DEPARTMENT OF DEFENSE AUTHORIZATION OF APPROPRIATIONS FOR FISCAL YEAR 2015 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, APRIL 9, 2014

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NATIONAL NUCLEAR SECURITY ADMINISTRATION MANAGEMENT OF ITS NATIONAL SECURITY LABORATORIES AND THE STATUS OF THE NUCLEAR SECURITY ENTERPRISE

The subcommittee met, pursuant to notice, at 2:35 p.m. in room SR–222, Russell Senate Office Building, Senator Mark Udall (chairman of the subcommittee) presiding.

Committee members present: Senators Udall [presiding], Donnelly, King, Sessions, and Fischer.

Majority staff member present: Jonathan S. Epstein, counsel.

Minority staff member present: Robert M. Soofer, professional staff member.

Staff assistant present: Lauren M. Gillis.

Committee members' assistants present: Christopher R. Howard, assistant to Senator Udall; Stephen M. Smith, assistant to Senator King; Lenwood A. Landrum, assistant to Senator Sessions; and Peter W. Schirtzinger, assistant to Senator Fischer.

OPENING STATEMENT OF SENATOR MARK UDALL, CHAIRMAN

Senator UDALL. The Strategic Forces Subcommittee will come to order. Good afternoon to all who are attending.

And let me make a short comment initially on questions and timing of this hearing. We've got two panels today, and I'd like to conclude the hearing at 4 p.m., with 45 minutes per panel. That means the first panel's until about 3:15 p.m., and then the second until about 4 p.m.

I want to note that we have a series of five stacked votes starting at 3:30 p.m., and I'll stay as long as possible past 3:30 p.m., and then go vote, and then hopefully some of my other colleagues will have had a chance to vote and they can come back and close the hearing, if that's okay with my colleagues, and I'm sure it will be.

And I'm going to ask my colleagues if 7-minute rounds makes sense. And, seeing no objection, we will go with 7-minute rounds.

With that, let me start off with our first panel with Dr. McMillan, Dr. Hommert, and Dr. Goldstein.

I think I'm going to, Senator Sessions, put my statement in the record and turn to Senator Sessions if he had any comments and—because I know we want to get to some questions.

[The information referred to follows:]

[SUBCOMMITTEE INSERT]

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Right, we do. And we, unfortunately, have had three votes coming up all of a sudden here.

Please note that I think all of us believe that we need a modernized nuclear force, that we're past due for that, and we need the help of the labs to get there. But, we're not—I am not—I'll just say it this way. I'm glad you're reevaluating, intensely, construction of new buildings and some of the other things. I'm—just could imagine that we might just ask France to do this for us, and I suspect it would be cheaper. We've created such a large infrastructure over the decades that we're not as lean as we ought to be. And so, we are just hammering the military, as you know. We just had the Army people in, this morning, talking about going from 570 to 490 to 450 and maybe 420 in troop—uniformed troop levels. And so, the money's tight.

Now, you—the nuclear program, including the triad, is only about 5 percent of our budget, so—but, that's not an excuse for not managing every dollar carefully. So, I guess you probably know that my view is that we've got to get this done, we'll pay the price that's needed to get there, but if we can do it for less, and effectively, that's what I believe it's our responsibility to do.

So, Mr. Chairman, thank you. I've enjoyed working with you on this committee. You've done a good job, and I believe that we're reflecting, pretty much, the National interest. So, I guess that's what we're—I'm pleased about.

So, thank you. I'll look forward to hearing from the witnesses.

Senator UDALL. Thank you, Senator Sessions.

I do owe each of you just a brief introduction, and to connect you to the laboratories that you all helm. And we've got the NNSA laboratory directors: Dr. Charles McMillan, of Los Alamos; Dr. Paul Hommert, of Sandia; and Dr. William Goldstein, of Lawrence Livermore.

Dr. McMillan, why don't we start with you.

STATEMENT OF DR. CHARLES F. MCMILLAN, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY

Dr. MCMILLAN. Thank you, Chairman Udall and Senator Sessions. I appreciate the opportunity to appear here before the committee today.

I am Charlie McMillan. I'm the director of Los Alamos, and I ask that my written comments also be entered into the testimony as part of the record.

Today, I want to focus on Los Alamos' ability to deliver today's commitments while ensuring our capabilities for an ever-changing future. There are three areas that I'd particularly like to draw your attention to: first of all, the plutonium strategy; and very much to

the point you were making, Senator Sessions, reductions in critical program budgets; and then harmonizing requirements and budgets.

I bring these concerns to your attention because, particularly within the current global environment, I believe the work at our laboratories is fragile. Because of severe budget constraints over the last 2 years, there is no longer management flexibility, at least at my lab, to address further funding shortfalls, balance risks, and meet mission requirements.

We now have, in my view, a sound business case, agreed on with NNSA, for a realistic plutonium strategy. We need approval to move forward in order to execute our plutonium missions, which cannot be accomplished with current aging infrastructure. And, Senator, it's one that we believe is at a much lower price point than CMRR was.

Recent budget guidance reduces our funding in three key areas: facility and maintenance; security; and our science, technology, and engineering base. Any reduction in facility budgets undermines mission capabilities, especially to sites such as Los Alamos, where infrastructure continues to age and, in some cases, dates back to the beginning of the cold war. Current requirements in the area of physical, cyber, and information security are outstripping our funding allocations and necessitate more prudent management decisions that balance risk and available funding.

As I contemplate the body of science needed to continue assessing the safety and reliability of the stockpile in the future, underfunding our science base is increasingly risky today. I understand that budgets will not grow significantly. We've heard your message. Therefore, we must work with DOE and NNSA to develop better risk-informed requirements. Let me give you an example:

The design basis threats for our physical security posture are a place where I believe we could reexamine requirements. Following September 11, we added guns, gates, and guards to our physical security systems. With security technology improvements that are available today and better threat analysis capabilities, it's possible to reduce the security costs while at the same time maintaining appropriate security stance, but the requirements would have to change.

The laboratory and its people are committed to our mission, solving our Nation's security challenges through scientific excellence; however, they must have the tools in order to deliver. The Congress, administration, and the laboratory need to continue working together to develop an agreement on nuclear facility strategies. We face an uncertain future that may be as complex as any we have dealt with since the cold war. We need decisions on out-year funding levels that balance risk and can be sustained for the complex. Predictability is important. We also need decisions on the role of the science, technology, and engineering base at our three laboratories.

Thank you, Mr. Chairman, and I look forward to your questions.

[The prepared statement of Dr. McMillan follows:]

Senator UDALL. Thank you, Dr. McMillan.

Dr. Hommert.

STATEMENT OF DR. PAUL J. HOMMERT, DIRECTOR, SANDIA NATIONAL LABORATORIES

Dr. HOMMERT. Chairman Udall, Ranking Member Sessions, and distinguished members of the Strategic Forces Subcommittee, thank you for the opportunity to testify today.

I am Paul Hommert, Director of Sandia National Laboratories. I'd like to briefly summarize the key points of my written testimony.

First, I am pleased to report that my laboratory is now successfully executing three full-scale engineering development efforts and supporting the continued production of the W76–1 life extension program. I want to thank the Congress for the support of these programs in the fiscal year 2014 authorization and appropriations bills. That support allows me to report that each of these programs remains on or under original cost estimates. And, in the case of the B61 LEP, the largest of these programs, I can report that we have already been able to realize $120 million in savings over the life of the program.

In the case of the B61, we have had to adjust schedule as a result of the funding profile we received being different from our original June 2012 planning basis. However, the cost savings I just mentioned will help us significantly mitigate any cost growth that would result from funding-induced schedule slip. We have achieved this cost performance by increasing our program management rigor, having a strong focus on controlling labor cost growth, and utilizing, where appropriate, common technology across the programs.

