. I can -- can you hear me?

Senator Fischer: Yes.

Admiral Caldwell: I can talk about our experiences over the 18 months, and then tell you that -- and where we are headed now. Over the 18 months, we have had incredible interactions with both of our allies.

One of the foundational dialogs has been stewardship, to make sure that we understand this incredible technology, but we treat it with respect. That has been just inherent in every part of the dialog that we have had.

So, as we think about the different phases of AUKUS, we built the optimal path so that Australia could learn, grow. That includes embedded opportunities here in the United States and in the UK, and eventually grow toward where they not only understand the technology, but they are ready to own and operate. It includes governance and regulatory structures as well.

So, I would -- I want to leave you with the view that
these dialogs have been rich. They have been strong. We have a lot of work ahead of us. I think we have laid an excellent groundwork. But to give you some sense, I have right now six Australian officers attending nuclear power school down in Charleston.

They will graduate from that program and then they will go into our U.S. fleet and they will serve initial junior officer tours there, qualify as engineer officer, and then we are going to find opportunities for them to continue to serve in our Navy.

Likewise, we are considering embedded opportunities in our shipyards, in our squadrons, and other areas where we can continue to teach, mentor, train, develop their leaders, and they are absolutely committed to this.

The same thing is true with the UK. So, we have completed the consultation period. We have described the optimal path. Now we are after the details to really make this happen. It is exciting, but there is also a lot of work ahead of us.

Senator Fischer: Thank you. And Administrator, before the next panel, I would like to highlight the phenomenal work by the men and women at Lawrence Livermore to achieve that ignition last December.

I recall being there and visiting NIF in I think it was 2014, and this is a huge accomplishment. Can you share
with the committee really the significance of the breakthrough?

I know the Admiral said it is going to be a long time, and we have all read the articles, it is going to be a long time before we can really put this into practice. But gosh, how cool. Tell us.

Ms. Hruby: Yes, thank you for that. It was very cool. And it speaks to the ingenuity of the scientists and engineers, and frankly just the grit. There were a lot of people that didn't think it could be done.

And not only did we do it, but we did it first. And so, I think it provides evidence of the power of science and technology in the United States of America. For us, so for us in the NNSA, this allows us to reach regimes, physics regimes for -- to study nuclear weapons in ways we haven't been able to do in the lab before.

That is our interest. Of course, the interest of the American public and others is the ability to produce boundless energy. And there is still a lot of work to do to get there, but this gives us hope.

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

Senator King: Thank you. This concludes the first panel, and we will not take a break. We will have the second panel come to the table and move forward. Thank you
all very much. Dr. Adams, you are in the center. You want to lead us off?

Mr. Adams: I would be happy to.

Senator King: Thank you.
Mr. Adams: Chairman King, Ranking Member Fischer, and distinguished members of the subcommittee, thank you for the opportunity to discuss the President's Fiscal Year 2024 budget request for NNSA.

As Deputy Administrator for Defense Programs, I am committed to working closely with you, our other partners in Congress, and the DOD to advance the nuclear security mission. The Fiscal Year 2024 budget request for Weapons Activities is $18.8 billion. This is a $1.7 billion increase over Fiscal Year 2023 enacted levels.

This budget will enable us to continue fielding safe, secure, reliable nuclear warheads, and an effective nuclear deterrent force. NNSA is executing five nuclear warhead modernization programs. Two of them are in full rate production now and delivering on schedule to the Navy and the Air Force.

The other three are making steady progress while remaining aligned with the DOD platform programs. These modernization programs address weapon aging, technology obsolescence, and changes in delivery platforms.

As you know, much of this country's infrastructure for manufacturing nuclear warheads has atrophied or
disappeared. And NNSA is engaged in a massive effort to
rebuild this infrastructure, an effort that will determine
our capabilities for decades to come.