I brought with me today an example of common technology. Last year when I testified before this committee, I showed you a radar module designed for the B61 air delivery system, the green board here. We successfully tested that module in the B61 in August. Here I'm holding an electrical model of the W88 ALT 370 arming, firing, and fusing assembly with that very same radar module incorporated. This assembly, which will become a key component of our submarine launch ballistic missile deterrent, will be part of a Navy flight test later this year. This radar component will also be used in our work with the Air Force Mk21 program. The use of this common technology across three systems brings considerable cost savings, on the order of 170 million, and confidence to these three major design activities. Furthermore, the fiscal year 2015 President's budget request supports these programs at a level that will allow us to meet current first production unit schedules.

While I am sanguine about our progress on the modernization programs, I am concerned about what I see as an increasing imbalance in the overall program. The resource required to execute modernization, which is the clear priority, is causing us to reduce efforts in other areas that increase long-term risk. Examples at my laboratory include surveillance, advanced and exploratory technology development, and, very importantly, high-priority infrastructure recapitalization. In fact, as I elaborate in my written testimony, I believe more is being asked of us today at budget levels in constant dollars less than we've had at—in comparable periods at any time in the last 30 years. In addition, we face new cost pres-

sures, such as pension and medical care, that we haven't faced before.

Let me be clear. I raise these concerns, fully cognizant of the overall fiscal constraints you face and to which Senator Sessions just spoke, but—however, I do believe those of us entrusted with the stewardship of the Nation's nuclear deterrent must acknowledge and look to mitigate risks. Two examples of areas that can mitigate these risks are increased programmatic flexibility inside a budget top line and support for synergistic work we do for other national security missions. For my laboratory, these broader efforts have often been a means to further advance technology for the weapons program of the type you—you're looking at in that component.

I do have some thoughts on the topic of your next panel—namely, governance—but, in the interest of time, I will save those for your questions, to which I look forward.

Thank you.

[The prepared statement of Dr. Hommert follows:]

Senator UDALL. Thank you, Dr. Hommert.

Doctor, would you help me pronounce your name properly, if it's—is it "Goldsteen" or——

Dr. GOLDSTEIN. It is, in fact "Goldsteen."

Senator UDALL. "Goldsteen."

Dr. GOLDSTEIN. Thank you.

Senator UDALL. Thank you, Dr. Goldstein. You are recognized.

STATEMENT OF DR. WILLIAM H. GOLDSTEIN, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. GOLDSTEIN. Thank you. Chairman Udall, Ranking Member Sessions, distinguished members of the committee, on behalf of the more than 6,000 men and women of Lawrence Livermore National Laboratory, thank you for this opportunity to provide perspective on our work.

I've submitted my full statement to the committee, and I ask that it be part of—made part of the record.

My name is William Goldstein. I'm the Director of Lawrence Livermore. And, in the spirit of full disclosure, I should note that, although I'm in the 30th year of my career as a scientist there, I'm—this is my 11th day as Director. So, while I can claim to know a great deal, I'm quickly learning how much I don't know.

As director, I have three major objectives: first, to ensure that the best and most innovative science, technology, and engineering is brought to bear to sustain the confidence in our nuclear deterrent and to support cost-aware options for warhead life extension programs and infrastructure modernization; second, to operate the National Ignition Facility safely and efficiently as a national user facility where nuclear weapons designers can hone their skills and test their models, where students can be trained in the fundamental science that underpins nuclear performance, and where we can explore the path to ignition and, hopefully, fusion burn in the laboratory; third, to apply the unique strengths of the lab established by, and required by, our core nuclear deterrence mission to new and evolving challenges in national and global security.

This past year, with the support of this committee, we've made progress in all of these areas. Livermore successfully met its annual assessment responsibilities and achieved all deliverables for the W78/88–1 LEP and long-range standoff study in support of the Air Force. NIF has provided data needed for stockpile stewardship, including advancing our understanding of the physics associated with ignition.

Working often in coordination with Los Alamos, we successfully conducted a series of hydrogen-amic experiments at our contained firing facility, and Los Alamos' dual access radiographic hydrotest facility, including a successful test of a pit reuse concept.

In partnership with NS tech personnel at the Nevada national security site, we significantly increased the shock rate at the Joint Actinide Shock Physics Experimental Research Facility, and have continued to support studies on pit and secondary assembly production at Los Alamos and Y–12, respectively.

In addition, we've provided innovative support to the Intelligence Community, the Department of Homeland Security, and the Department of Defense, among other agencies responsible for the National Security Enterprise and the Nation.

The President's fiscal year 2015 budget proposal helps strengthen our ability to deliver for stockpile stewardship by providing a modest increase in funding for our core weapons activities. This small increase in directed stockpile work and the science campaigns would enable us to improve our capabilities in support of current stockpile warheads, continue the development of cost-aware LEP options for the future, and help us recruit and retain new stockpile stewards as senior weapons experts retire.

The budget also—the budget request also stabilizes funding for the NIF, following 2 years of significant reductions, and this will allow us to continue our recent restructuring of the facility and its operations in order to increase experimental opportunities and allow researchers to effectively support the stockpile stewardship mission.

These small increases for core weapons activities are especially critical in light of the delays in the life extension programs for the W77/88 and the LRSO, which limit opportunities for our scientists and engineers to learn and practice the skills needed for weapon development and engineering.

Now, we've had some success exercising weapon engineering skills in work for the Department of Defense on conventional munitions, such as the Blue 129B low-collateral-damage weapon, a notable example of work for other agencies that helps us sustain the health and vitality of the laboratory. And this work exercises some, but not all, of the skills required to support sustaining the nuclear stockpile, and therefore, retaining these needed skills continues to be a challenge in the current program and budget environment.

I also have some comments on the relationship between the laboratories and NNSA, but, again, in the interest of the time, I'd like to delay, though, for the questions and again thank the committee—subcommittee for its continuing support of the Stockpile Stewardship Program and for the dedicated men and women of Lawrence Livermore who are committed to making our Nation a safe and secure nation.

[The prepared statement of Dr. Goldstein follows:]

Senator UDALL. Thank you, Dr. Goldstein.

Let me recognize myself and start the round of 7-minute blocks of time.

I want to start with Dr. McMillan. The NNSA has stated it still wants to move out of the old chemistry metallurgy research facility by 2019, given its aged state. Is this target achievable? And what has to be moved out to make it happen? What happens if you don't achieve the target date?—as a follow-on.

Dr. MCMILLAN. Senator, thank you for the question.

Yes, it is achievable, provided—and the provisos really fall into three categories. First of all, the funding stream profile. In fiscal year 2014, we need to see $90 million available to do the work in those facilities. In 2015, we need to see 38 million. And then, in the out years, we need to see 85 million, relatively uniformly, out to 2019. Second, we're going to need to have a streamlined process, what DOE and NNSA call the 413 process, for being able to do the project. We need to be able to do that efficiently; and, if we do that, then I think, you know, that will work. And so, with funding in the next 2 years, out-year funding, and then a streamlined process, I believe it's possible to do.

The pieces of the work that we need to move out of CMRR are primarily analytical chemistry. There is some what we call material characterization work that happens there, but it's mostly analytical chemistry. So, that's what we need to be able to move out.

And if we're unable to do that, we face choices such as extending beyond 2019, which I think is unadvisable. That building will be 70 years old at that point. The nuclear facility standards were very different in 1952, when the building came online. And so, either we do something like that, we have a gap in capabilities. But, it's probably early to really say what those consequences would be.

Senator UDALL. Dr. Hommert, let me turn to you and the B61 life extension. Your laboratory's performing the largest amount of work on that weapon. I think you're now in an engineering phase. Let me ask you three questions connected to that effort: What's your assessment of the largest remaining technical risk you have to buy down in this program? Second, assuming you enter into production in time, what is your assessment of the capacity of reduced components in this program combined with all the other activities at the Kansas City plan? And then, third, do you see any areas for cost savings once it enters production?