As Administrator Hruby says, we have to get this
right. Our budget request will enable this rebuilding to
proceed at an aggressive but executable pace. NNSA's world
class computational, experimental, and test capabilities
are used every day to execute our mission. We can't do
without them.

They also attract outstanding individuals and help
them develop the expertise and judgment that we need in our
stockpile stewards. They add credibility to our nuclear
deterrent by demonstrating world leading expertise, as with
the recent fusion ignition experiment at the National
Ignition Facility.

And they enable us to maintain confidence in our
weapon performance without nuclear explosive testing. Our
budget request will allow us to keep these vital
capabilities up to date. Our tasks are urgent and
challenging, but with continued support from Congress, we
will succeed.

Our mission is vital and our workforce is determined.
Thank you and I look forward to your questions.

[The prepared statement of Mr. Adams follows:]
Senator King: Thank you, sir. General.
STATEMENT OF GENERAL THOMAS A. BUSSIERE, USAF,
COMMANDER, AIR FORCE GLOBAL STRIKE COMMAND

General Bussiere: Chairman King, Ranking Member Fischer, and distinguished committee members, I am honored to be here today to represent the men and women of Air Force Global Strike Command and provide you an update on our mission, our Airmen, our modernization programs, and the challenges we face in sustaining our legacy weapons systems.

As you all know, the world is a very different place than it was in 2009 when this command was activated. Air Force Global Strike Command was created to ensure the Air Force dedicated the appropriate leadership and oversight of our nation's nuclear mission.

As the Commander of Air Force Global Strike Command, I intend to make sure no one forgets why this command exists. For the first time in history, the U.S. faces two major nuclear strategic competitors.

China continues to expand, modernize, and diversify their nuclear forces, and is the foremost country positioned to reshape its region and the international order to comply with its authoritarian purposes.

Meanwhile, President Putin has engaged in reckless rhetoric about the use of nuclear weapons as Russia persists in their unprovoked attacks on Ukraine in an
attempt to expand their power and influence. Air Force Global Strike Command remains the bedrock of our nation's defense and the international insurance against these threats.

I would like to thank the members of this committee for your steadfast support as we continue to modernize our weapons systems. I will briefly highlight some of our ongoing initiatives. We continue to maintain and operate our current minimum three ICBMs, and we are already preparing our wings in their surrounding communities to receive the future ICBM, the Sentinel.

Additionally, our bomber fleet, including the B-1s and our dual capable B-2s and B-52s, are being sustained with innovative solutions as we prepare for the future bomber fleet, including the B-21 Raider and the B-52 Juliet. In addition to ICBM and bombers, we continue our efforts to modernize our nuclear command and control communications, or NC3.

NC3 is integral to the national military command system used to exercise and conduct continuous survivable and secure nuclear command and control. To maintain the security of our nation and our allies and partners, the U.S. must ensure our weapons are capable and ready.

Our Airmen are empowered and equipped. The Airmen of Air Force Global Strike Command fulfill our mission with
discipline, excellence, and pride. However, a number of our Airmen also face personal challenges, including health concerns, housing and childcare availability, and we are working tirelessly to develop prompt and comprehensive solutions to ensure our Airmen are getting the care and support they deserve.

Last December, I was honored to be confirmed by you to be the Commander of Air Force Global Strike Command. There is no other place I would rather be. Strategic deterrence and long-range strike are foundational to our nation's defense, and Air Force Global Strike Command is the backbone of these mission sets.

With our legacy platforms, our modernized forces, and our devoted Airmen, we safeguard our nation now and, in the decades, to come. Thank you for this opportunity. I look forward to your questions.

[The prepared statement of General Bussiere follows:]
Senator King: Thank you, General. Admiral Wolfe.
STATEMENT OF VICE ADMIRAL JOHNNY R. WOLFE, JR., USN, DIRECTOR, NAVY STRATEGIC SYSTEMS PROGRAMS

Admiral Wolfe: Chairman King, Ranking Member Fischer, and distinguished members of the subcommittee, thank you for the opportunity to testify on the Department of the Navy's budget priorities for nuclear forces.