Dr. HOMMERT. Senator, thank you for the question. On the issue of technical risk, you know, when we began the program, 2 years ago, the highest technical risk we had was actually that radar module that you just saw. We've put that risk largely behind us, the green board there. As we stand here today, I would say there are a couple of areas of low- to moderate-risk that we continue to watch. It's important that we maintain effective work with our supplier base in a variety of different component areas—magnetics, et cetera. We have a small, relatively fragile supplier base, and it's important that we maintain strong relationships with them and ensure that they can meet our quality and schedule requirements.

There is also a longstanding issue with the program, which is to effectively integrate the Air Force component into the B61. We con-

tinue to work closely with the Air Force and with their contractor, and we've made progress on that in the coming year, but that is the—a—sort of a new technical component of the program that we'll have to continue to watch all the way through our design period.

But, I would say, in aggregate, our risk—technical risk posture is stronger and in a better place than where we were a year ago, retiring that risk element for—in large measure. So, I feel pretty good about that.

With respect to production, as we look at the production requirements through Kansas City, we think that the phasing of the programs, largely the 76–1, will complete its production by the time, in 2019/2020, when we begin the 61 production. So, I believe that that's effectively phased.

The other thing I think that's very valuable in our working relationship with Kansas City, I think we've honed that working relationship very effectively through the 76–1 process and production. We're doing that now. So, I think we'll have a—effectively, a more honed and a—and working relationship with Kansas City when we enter that. And also, the sequencing with where we would go with the Mk21 program, which now we look at 2023. So, actually, the phasing is pretty good through the throughput for Kansas City right now.

And finally, on cost savings in production itself, actually that has to begin well before production. We have a very active cost-control board with Kansas City. We're trying to make sure that there's a level of dialogue that we're factoring into our designs. The questions of manufacturability, we think we've made great progress on that, on the 61. And we expect we'll see cost savings through the production period, as we've begun to see already in design phase.

Senator UDALL. The subcommittee certainly likes to hear that.

Dr. Goldstein, you talked about the NIF, the National Ignition Facility. And it's a multibillion-dollar facility. It focuses on—192 laser beams on a small target to simulate the condition of a nuclear weapon. And one of the milestones associated with the facility was to achieve ignition or a sustained burn of a small target containing an isotope of hydrogen. My understanding is, this milestone has not been achieved. Can you explain to us why it's important to achieve that milestone, where you are in the progress towards this milestone, and what other stockpile activities are you using the facility for?

Dr. GOLDSTEIN. Thank you for the question, Mr. Chairman. You're correct, that milestone was not achieved. Achieving ignition is important to the Stockpile Stewardship Program because of the data that it will allow us to collect on physical properties important to understanding weapons performance, including the process referred to as "boost," which occurs at all of our current stockpile weapons.

This information is important in our assessment of the legacy stockpile and could help us develop options for future life extension programs, and also to test the fidelity of our integrated multiphysics computer simulation codes. At the present time, we're making steady progress towards understanding the underlying physics associated with achieving ignition on NIF. As measures of progress,

we've already set new records for the production of fusion neutrons and demonstrated a process known as bootstrapping, which is a prerequisite, a stepping stone, if you will, that's needed on the way to demonstrating fusion ignition. And we've also demonstrated success in predicting the behavior of recent experiments using those large multiphysics codes that are used for weapons design.

It's important to bear in mind that our work on ignition is even now helping us to evaluate and improve the level of confidence we have in the physics models used in our weapons computer codes.

At the same time, both Livermore and Los Alamos have been using NIF to collect data on materials properties under the very extreme conditions that are found in operating nuclear weapons, on the transport of radiation, in weapons geometries, and on the hydrogen-amic behavior of weapons materials.

I'd also add that NIF has already provided important confirmatory data for a theory put forward by a Livermore designer that resolved a so-called "energy balance conundrum" that has bedeviled nuclear design for decades. I mean, since the time of testing, we have not understood this—the nature of this process. And it has been resolved recently, with the significant help from the experimental validation done on NIF.

Senator UDALL. Thank you, Doctor.

Let me recognize Senator Sessions.

Senator SESSIONS. Thank you.

This is—I'm—been on this committee 17 years, it's hard to believe, but I've never been comfortable with where our money is spent and how we've managed it. It's just—it's given me some concern over time.

Well, the first thing I want to ask—draw your attention to—I don't know if you have a copy of this chart. Do you have that copy? Just see if we have this correct. The chart, across the top, is the commitment made by the President and Congress to secure New START ratification in 2010 with regard to modernizing our nuclear weaponry. It appears to me that we're about $2 billion below that promised amount. This top line being those numbers. For example, in 2012, the commitment was 7.6 billion, and we came in a little over 7.2 and 7.9 and 6.9, 8.4, 7.7 is where we're headed. Is this—somewhat of a dangerous trend, it seems to me. And then, if you take the results of these delays, I guess we can blame these—the results of this failure of money is that the W76 was to be completed in 2017 and it looks like we have a 2-year delay on that, with a reduced number of warheads. Would you agree or disagree with that? It would—

Dr. HOMMERT. That is—fiscal year 2019 is the current schedule for the 76, yes.

Senator SESSIONS. All right. Then, in the B61, the first production unit was to be in 2017, but it looks like we've got a 3-year delay to 2020. Is that correct?

Dr. HOMMERT. Yes, Senator, that's the current schedule.

Senator SESSIONS. Dr. Hommert, are these formal decisions? I mean, they've been adopted by the labs? Or are they NNSA or—who has made these decisions?

Dr. HOMMERT. These FPU dates—first production unit dates—are the agreed position of the Nuclear Weapons Council and then the NNSA and as requirements through to us.

Senator SESSIONS. All right. So, NNS-—Nuclear Weapons Council and the NNSA has said this is what we're going to have to do, based on the budgets that we have, I guess is the way to express it.

Dr. HOMMERT. Yes, Senator, that's correct.

Senator SESSIONS. And then, the W88, we don't have a date specified for that. It's in development engineering. Would you say a delay is likely on that?

Dr. HOMMERT. I don't think there'll be significant delay on the 88, as I currently see it right now.

Senator SESSIONS. And the IW–1, delayed at least 5 years?

Dr. HOMMERT. That's correct.

Senator SESSIONS. That's correct?

Dr. Goldstein, and then LSRO, initial low rate production, to begin in 2025, looks like it's delayed for 3 years.

Dr. GOLDSTEIN. That's correct.

Senator SESSIONS. And CMRR, we're looking for functionally—functionality attainable by 2020, completion in 2023, and now looks like we're going to 2027. And the UPF—that's the—what is that? That's the——

Dr. GOLDSTEIN. That's the Uranium Production Facility at——

Senator SESSIONS. Yes, okay. That's the building I've been asking questions about. And so, that's delayed.

So, I guess I'm saying to you, those represent fairly serious delays in the important programs that we've focused on, would you not agree? And I assume you think, in addition, I'd ask you, is that unfortunate? Do you—would you have preferred to stay on track? Who would like to answer that? [Laughter.]

Dr. HOMMERT. I'll take a first crack. I—let me just deal with the first three—the 76, the 61, and the 88—very quickly. I believe the schedules now are still schedules that provide effective margin against any issues in the stockpile. What is of paramount importance is to now hold them on schedule. The 61, for example, 2014, 2015, and 2016—are these the most important years? If we can hold the budgets at the requested levels, we will be able to execute that, and that timeframe is acceptable.

I think, from my perspective, going back to my comments, the emphasis to now get these modernization efforts on a defined schedule, which you've gone through, Senator, I think has been effective, but it's had a—an associated effect of pressuring other elements of the program, which both Dr. McMillan and I have highlighted, in the infrastructure, surveillance, et cetera. And I think that is where my current concern is most.