I would like to thank the subcommittee for its continued support of the Navy's nuclear deterrence mission. The mission of my command, Strategic Assistance Programs, is to provide credible and affordable strategic solutions to our warfighter.

To quote from the Administration's 2022 Nuclear Posture Review, I quote, "in a dynamic security environment, a safe, effective nuclear deterrent is foundational to broader U.S. defense strategy and the extended deterrence commitments we have made to allies and partners." For nearly seven decades, the Navy has provided unwavering support to the sea-based leg of the nuclear triad.

This coming year we will build on this remarkable history. Later this year, the Navy will conduct the final demonstration and shakedown operation for an Ohio class ballistic missile submarine. Alongside our partners in the United Kingdom, we will celebrate the 60th anniversary of the Polaris Sales Agreement.
In coordination with our colleagues at NNSA, we will continue to ensure the W93/Mk7 program remains on schedule. As this work shows, we must continue to sustain today's deterrent while modernizing for the future.

The Navy continues to manage the nuclear strategic weapons system across three main mission priorities. First, sustaining the weapon system D5LE through Ohio end of life. Second, developing the strategic weapon system in the future, D5 Life Extension II for the Columbia class.

And thirdly, 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 through their end of life in the early 2040s.

All of our life extension programs remain on track, and our current program will support the deployment of all existing warheads. We must also recapitalize our supporting Navy nuclear deterrence mission infrastructure to support and sustain nuclear weapons and SSBN operations that enable sea based strategic deterrence.

Secondly, along with PEO SSBN, we must continue to transition between Ohio class and Columbia class submarines and make sure they stay on schedule. For PEO SSBN, this means delivering the largest, most capable, and most
advanced submarine ever produced by our nation,
representing a generational recapitalization of the SSBN force.

For my command, this requires a seamless transition of the current Trident II D5LE weapon system and missile inventory onto the new Columbia class ballistic missile submarine. We have already started the work on the next variant of Trident D5LE II and its corresponding weapon system. D5LE II will be necessary to out load the Columbia class SSBN, starting with the 9th hull, ensuring that Trident remains credible until at least 2084.

Finally, one of the greatest advantages the United States has is its alliances and partnerships. For decades, U.S. policy has recognized the contribution of an independent British nuclear deterrent and how it adds to NATO and global security, and SSP will continue to support this most important relationship.

Execution of these three mission priorities is only possible through investment in our people, our infrastructure, and our industrial base. Nuclear modernization will take time, so sustained resourcing and enterprise effort is absolutely essential. We can no longer put off recapitalization -- recapitalizing our nuclear triad.

Our adversaries are not idle. Russia's and China's
nuclear arsenal is our nation's biggest existential threat. It is only through your continued support that the Department's top modernization priorities can be achieved and the Navy can deliver a reliable, sea based strategic deterrent capability.

As the 14th Director, it is my highest honor to represent the men and women of SSP. My personal number one priority is to ensure that they are poised to execute the mission with the same level of success, passion, and rigor that has characterized our workforce since our program was founded in 1955.

Thank you for the opportunity to testify today on behalf of the dedicated Americans that make deterrence of major power conflict their life's work. I look forward to your questions.

[The prepared statement of Admiral Wolfe follows:]
Senator King: I think your last statement is very important in terms of the basic strategy of this country, which is deterrence. The best way to prevent a war is to be sure that adversaries know that they will pay an unacceptable price for an attack on this country, and that is what has, in fact, worked to deter -- nuclear deterrence for over 70 years.

So, I think that is an important overall, overarching concept of this hearing, and in fact, our entire military strategy. Admiral Wolfe, we heard General Caldwell talk about a new or a modified reactor.

Are you talking about modernization of the D5 missiles for the new -- for the Columbia class? And is that a later development or is that part of the current schedule?

Admiral Wolfe: So, what we have requested, sir, as part of SSP's strategy going forward in schedule to make sure that we have what we call D5 Life Extension II. It is a new missile that will replace aging assets that we have got in the current system.

Senator King: Will that be ready when the first Columbia --?

Admiral Wolfe: It will not be ready. The plan is for Columbia, in order to reduce risk to the overall deterrent, the decision was made because of where we are at with the Trident weapons system.
We are ostensibly picking that system up and we are going to install that onto the first eight platforms of the Columbia class. We have got the missile inventory. We have got the life on the system to be able to do that.

In 2039 when we get to the 9th hull, we will have concerns about aging electronics. We will have concerns about quantities of missiles that we have because we flight test every year to prove their reliability --

Senator King: I am assuming that the Columbia is going to be designed on a modular basis so that as technology develops you will be able to improve and add new technology without rebuilding the whole platform.

Admiral Wolfe: Yes, sir. That is exactly right. So, we already do that today on the shipboard systems. All of our shipboard systems, we are able to modernize them and keep up with technology of what industry is doing and others are doing.

Senator King: Let me follow up with another question on the Columbia. We have heard testimony in this subcommittee and in the larger committee and all over Capitol Hill on workforce problems.

And we are talking about major workforce demands to do Virginia, Columbia, and now AUKUS. Is it realistic that the yards are going to be able to meet the schedules that we have laid out for those programs, given the challenges
of workforce that we have -- that we are experiencing everywhere?

Admiral Wolfe: Sir, I think to your point, there is no doubt we are going to continue to have challenges. Those challenges are going to go well in the future. I would tell you, I think that the strategy that the Navy has taken with the things that we are doing for industrial base investment, if you look at the request in President's budget '24, it is greater than $1 billion to invest in six key areas of how we are going to get the industrial base revitalized, how we are going to more rapidly train a workforce, a skilled workforce that the Navy is going to need and the shipyards are going to need.

And in our program, we are also very concerned about that workforce as well as we start to ramp up a number of missile development programs, not just for what the Navy's doing, but in parallel for what the Air Force is doing.

There are challenges everywhere. But we are working that very diligently with the industrial base to make sure we keep up with that demand.

Senator King: I think diligence is the right word.

General, you are going to be in charge of managing the Sentinel project, one of the largest, as I mentioned, one of the largest projects ever undertaken by the United States Government.
Are you satisfied with the progress -- and this is an unclassified setting. Are you satisfied with the project -- the progress that is being made under that contract?

General Bussiere: Chairman King, so far, yes. It is probably one of the most scrutinized and overseen program in the Department of Defense. Has the direct attention of Honorable Plehn, Honorable Hunter, myself, obviously, the Secretary and the Chief.

We do episodic and routine progress statuses with both internal to the Defense Department as well as with the industry partners. It will be one of the major work projects our nation has undertaken probably in the last 50 plus years.

So, it is not only just the aspects of building the new weapons system itself, but the process of integrating that new weapon system across the fabric of our nation, while we maintain full operational capability with our legacy Minuteman III.

Senator King: I know you are aware that one of the great challenges is NC3 also. The whole enterprise won't work if we don't have invulnerable communication.

General Bussiere: I couldn't agree more, Chairman King. The underpinning of our deterrence is the ability to command and control our forces.

Senator King: Thank you. Admiral Wolfe, one final
point. I am running out of time. But we have had testimony in the past on the strategic importance of a sea launch cruise missile that is nuclear tipped.

The Congress passed appropriations to support research, and yet there is nothing for it in this budget that has just been submitted. Can you give me your best military judgment about whether the SLCM-N is a significant part of our strategic deterrent?

Admiral Wolfe: So, sir, as I alluded to, the '22 Nuclear Posture Review, as they looked at the body of the requirements, it was decided that the sea launch cruise missile was not going to be part of the Nuclear Posture Review, not be part of a supported system.