Senator SESSIONS. Well, let me, just briefly, tell you. We're—last year, our interest on the debt was 220 billion, which was—is a lot of money. But, CBO told us, in—last month—that, in 10 years, the interest on the debt for 1 year would be $880 billion. So, this is going to crowd out a lot of things. And so, I'm just saying it's going to take a heroic effort in the laboratories, I believe, to ask yourselves, "Can't we produce what we need for the Nation at a lower cost?"

Now, the Nuclear Weapons Council told Congress, on March 13th, that, while the fiscal year 2015/19 budget request will meet nuclear stockpile requirements, as you've indicated, Dr. Hommert, quote, "The program is fragile, and any funding reductions at this point could pose unacceptable risk to the health of the nuclear enterprise." Would y'all—each of you agree, a yes or no, to that?

Dr. MCMILLAN. Yes.

Dr. HOMMERT. Yes.

Dr. GOLDSTEIN. Yes.

Senator SESSIONS. So, I think that's where we are. We're in a tight situation, for sure.

Let me ask one question—my time's about up—and give you a chance to—ask this. The interim report of the Congressional Advisory Panel on Governance of the National Nuclear Security Enterprise concludes, quote, "The existing governance, structures, and practices are most certainly inefficient and, in some instances, ineffective, putting the entire enterprise at risk over the long term. The NNSA experiment involving creation of a semi-autonomous organization has failed. This needs to be fixed as a matter of priority."

So, briefly, I'll give you a chance to respond, maybe all three of you. Do you agree with that assessment? What's been your experience? And what actions do—could you suggest? In 1 minute or less. [Laughter.]

Or you could supplement, of course. But, we are going to need to talk about their recommendations and what we're going to do.

Please, Dr. McMillan, do you want to—or where you——

Dr. MCMILLAN. Sure, I'll start.

As I'm sure you know, Senator, I and my colleagues have interacted closely with the committee, and I have not yet heard the report. I'm looking forward to their report, here in a few minutes. But, I certainly find a lot that I resonate with in the statement you made, particularly on the issues of efficiency, as I said in my prepared remarks.

Dr. HOMMERT. And I would agree with that. I believe the construct is—it's timely to reexamine the construct, because I think it's not as efficient a way to operate, and, as you just cited, there are significant pressures to control cost and meet schedule. And I believe there's a relationship there, that it's, again, a good time to reexamine, and we look forward to the work of the Congressional Advisory Panel on that.

Dr. GOLDSTEIN. And I would agree that there's much room for improvement; in particular, in the efficiency area. We have had the opportunity to interact with the committee and to provide our input and our observations.

The one thing I would add, I think, is that the NNSA, together with its labs, I think have been tremendously successful over these years in executing the Stockpile Stewardship Program, and I don't think we should lose sight of that fact as we go forward.

Senator SESSIONS. Thank you. And I agree. I wish Congress and the President would allow new weapons to be built. I think that'd be safer and cheaper and better. But, we've got to refurbish, it appears, what we've got, and we've got to get it done, in my opinion. And delays—more delays, will—are not acceptable.

Senator UDALL. Thank you, Senator Sessions.

Senator King.

Senator KING. Thank you, Mr. Chair.

Let me talk about your workforce for a few minutes. How do you fellows assess the morale and the state of your workforce? This is a time in our economy when high-tech technology, scientific people are in great demand in the private sector. Are you able to recruit and retain the people that you need, or is that an issue?

Dr. HOMMERT. Senator, we—in order to meet the modernization programs that I just discussed, we've had a very significant recruiting requirement over the last 4 years. And I'm actually pleased to reply that we've had a fair degree of success in that. We've brought something just under 1,000 advanced-degreed scientists and engineers. That's a new generation of stockpile stewards from the finest research universities in the country. We are under pressure to retain them. This—they're—they do have other opportunities. You would expect that, given their talent. But, I'm reasonably optimistic we can do that, as long as we have the stability to execute the programs, because that's what keeps them. They believe they're doing something important, challenging, and, if we can convey to them that stability, I think we'll be effective in retaining that workforce.

Senator KING. Are they straight-up Federal employees? Are they subject to furloughs and all of the kinds of things that we've gone through?

Dr. HOMMERT. They're not Federal employees, but, as contractors to the Department of Energy, we certainly were subject to the impact of the shutdown of the government in October. That had a very dramatic effect, and it's not a point of stability. That did cause some retention issues for us. I think we've been able to push through that. But, yes, we're—we were subject to that impact.

Dr. GOLDSTEIN. So——

Senator KING. Do either of you want to comment on that?

Dr. GOLDSTEIN. Well, I would just follow up on this issue of—we are not Federal employees, but we are subject to furlough when we run out of money. And Livermore Laboratory actually was the only Department of Energy lab that, because of limited carryover, was actually in a position of having to close for several days in October. And the morale impacts of the—of that, the lack of security that that conveyed to our worker—workforce—were significant. And we can point to specific people who have left the laboratory because of their reaction to that kind of uncertainty.

Dr. MCMILLAN. Senator, if I could.

We do a lot of our recruiting at Los Alamos through our postdoc program. We have continued to be able to recruit extremely high-quality postdocs, among the best in the world. However, we are seeing increasing pressure on retention, and, in the last year, I've lost some of my very best mid-career people to universities, and I'm fighting off attempts on some of my people from companies such as Google, Apple, and Yahoo!.

What's the reason for their readiness to leave?

Dr. MCMILLAN. Exactly the issues that my colleagues have talked about: instability in funding, uncertainty about the future program. We need to be clear and stable for the employees.

Senator KING. Well, let's—we certainly agree. I hope we can achieve that.

We haven't conducted an underground nuclear test, or any kind of test, for that matter, since 1992. What kind of problems does that raise? Because you're in charge of being sure that a weapon is ready to go if it's needed, God forbid, but you don't have the ability to test them. Is that a—are there ways to test, other than by testing the whole weapon, that can ameliorate that problem?

Dr. MCMILLAN. Yes, Senator. I would say—two key areas, and they're parts of the Stockpile Stewardship Program.

First, we do experiments in areas where we can. And, in the last year, I'm very proud of the people of Los Alamos in having developed a very innovative new diagnostic for an experiment that we did in Nevada. It didn't produce any nuclear yield, but it was a way for us to gain information we had never had before.

A second example of that is what my colleague Dr. Goldstein mentioned of doing experiments on NIF. We're finding those to be very productive of information in domains of weapons performance that we haven't historically been able to touch.

The second broad area, modeling and simulation. Through the last 20 years of the Stockpile Stewardship Program, we have all worked to develop not only the computing machines, but the codes that run on those machines, to help us bridge the gap to testing. And, as someone who helped develop that program 20 years ago, I'm not only proud of what we've done, I am amazed at how far we've been able to go. It's successful beyond my expectations.

Senator KING. And you can do, in effect, partial testing. You can test the components——

Dr. MCMILLAN. Yes.

Senator KING.—the firing mechanism, all of that. You simply can't test the physics of the nuclear part, itself.

Dr. MCMILLAN. That's correct.

Senator KING. Last December, the Congressional Budget Office talked about the nuclear weapons complex and cost for the next decade, including $105 billion for nuclear weapons supporting the labs of the naval reactors. Within the CBO report was a chilling statement, "If they follow historical trends, efforts related to sustaining and modernizing the weapons stockpile are likely to be particularly susceptible to cost growth." That's a term we don't like to hear around here. Can you comment on that? Can we do the upgrades and the work that we need to do without necessarily being particularly susceptible to cost growth?

Dr. Hommert?