The 76-2, which we currently have, was stocked to fill that gap. We are aware, though, and we will comply with the plus ups that Congress has given us, $5 million in Fiscal Year 2022. We are executing that for research and development.

The $25 million in Fiscal Year 2023, we have developed a plan to continue to look at technologies, to look at what infrastructure would be, to look at how we would integrate into platforms as time goes forward.

Senator King: I think we have to take cognizance of the way the world has changed since that Nuclear Posture Review was prepared, particularly given Russia's continuous
discussion of the use of tactical nuclear weapons.

We don't want to be in a situation where our only response is a massive one, which isn't credible given a lower level of utilization. So, I hope that you will continue to review that issue, and I know we are going to have further discussions in this subcommittee. Senator Fischer.

Senator Fischer: Thank you, Mr. Chairman. Admiral, I appreciated our conversation yesterday about the significance of developing new weapons based on proven designs, like the W-93. Can you share with the rest of the committee your assessment of why this is important and necessary?

Admiral Wolfe: Yes, ma'am. Certainly, as we look at what the combatant commanders' requirements are, and to Senator King's point, as we look at the changing environment that we now face, we are faced with the challenge of making sure that we have weapons -- first of all, they have to be credible and they have to be from our strategic competitors' eyes reliable that they are going to work.

Which is why we talk about in partnership with NNSA, making sure not only what they do with the explosive package, but what we do with the system at large to make sure that if ever called upon, it is going to work every
single time. And that is really the essence of deterrence.

    And so, it is absolutely critical, as our systems
start to age, that we stay ahead of that and we never
question the reliability or the function of any of those
weapons, which is why modernization right now is so
important for the entire Department.

    Senator Fischer: Thank you. General, the chairman
touched on NC3. It has become really common terminology
within the nuclear enterprise. With Sentinel's integration
into our nuclear architecture, can you describe any
advances taking place on items that you believe need
Congressional support?

    General Bussiere: Specific to NC3, Senator Fischer?
So, the Sentinel weapon system will be fielded with
probably the most advanced communication systems that our
nation has developed. It will take into account our new
carrier pathways, for example, fiber.

    It will take advantage of our cybersecurity protocols.
It will be designed so that, like Admiral Wolfe
illuminated, it will be designed so that as technology is
developed over the years, it is not difficult to integrate
that into the open architecture of our NC2 systems.

    Senator Fischer: Do you have any specifics on the
technologies that you have been briefed on that might be
emerging that you are looking ahead that Congress needs to
know about?

General Bussiere: I don't think we would require any assistance of Congress now, but there may be some technologies in the future that would require that.

Senator Fischer: Okay. Can you provide us with an update on the SAOC program?

General Bussiere: So, the Survival Airborne Operations Center, as everyone knows, is the replacement to our current E-4B fleet, which is our airborne command and control platform. It is a 747-200 platform now.

There are requests out to industry to come back with their proposals and offerings for the SAOC program, and we are optimistic we will see those in the next few weeks, if not months.

Senator Fischer: Okay. And then for Admiral and General, how are you both working with NNSA to ensure that the warheads needed for Sentinel and for Trident missiles are delivered on schedule?

And then I would like Dr. Adams to respond to that, to look at how -- what the possibilities are that we could accelerate the delivery of those.

General Bussiere: So, Senator Fischer, specific to our programs, whether it is the fielding of Sentinel or the fielding of the LRSO weapon system, we work closely with NNSA. We work closely with the Nuke Weapons Council, and
the Department of Energy, Department of Defense Forum that really has those oversight responsibilities.

We are integral into those discussions. We are confident that the Sentinel will be fielded, as you know, with the W87-0. And so, we will be able to field that weapon system and then transition in the future to the W87-1.

We are also confident in NNSA's estimates to get us the required W80-4 for our current schedule for when we field the RSO.

Senator Fischer: Thank you. Admiral.

Admiral Wolfe: Yes, ma'am. So much like General Bussiere said, we work very closely within NNSA. We work at the Nuclear Weapons Council. I would say for our systems, as Dr. Adams alluded to, we have just come through the life extension for W76/Mk4.

We are in the throes of having the deliveries for the W88 alteration that NNSA just completed, and those deliveries are occurring. As we look to the future for the W93/Mk7, Dr. Adams and I work very, very closely together.

We are in phase two right now to understand what the options are and what options we want to carry forward, so that as I get into the Navy work and the integration that has to occur, and NNSA gets into the work they have to do, we are absolutely in sync and aligned on schedules, and
that we are pushing each other to make sure that we stay true to those schedules.

Senator Fischer: And Dr. Adams, your comments?

Mr. Adams: Yes, those were the -- [technical problems] -- I am sorry. Do I need to repeat that? Just it was a comment that says that the two programs in production now, we have delivered on schedule to both the Navy and the Air Force.

The next one up is the W80-4. We are holding very closely to our scheduled first production unit of 2027. There is some schedule risk. We are monitoring that very closely and putting all hands-on deck to make sure we don't realize schedule risks. Several components are difficult to manufacture and we are working on that. We do remain closely aligned with the LRSO program.

The LRSO delivery platform depends on us for hardware, for their part of flight testing, and we depend on their flights for our part of the flight testing. There are a lot of environments that the LRSO is subject to because of a lot of delivery platforms, a lot of aircraft, and we have to design our warheads to make sure they can withstand those environments.

The W87-1 is farther out. At this point, we talk in terms of a schedule range. It is quite consistent with the Sentinel schedule ranges that I have seen. We will be able
to support the deployed stockpile of that.

I am highly confident of that. And we are working hard to make sure that we support the need for the hedge portion of that as well. Details of that are classified.

With the W93 farther out yet, as Admiral Wolfe said, we are in phase two, but already -- that is a tightly integrated program.

The Mk-7 is under development at the same time that the W93 warhead that will go in it is under development. Our teams work incredibly closely together, and we have also begun working very closely with the UK on their parallel program.

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

Senator King: Senator Rosen.

Senator Rosen: Well, thank you, Chairman King, Ranking Member Fischer, for holding this hearing. And I would like to thank you all for your service and for being here today. And before I begin, I really want to start by offering my condolences to the families of the Ula miners killed in a car accident last week at the Nevada National Security Site, and to our entire NNSS community.

They are a very tight knit group and I know how much this is hurting all of them. So, I want to just give them my condolences. And I am going to move on and continue to
talk about Nevada National Security Site, build on some of
the importance of NNSA.

We have the NNSS and NNSA, all the NNs, but the audit
of the U1a complex and the enhancement projects. And so,
Dr. Adams, as you and I have discussed, the Nevada National
Security Site oversees the Stockpile Stewardship Program,
principally the U1a facility.

It is an underground laboratory where scientists
conduct subcritical experiments to verify the safety and
reliability of our nuclear stockpile without explosive
testing. U1a is undergoing a major construction project
that will soon host the most capable weapons radiographic
system in the world.

However, a November 2022 audit by the Department of
Energy's Inspector General found that the U1a Complex
Enhancements Project has faced unanticipated cost increases
and schedule overruns, which are going to threaten our
stockpile stewardship goals.

And so, Dr. Adams, what actions has the NNSA taken to
improve its management of science and technology
development projects that are necessary to support the
stockpiles through our stockpile stewardship, and what
management oversight changes are you putting in place to
avoid further cost and schedule changes in the future?

Mr. Adams: Thank you for that question, Senator
Rosen. We agree with the recommendations made in that IG report, the draft recommendations. We have taken corrective actions.

We had taken corrective actions prior to that audit and we have been enhancing our management of these critical activities. Like other construction projects around the country and certainly within the NNSA portfolio, the construction underground at Ula, those projects have suffered from the same kind of supply chain problems, inflation, labor shortages, and labor productivity being lower than expected.