Dr. HOMMERT. Well, I'm particularly sensitive to this, because there's been a lot of dialogue in Washington about the cost of the modernization programs, and I believe we—we have a high degree of confidence that we can hold to the cost estimates that we submitted on each of these programs. We have a process that's called a Weapon Development Cost Report. We're very committed to execute on that. We have, in that, appropriate contingency. As I indicated, on the largest of those programs, we've been able to actually realize savings in the first 2 years. So, that may have not—that may have been the historical characterization. I think we've gotten

the message. We understand the pressures that you're under, and I'm confident we can execute to that.

But, I—as I—I'll also emphasize something I said earlier, that if you look at our budgets today in sort of constant dollars and what's on our plate, there's actually more on the plate, and less, overall. We got it, we're working to that, and I am confident that we can execute without significant cost growth if we hold the schedules.

Senator KING. That's—I was just going to end with that. I think what I'm hearing is, you can do it if we can deliver some kind of certainty and predictability. Fair enough?

Dr. HOMMERT. Absolutely. If—the biggest risk to cost growth is a delay in appropriations that causes the schedule to slip.

Senator KING. Thank you.

Dr. HOMMERT. Then you'll inevitably have some cost growth. If we don't have that, I think we're—we can do it.

Senator KING. That's an important message for us.

Thank you very much, gentlemen.

Senator UDALL. Thank you, Senator King.

Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

And thank you all for being here today.

I apologize if I'm repeating any questions that you've—might have had. I was at a Commerce Committee markup, so I'm—my staff tells me that my questions are good to go. So, you can correct him if there is an issue here. [Laughter.]

Again, thank you.

Dr. McMillan, the assistant Secretary of Defense, Andrew Weber, testified to me last year that DOD and DOE agreed on achieving a production rate of 30 pits per year by 2021, but this budget would delay that rate to 2026. What was the reason for the delay, please?

Dr. MCMILLAN. Well, as you said, the——

Senator FISCHER. And has that requirement changed at all?

Dr. MCMILLAN. Well, as we discussed in earlier conversations, both the immediate need for pits for systems such as the Adaptable Warhead 1 have moved out. And so, the requirement for 30 pits per year has also moved out. However, I think it's important for this committee to understand that, with a capability like pits, it's important that we be making them. I would remind you that, following the closure of Rocky Flats in 1989, we lost the ability to make pits. And it cost us nearly a billion dollars in almost a decade to regain that capability. I don't think we should go there again.

So, even if we're not making pits at the rate of 30 per year, we need to be continuing to practice that arc so that the people who do the work are able to do it for the country when it's needed.

Senator FISCHER. Is that going to have an impact on our current modernization plans, then——

Dr. MCMILLAN. Not after the delays——

Senator FISCHER.—if we're not able to——

Dr. MCMILLAN. Not after the delays that are in place. If we can do 30 by 2026, that will provide what we need.

Senator FISCHER. And if we cannot do 30?

Dr. MCMILLAN. If we cannot, then it will, of course, have an impact.

Senator FISCHER. Are we going to—if we can do the 30 by 2026, are we going to meet the targets, then, by—I think it's 2030, that are 50 to 80?

Dr. MCMILLAN. That depends on the funding. As I've discussed, the—we've laid out a three-phase program for plutonium strategy. The first two steps of that, which are what we're working on most immediately, will get us to the level of about 30 per year. And we should be able to do that by 2026. Then, if we make further investments, that will get us to the 50, and possibly beyond 50, per year.

Senator FISCHER. We're delaying a cruise missile warhead. Is that correct?

Dr. MCMILLAN. Yes.

Senator FISCHER. By how many years?

Dr. MCMILLAN. Three years?

Dr. HOMMERT. Roughly three, yes.

Dr. MCMILLAN. Yes, I'd—my colleagues are better prepared for that one than I am.

Senator FISCHER. Are we going to be looking at delaying everything by 3 years, 5 years, 10 years? What are we looking at?

Dr. HOMMERT. Well, let's see, the three programs we're executing now—the 61, the 88 and the Mk21—the first two of those are—I believe the schedules are firm now, 2019 and 2020. There is—been a change in the schedule on the Air Force Mk21, but I also believe that's now firm—2023, I believe. I think those are firm. I think the ones that are less firm right now because we haven't done 6–2—what we call our cost-estimate phase of 6–2—are the cruise missile system and the, what we call, IW–1 and –2. Those, I think, are still to be nailed down.

Senator FISCHER. And last year, Doctor, you were saying, and I quote, that—about the LEP schedule, and maybe seeing that slip, as well, and significantly slip—and you said, quote, "You then have the possibility of stacking up a fair amount of production requirement falling on top of one another early the next decade, and also just late design activities that can complicate our ability to support the 50-—or, I'm sorry, the 78/88. There is sequencing and phasing here that is important to adhere to." Are we looking at a problem with that sequencing and phasing?

Dr. HOMMERT. I think we're in—we're not—a year ago, when we were here, we had a fair amount of uncertainty as to exactly what the 2014 budget would bring to execute those programs. The final numbers on 2014 were such that we are able to hold the current schedules of, particularly, the 61, the 76 production, and the 88, which would—if we can hold them through the 2015 and 2016 appropriations funding process, would avoid that stackup, which would have been clearly a possibility.

Senator FISCHER. Are you worried that some of these systems are going to age out, though, if we can't hold it?

Dr. HOMMERT. Certainly that's a concern. The 61 schedule needs to be held. I'll just leave it at that.

Senator FISCHER. Okay, thank you. I think I'll stop there.

Thank you, gentlemen.

Senator UDALL. Thank you, Senator Fischer.

Senator Donnelly.

Senator DONNELLY. Thank you, Mr. Chairman.

And this is to follow, a little bit, up on my colleague Senator King's questions. In regards to keeping your talent, when we look at the folks that work there and we see some of the salary challenges of an Apple or a Google or those kind of things, what are the most important, I guess you'd call it, counter-weapons you have to try to keep people on the team?

Dr. MCMILLAN. Why don't I start with that one, Senator? I think, first of all, the importance of mission. People come to the laboratory because they believe that the mission we provide for the Nation is an important mission. And, to the degree that we, as a country, make sure they—that that commitment is reciprocated, that's an important tool.

I think, second, having the tools to be able to do the scientific work that no one else in the world can do. I remember, in the late 1990s, when Silicon Valley was drawing off my computer science people. Having the fastest computers in the world for them to work on to tackle those mission requirements would help to balance some of the differential.

I think, third, we need to constantly pay attention to the work environment, making an environment in which those people can work rather than one in which they're stymied. And, as our colleagues from the governance panel talk, I think that's one of the things I'm looking for, is, Are we able to govern the laboratories in our relationship to the government in ways that will make it possible for people to work rather than impossible for them to work?

Dr. GOLDSTEIN. So, speaking from a laboratory that has Google and Netflix and assorted other giants right down the street——

Senator DONNELLY. Great neighborhood, huh?

Dr. GOLDSTEIN. Absolutely—in many ways, yes. [Laughter.]

We're in a situation where people don't even have to move in order to take these jobs, and they are constantly pinged by these companies. When we lose somebody to one of these companies, the people who leave are offered—I don't know if I want to use the word "bounty," but——

Senator DONNELLY. Well, is——

Dr. GOLDSTEIN.—compensation. If they can go back to us and——

Senator DONNELLY. I've heard the salaries can be, like, triple the salary——

Dr. GOLDSTEIN. There are many things——

Senator DONNELLY.—or more.

Dr. GOLDSTEIN. So, their—the salaries can be larger, the—but also, the other parts of the compensation package—stock options, things like that—as well as the—a range of amenities that these companies can offer their employees.

I will just go through the things that I think distinguish us from them, and that we've found works very well in attracting and retaining talent:

First of all, it is, as my colleague said, the mission, the ability to make a difference on a national scale. And that's one of the reasons it's so important for that mission to be strongly emphasized and reinforced all the time.

Second, it's the caliber of the people that they get to work with at the laboratory. And it's—that's kind of a circular thing. If we have good people there, we can keep good people there.