Our response to that is manyfold. We have instituted, for example, a lessons learned task force on UPF, which was one of the first construction projects we saw kind of go off of the anticipated cost and schedule a little less than a year ago, that came to light. We are instituting recommendations based on those studies.

A lot of those things, Administrator Hruby mentioned in the first panel session. With regards to sort of the big picture of how we are handling those things, given the causes for some of these construction schedule problems and the costs that go along with schedule extensions, our Fiscal Year 2024 budget request reflects the prioritization that we have made to focus our limited labor, supply, and dollars on a smaller number of high priority projects to
try to execute in parallel.

Those high priority projects include projects under
ground Ula, the accelerator that you mentioned for the radia-
graphy capability, the ASD Scorpius project. We have added money to that in our request for Fiscal Year 2024. And similarly, what is known as the ZEUS testbed is going to require some mining that we didn't expect before and we have asked for the funding to support that.

Senator Rosen: Thank you. I have a short amount of
time, so General Bussiere, I am going to just ask you a little bit about AFWERX. So, you have a location right here in Las Vegas -- right there in Las Vegas, designed to develop effective solutions to the challenges facing the Air Force by establishing partnerships with the private sector.

In a few short years, it has evolved into the innovation engine of the Air Force. Is now part of the Air Force research laboratories, and the Air Force Global Strike Command's innovation hub STRIKEWERX is based on the AFWERX's model?

And so, I just have a few seconds left, but I know that with cyber innovation center, STRIKEWERX, we have saved the Air Force over $248 million. It is nearly a fivelfold return on the funding that Congress originally appropriated to fund this agreement.
So, I didn't see any discussion of this in your Fiscal Year 2024 budget request, so what are your plans for expanding the command's innovative efforts to take advantage of things like STRIKEWERX?

General Bussiere: So, Senator Rosen, thanks for highlighting the CIC and the innovation efforts of Global Strike Command. So, I will briefly kind of give you an overview. We have several different programs that highlight and give our Airmen the opportunity to use their most powerful tool, and that is their ideas.

So, we have AFWERX at the Air Force level, as you are well familiar with. We have STRIKEWERX, which was really a smaller scale model of that entry port. We also have innovation cells at all our installations. In addition to our Airmen innovation areas and cells, we also have started a partnership with the help of Congress.

It is a commercial capabilities innovation team, which basically does the same things with small business and commercial entities in and around our business. It is sometimes difficult to convince the system that an idea is worthy of a program. But make no mistake, we invest and bring in our Airmen to get ideas.

And we use the funding within our current top line and we use our program. Whatever innovation that are saving money is, that is where we would use the program dollars
for. But I will take for the record to go back and see what was submitted in '24. I don't have that in front of me and I will get back to you, if that is acceptable.

Senator Rosen: Thank you. I appreciate it. Thank you, Mr. Chairman.

Senator King: Thank you, Senator. Senator Rounds.

Senator Rounds: Thank you, Mr. Chairman. And thank you to all of you for your service to our country. Admiral Wolfe, I would like to begin with you. The -- you mentioned the really special anniversary coming up here, the 60th anniversary of our agreement to Polaris sales of missiles to the United Kingdom.

And as part of the Five Eyes group, they clearly are some of our closest allies. But this particular agreement has continued on through the years, and it really has been a way for us to extend our capabilities. Can you talk a little bit about just how critical it is that we continue that relationship with the United Kingdom?

Admiral Wolfe: Yes, Senator, thanks for that, because I think you are absolutely spot on, our relationship with the United Kingdom under the Polaris Sales Agreement. I am the U.S. project officer as part of that Polaris Sales Agreement, and what we provide to the United Kingdom is the entire weapon system.

It is not just the missiles. And as you look at where
we are at right now with the United Kingdom, they are modernizing their entire SSBN force as well to include their replacement of their Vanguard class submarine, which would be the Dreadnought. We work very closely with them, PEO SSBN.