And third, it's the caliber of the facilities. And this makes it absolutely essential that we find ways to reinvest in keeping our science, engineering, and technology facilities at the forefront. That's a—that's one of the things that our people come looking for, and it's one of the things that keep them there.

And I'll just mention, also in this context, the importance of the Laboratory Directed Research and Development Program (LDRD) at these laboratories, which is one of the important ways that we recruit people and also retain them. We keep our scientists at the forefront of their fields through this—among others, this mechanism. And when there's pressure on this program at the lab, we feel it in our ability to attract and retain the nuclear force that we need.

Senator DONNELLY. Have you been able to stay as deep as you need to be, talent-wise? Are we as deep as we have ever been, or has it been more difficult to try to make sure that we're meeting all the goals we need to meet, in terms of having critical talent in our locations?

Dr. GOLDSTEIN. So, I would answer that by saying we have the critical talent we need right now for the program, but we are not deep in the areas that are critical. And I believe that's primarily because we're making the best use of the budgets that we have, and that does lead to our being thin in areas where, if we lose the next person, it could become an issue.

Dr. HOMMERT. I'll—my colleague said this very well; I'll just try to summarize: importance of the mission, the stability with respect to the ability to execute the mission, the requisite infrastructure, and an environment conducive to the best in science and engineering. And if we have those things, in my view—I mentioned earlier, we have brought some outstanding staff to the laboratory. They are fully capable of executing our mission, but we need those elements.

Senator DONNELLY. On a long list of things that we can do better here, if you had three top things that you looked at us and said, "We need you to do this and this and this," what would they be? Or two.

Dr. HOMMERT. Reinforce clarity on the expectations of our mission and its importance. And, in doing that, do it with a time horizon that gives us some confidence of the stability that we would execute on that mission. And then, I think, to your next panel, I do believe, to listen carefully to their recommendations about the nature of the environment in which we can operate in these institutions, because that's going to be very important to retain this new workforce we've brought through. Those would be the three things I would suggest.

Senator DONNELLY. Dr. McMillan?

Dr. MCMILLAN. I agree with my colleague.

Senator DONNELLY. Thank you, Mr. Chairman.

Senator UDALL. Senator King, did you have a——

Senator KING. I just—before this panel leaves, I hope you will take the message back to your people that they have one of the most important missions in this country, and it's—it doesn't get recognized, because their mission is to provide the intellectual guts of our deterrent. And if you look back at the sweep of history, I think the fact that we've gone for 69 years without a use of nuclear

weapons is a miracle. And it's a miracle because of the credibility of the deterrent. And your people are an essential part of that. And it's hard to recognize a negative, in effect, because what they've done through their work and their contributions, along with all those others in the nuclear enterprise, has enabled our deterrent to be a kind of umbrella for the world, which—you know, there is no more important work.

So, I just hope you'll convey that those of us here understand and appreciate that.

Dr. HOMMERT. Well, thank you, Senator.

We do provide our workforce the opportunity to Webcast and view this hearing, so hearing that from our political leadership is very, very important. They'll hear it directly.

Senator KING. Let the record show. [Laughter.]

Senator UDALL. Yes, let me thank Senator King and Senator Donnelly and Senator Sessions and Senator Fischer, and hopefully I'm on that list, as well. But, I think what I hear everybody saying on the committee is that your people are—and their intellectual capital—are part of our overall deterrent. And Senator King put his finger on it.

We thank you for your service and for your time. I know we could spend easily another hour or two with you, but the day is getting on. I'm going to excuse all of you and ask our next panel to take their seats.

Thank you. Thank you.

Dr. Hommert, I'm tempted to keep this assembly, here, but I guess it's a million dollars. I've never held a million dollars in my hands.

Dr. HOMMERT. Probably even more than that.

Senator UDALL. The Doctor is saying "even more than that." I feel asset rich and cash poor.

Dr. HOMMERT. It's the best of American technology——

Senator UDALL. It's a work of art.

Well, I want to welcome Mr. Norman Augustine and Admiral Richard Mies. They're the co-chairs of the Congressional Committee on the Governance of the Nuclear Security Enterprise at the Institute for Defense Analysis.

If I might, I just wanted to set the stage for these two gentlemen. And we just spoke to this with the previous panel. And this is a part of the—my opening statement that I put in the record, but I think it's important, for those watching and here today, to understand what we face and what our opportunities are. By that, I mean, look, the heart and soul of our Nation's nuclear deterrents are the scientists and engineers working in our laboratories. And Robert Oppenheimer—and Senator King's a great student of history—

Senator SESSIONS. Mr. Chairman——

Senator UDALL. Yes.

Senator SESSIONS.—we've got to vote. I just see the first vote starting. Do you think we're going to try to come back and forth——

Senator UDALL. Yes, we're going to——

Senator SESSIONS.—between the votes?

Senator UDALL. Would you all like to—there's a series of votes. The first vote will most likely be about 20 minutes, so perhaps, Senator King——

Senator SESSIONS. Go early and come right back?

Senator UDALL.—if you go early, and then I'll hold the fort. And then when you return, whichever one of you arrives first will—this is a bipartisan committee—will chair the committee.

And I want to highlight what Robert Oppenheimer said at the end of World War II. He looked back on the Manhattan Project, and he said to his fellow scientists at Los Alamos, quote, "If you're a scientist, you cannot stop such a thing. If you're a scientist, you believe that it is good to find out how the world works, that it is good to find out what the realities are, that it is good to turn over to mankind at large the greatest possible power to control the world and to deal with it according to its lights and its values."

Since Dr. Oppenheimer's leadership, the core mission of these laboratories has not changed on the nature of the scientific enterprise that served as the foundation of our deterrent. That scientific base is a fragile enterprise that needs constant oversight by the witnesses here today and by this subcommittee. We, as the Congress, need to ensure the resources are available to maintain this scientific enterprise so that our nuclear deterrent remains an effective one. And I look forward to both of you providing us with your testimony, particularly with a focus on the relationship between the laboratories and the National Nuclear Security Administration.

Both of you, Mr. Augustine and Admiral Mies, have a track record of being forthright, and I expect as much today in your testimony. So, thank you for being here.

Mr. Augustine, perhaps we'd turn to you.

STATEMENT OF NORMAL R. AUGUSTINE, CO-CHAIR OF THE CONGRESSIONAL ADVISORY PANEL ON THE GOVERNANCE OF THE NUCLEAR SECURITY ENTERPRISE, INSTITUTE FOR DEFENSE ANALYSES; ACCOMPANIED BY ADM RICHARD W. MIES, USN (RET.), CO-CHAIR OF THE CONGRESSIONAL ADVISORY PANEL ON THE GOVERNMENT OF THE NUCLEAR SECURITY ENTERPRISE, INSTITUTE FOR DEFENSE ANALYSES

Mr. AUGUSTINE. Thank you, Mr. Chairman. I have about an 8-minute statement, which, with your permission, I'll proceed. Otherwise, I can submit it for the record and make it more brief.

Senator UDALL. That would be—if you could make it more brief, that would be well appreciated. And I'll leave it to you.

Mr. AUGUSTINE. Well, thank you. Mr. Chairman, members of the committee, and I will submit a longer statement for the record, but—and we appreciate this opportunity to share with you the findings to date of our panel on the Governance of the Nuclear Security Enterprise. As you know, Admiral Mies and I have the privilege of serving it as co-chairmen.

The Congress asked our panel to broadly examine the performance of the Nuclear Security Enterprise and to consider alternatives and improvements. And let us state very clearly at the outset that the current viability of our nuclear deterrent is not in question. At the same time, the existing governance structure and operating practices are most certainly inefficient and, in some in-

stances, actually ineffective, which does put the entire enterprise at risk over the long term.

During the past 5 months, the panel has focused attention on the National Nuclear Security Administration, both in the headquarters and the field, including the laboratories, the production plants, and the Nevada National Security Site. We've examined the current situation from the perspectives of the National leadership, from the users of the facilities and also from the standpoint of the customers of the facilities and the employees.

We've benchmarked the NNSA against proven management approaches that have been used by high-performing enterprises both in the private sector and in the government. We've conducted onsite visits to virtually all the installations, and we've heard from dozens of expert witnesses. And I should say that we appreciate—Admiral Mies and I appreciate the great support of our colleagues on the panel and certainly the candor of those people that we've interviewed.

Today, we are prepared to summarize our panel's findings on the current health of the NNSA and the root causes of its challenges, but we are only beginning to formulate our recommendations, and we'll look forward to presenting those to you. We believe we're on schedule for our final report.

Unfortunately, the unmistakable conclusion of our factfinding is that, as implemented, the NNSA experiment involving creation of a semi-autonomous organization has largely failed to achieve the system that the Congress apparently intended. And this does need to be fixed as a matter of priority.

Despite the flaws, we found examples of great success in NNSA's endeavors. To date, the science-based stockpile stewardship has succeeded in sustaining confidence in our nuclear deterrent, unmatched technical innovation on the part of NNSA scientists and engineers has produced a dramatically increased understanding of the aging of our nuclear weapon stockpile, the labs and plants are providing solid support to the nonproliferation efforts and unique expertise to the intelligence committee—community. NNSA's naval reactors organization continues to provide the world-class performance in developing and supporting the most advanced naval nuclear propulsion systems in the world.

On the other hand, NNSA, as a whole, continues to struggle to meet fundamental commitments. And, to that point, it's lost credibility among many of its customers and overseers. At the root of the challenge are complacency and the loss of focus on the nuclear mission by both the Nation's leadership and the public, following the end of the cold war. Although the National leadership has provided strong policy and has provided substantial amounts of funds, it's evident that the followthrough has been insufficient, and the Congress's present focus on this issue is certainly timely and welcome.

Fundamental reform will be required to shape the enterprise so that it can meet all the Nation's needs and rebuild the essential infrastructure that's required. While the technical work is rocket science, certainly the kind of management issues we've seen are not. That's not to say that they will not be difficult to rectify. Many

have to do with culture. And, in my experience, there's nothing harder to change than culture.

The changes that we will recommend undoubtedly will be difficult to implement. They will require strong support from the higher levels of the government, including the Congress and certainly the White House.

While organizational issues such as we have addressed are important, they are, frankly, the easy part and a necessary, but not sufficient, condition to achieve the improvements that the Congress has pointed to.

The panel believes that the enterprise today benefits immensely from the political leadership of an engaged Secretary of Energy and the strong science and engineering of the National Laboratory system, but we have found five systemic disorders that have taken root that we believe are at the heart of the problem. And, with your permission, Mr. Chairman and members of the committee, Admiral Mies is prepared to describe, briefly, those five issues.

Senator UDALL. That's perfect.

Admiral MIES.

Admiral MIES. Chairman Udall and Ranking Member Sessions, let me add my thanks, as well, for being here today. And my remarks are intended to provide some specifics on the panel's findings within the context of my co-chair's overall characterization of the health surrounding the enterprise.

As Norm indicated, our panel has identified five systemic disorders which result from the causes outlined in Norm's preceding testimony.

And the causes and the disorders are really inseparable. Most, if not all, of these disorders can be traced back to national complacency, the lack of a compelling national narrative, and a widely accepted understanding regarding the role of the U.S. nuclear deterrent in this century.

Today, I would like to offer a brief synopsis of our panel's key findings, specifically focusing on the five systemic disorders we have identified:

First, a sustained loss of national leadership focus. Since the end of the cold war, the United States has experienced significant erosion in its ability to sustain nuclear deterrent capabilities for the long term. The atrophy of these capabilities has been well documented in numerous reports over the past decade. And the fundamental underlying cause of this erosion has been a lack of attention to nuclear-weapon issues by senior leadership, both civilian and military, across both past and present administrations and Congresses. This lack of attention has resulted in public confusion, congressional distrust, and a serious erosion of advocacy, expertise, and proficiency in the sustainment of these capabilities. Absent strong national leadership, NNSA, as well as the whole Nuclear Security Enterprise, has been allowed to muddle through. First and foremost, we must consolidate and focus national-level support——

Senator UDALL. Admiral, if I might stop you there, we had hoped to phase in your testimony, like we're going to phase in the modernization of our weapons. I believe I need to go to the floor, so we'll temporarily recess, and when the first Senator——

Admiral MIES. Fine, sir.

Senator UDALL.—arrives, you can pick up at your second point. So——

Admiral MIES. Great.

Senator UDALL. But, we stand in recess. [Recess.]

Senator SESSIONS [presiding]. Colleagues, I'm—we are very, very apologetic from having our meeting interrupted. It's just—and having good people like yourselves testifying in—on important subjects. We are hearing it, we are reading the report, and we will consider very seriously your recommendations.

So, Admiral, I believe you were getting warmed up, so feel free to go ahead and——

Admiral MIES. Thank you, Senator Sessions.

I have already begun, and I am talking about five systemic disorders. I've already covered the first.

The second is a flawed DOE/NNSA governance model. The current NNSA governance model of semi-autonomy is fundamentally flawed. NNSA has not established effective leadership, policy, culture, or integrated decisionmaking. Indeed, the design and implementation of NNSA governance has led to numerous redundancies, confused authorities, and weakened accountability within the Department of Energy.

The third disorder is a lack of sound management principles and practices. NNSA and the associated policy-setting and oversight organizations within DOE reflect few of the characteristics of successful organizations. An entrenched risk-averse bureaucracy lacks a shared vision for, and a unified commitment to, mission accomplishment; and hence, they don't act as a team. Both DOE and NNSA lack clearly defined and disciplined exercise of roles, responsibilities, authorities, and accountability aligned to NNSA's mission deliverables. Too many people can stop mission-essential work, for a host of reasons; and those who are responsible for getting the work done often find their decisions ignored or overturned. Chains of command are not well defined, and resources are micromanaged. Personnel management and career development programs, issue resolution processes, and deliverable aligned budgets are deficient. Shortfalls in project management and cost estimating are well documented and acute.

Fourth, there is a dysfunctional relationship between the NNSA Federal workforce and their management and operations, the M&O partners. The trusted partnership that has historically existed between the laboratories and DOE/NNSA has—headquarters—has eroded over the past two decades to an arms-length customer-to-contractor adversarial relationship leading to a significant loss in the benefit of the federally funded research and development centers the FFRDC model. The trust factor essential to this model, underscored by a recent National Academy of Sciences study, results from unclear accountability for risk, a fee structure and contract approach that invites detailed transactional compliance-based oversight rather than a more strategic approach with performance-based standards. Additionally, excessive fragmented budget and reporting lines also confound effective and efficient programmatic management and further erode any sense of trust. Furthermore, there is no enterprise-wide approach within NNSA. While there are examples where the relationship has improved, such as at the Kan-

sas City plant, overall this government and M&O partnership remains highly inefficient and, in many cases, severely fractured.

And fifth and finally, there's a lack of close collaboration with selected customers. The issues the panel has identified are mainly with the Department of Defense weapon customers, and this is at once a culture—cultural and communications divide. There's no affordable, executable, joint DOD/DOE vision, plan, or program for the future of nuclear-weapon capabilities. There's a lack of effective joint planning and budget coordination because of a fundamental lack of mechanisms to ensure requisite collaboration and consensus to address core mission requirements. And, as a consequence, DOD customers lack trust in NNSA's ability to modernize facilities and execute warhead life extension programs. Although other customers appear to be satisfied, hereto a more strategic approach could strengthen capabilities in the services provided.