We have a common missile compartments. Ostensibly, it looks exactly the same as what the U.S. Columbia will have. And in so doing, what that allows us to do is have -- treat them like an extra four SSBNs in my program.

And so, we -- I know the other panel talked about trust. I would tell you that the trust that the UK has with us, and the system that we provide, and the certifications that we give to them really does provide an extension for the United States, it really provides for NATO, and it really leads to global stability.

So, it is incredibly important that we continue to support them in everything that they do as they modernize their entire SSBN force. They have recently celebrated more than 50 years of continuous at sea deterrence, which means one SSBN at sea 24 hours a day, 7 days a week for the last 50 plus years.

We have a big part in making sure that they continue that record, and we are absolutely all in to do that.

Senator Rounds: And that is one less that we have to have in the water at the same time.
Admiral Wolfe: Yes, sir. I mean, it is all part of that extended deterrence. Yes, sir.

Senator Rounds: Thank you. General Bussiere, the B-21 program is right now one of the shining stars out there with regard to being on time, on budget, and one which the folks in Rapid City, South Dakota, are really looking forward to having it deployed there at Ellsworth Air Force Base.

I am just curious with regard to the implementation of its nuclear capability as well that requires a weapons generation facility which will be created there at Ellsworth. Can you share a little bit about the timelines and so forth, and where you are seeing the B-2, in this unclassified section, but at least share a little bit about the development and the future timelines that you can share with the public.

General Bussiere: So, Senator Rounds, as you know, the first base for the B-21 raider will be Ellsworth Air Force Base. Construction has already started on several different facilities to support that sixth-generation low observable platform, including adding a weapons generation facility to be able to facilitate its dual docked mission.

I think the committee is also familiar that the Secretary of Defense, I think three years ago, directed that the certification of the B-21 Raider for conventional
and nuclear certification be closed. So, when we deliver that weapon system to the wings, it will be capable of both missions.

Very happy with the way that program is going. Very happy with both industry, as well as the Rapid Capabilities Office, and obviously the nation and the world got a sneak peek at that in December when that weapon system was revealed.

Senator Rounds: Great, thank you. And I need to go back just for a minute, Admiral Wolfe, with regard to the situation we have got with trying to deploy the new submarines, as well as keep the existing submarines operational. I go back to the USS Boise as an example.

This is a Los Angeles class nuclear submarine, attack submarine, has now been in dry dock or prepared to be in dry dock for its half-life basically, or close to seven years now, if my memory serves me right.

But it suggests the bigger problem that we have got in that we are trying to not only maintain and configure the Ohio class, but also another Columbia class. How are we going to right now create the new submarines, maintain the existing submarines, handle the half-lives for the attack submarines.

It seems to me that we just simply don't have enough shipyard space and is there a priority for the Columbia
class and the Ohio class that is perhaps one of the reasons why the Los Angeles class submarines are sitting at dry dock.

Admiral Wolfe: So, yes, sir, I would tell you that from a Navy priority, Columbia class as a new platform is the priority. And I would tell you that PEO SSBN and PEO SSN, both of them frequently meet together to understand what needs to be done to make sure Columbia stays a priority, to your point, so that we have a replacement SSBN.

I would also tell you that the good news is, we are about done with all of our -- as I alluded to, we are going to do our last demonstration and shakedown operation on our Ohio class, the USS Louisiana, and that will be the last of the Ohio class that goes through their mid-life refueling overhaul.

So those will be past us now. We will still have to do normal maintenance and all the things that we do, but those big availabilities are now going to be completed, and we will continue to work through that capacity challenge as well.

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

Senator King: One thing we learned from Admiral Caldwell was that the Columbia class will never have to be refueled. Gentlemen, thank you very much for your
testimony, for your service.

Thank you for joining us today and for giving us the
forthright answers to our questions. This hearing is
adjourned.

[Whereupon, at 6:27 p.m., the hearing was adjourned.]