So, in conclusion, lasting reform requires aggressive action and sustained implementation in all five of these areas, but national leadership engagement is really the common theme. Improvement is possible, but it will demand strong leadership and proactive implementation of the panel's recommendations by the President, the Congress, and an engaged Secretary of Energy.

Thank you for your time, and we look forward to answering your questions.

[The prepared joint statement of Mr. Augustine and Admiral Mies follows:]

Senator SESSIONS. Well, thank you very much for the work you put in this. I do believe it's very, very important, and hopefully we'll be able to have a good discussion today and we'll be able to study your recommendations.

And I would point out that we could be marking up, Memorial Day, by that time. And to the extent to which you have any specific recommendations that could become part of our Defense bill, that if you could have those by that date, or as soon as you could—it may not be everything that you're fully prepared to recommend, but if there are some things that you're unified on, I would appreciate it if you could get that to us by that date.

Mr. AUGUSTINE. We could certainly do that.

[The information referred to follows:]

[INFORMATION]

Senator SESSIONS. Senator King, you want to start?

Senator KING. Sure.

Well, first, I don't know why you guys beat around the bush so much. [Laughter.]

I'd like to engage you to do a similar study of the entire U.S. Government, but——[Laughter.]

You keep talking about culture. And, in my experience, leading cultural change is probably the hardest thing in any organization. You can move the boxes around, and the only way to make cultural change is through leadership, in my experience. Would you give me some thoughts about, How do we get to the cultural issues that are at the heart of a lot of your criticisms?

Admiral MIES. Well, again, I think the change—the creation of NNSA was simply what you suggested, as moving the boxes around. It really didn't address the cultural issues, which, from my

perspective, are DOE-wide, not just isolated to NNSA. And so, there's a real need to attack a number of the cultural issues, and you're not going to do that in a short period of time. It will take a long time to make the changes you need. But, stability and continuity of leadership is a key element of it. Clearly defined roles, responsibilities, authority, and accountability is another key element of having a well-understood, well-defined chain of command to make an organization responsive. I think career-development programs with rotational assignments are presently weak within the Department of Energy, and NNSA specifically, and there is a need to have stronger career development to develop greater technical competence, to give people who are in the headquarters more field experience, and vice versa, so there's an appreciation on both sides. I think program management—again, program management expertise, project management expertise, has been weak and inconsistent. You've had examples of very deficient cost-estimating processes. I would comment that the issue has not been cost growth, in many cases, of these projects as it has been poor cost-estimating up front, which came in with very unrealistic estimates of the cost of some of these facilities and the life extension programs, and that created unreasonable expectations.

So, again, working on the cultural issues and trying to restore a sense of credibility and regaining the trust that has been lost over a period of time, I think is really critical to the success of the organization.

Senator KING. I should have asked, as a preliminary question, Is the view that you all have represented in this interim report the consensus view of the 12 members of the Commission?

Mr. AUGUSTINE. It's a unanimous view, sir.

Senator KING. Okay. And when do we expect your final report?

Mr. AUGUSTINE. The date we were given is late summer, and we are on schedule, and I think we have a good chance of having—perhaps not a bound, finished report by Memorial Day, but certainly having the essence of a report by then.

Senator KING. Well, I think that is—the sooner the better, because we want to get it within time to be able to incorporate your findings into the bill that we're going to be working on starting around Memorial Day. So, don't worry about the binding, just give us the data. That would be very, very helpful.

Mr. AUGUSTINE. That's absolutely in our minds.

Senator KING. Part of this is—what came through to me was a—sort of a general lack of attention to this subject. Is that—has that been part of the problem, from Washington in general, from the administration, from the Congress?

Mr. AUGUSTINE. Senator, I think that's true. I think, back in my own career, when I graduated from college, the most important job, if you were an engineer, to work on in the Nation was probably the nuclear deterrent. And the place at the leading edge of technology at that time was in the Department of Defense. Today, the leading edge of technology is certainly not within the Department of Defense. And the nuclear deterrent has certainly not been the highest priority issue among our Nation's leadership.

Senator KING. But, ironically, in large measure because it's worked.

Mr. AUGUSTINE. That's very ironic. We tend to take it for granted, and one day it may not work if we don't pay attention to it, of course. And—but, I think that when you—we visited so many of these laboratories, and some of the buildings go back to World War II. And if you're a young scientist, and you go to work in a place where there are buildings around from World War II, where you're not sure if you're going to be put on furlough, you can't attend scientific meetings, that's not an attractive place to work. And that should be a real concern of ours.

Senator KING. If you could give us—what are the immediate steps that you see? We're going to be talking about this, this summer—this spring and—late spring and summer. What should be in our bill to make changes? What are the—I realize this is a little premature, you're not at your final recommendations, but, to the extent you can give us a preview.

Mr. AUGUSTINE. Well, we are just beginning to formulate recommendations, and we have pretty good agreement about what the problems are. That's the easy part. I would say that our recommendations will come in two categories. One will be organizational—Do we have the right organization? And it certainly appears that we don't. It's not clear what is the right organization. There are no silver bullets here. The second category will be dealing with some of these issues that the Admiral has described. And I think that there are some things that just stand out. Much of it is Management 101. If I had to summarize one word of something that's lacking, it's—the word would be accountability. And we have to get accountability into this system. We're going to make a number of recommendations in that regard.

Senator KING. Well, that's a challenge for all of government, because, in business, accountability is whether you stay in business the next day. In government, it's not quite the same. So, we have to find an alternative to the profit motive and—to provide that kind of accountability. But, it can be done. We've done it in wartime, certainly. We've done it under—we did it when we—when the President said, "Let's get a train to New York in 3 hours," and it was accomplished. Maybe—I've read about that case. That was a case where there was a clear goal and a clear deadline and a—and clear accountability, and it happened. And maybe that's the kind of thing that we need here.

Mr. AUGUSTINE. Well, I think the lack of emphasis by the Nation's leadership is clearly a part of the issue here. But, I've spent 10 years in the government, and the rest of my career, most of it, in private sector. And it is just very hard to imagine government—and part of it is the personnel system that—no company would survive with the government's personnel system. It would be gone in a year.

Admiral MIES. I think there are probably some recommendations that would be appropriate for your bill, but I think there are some broader congressional issues which aren't necessarily relevant to the bill itself. I think the importance of encouraging greater expertise and advocacy within Congress is important. A greater understanding of the role of the deterrent, as you've expressed, I think is critical. Better collaboration between the authorizers and the appropriators on nuclear weapons programs would be beneficial. Con-

ducting a joint program review between DOE and DOE on nuclear weapons programs would also be very helpful. Again, greater synchronization between the DOE and the DOE budget submissions and their synchronization, in terms of agreement, would be very important, as well. So, I think those are a number of issues.

And lastly, I would say timely confirmation of nominations to assume the leader—leadership positions is really critical.

Senator KING. Well, I think we heard, in the prior panel, that timeliness and predictability and certainty is a—something that we can help supply to this proposition.

Before you leave, gentlemen, I would commend to you my favorite—one of my favorite books about Washington. It's out of print now, but you can get it on Alibris. It's called "The Institutional Imperative or How to Understand the United States Government and Other Bulky Objects," written by a fellow named Robert Kharasch. It's absolutely brilliant, and it—you—some of your writings read like chapter subheads. I—I'm—it's hilarious, brilliant, and insightful. I commend it to you.

Admiral MIES. Thank you, Mr. Chairman.

Senator UDALL [presiding]. Thank you, Senator King.

Let me thank Senator Sessions and Senator King for hurriedly making their way back so that we could continue this important hearing. I know we have another vote, I think, that's going to be underway soon, but, before we—did it just—was it just called? So, we've got to—certainly, we could squeeze in another 10 minutes.

But, I thought, on the heels of what Senator King just shared with us, Mr. Augustine, you're famous for a number of things, but perhaps one thing that really stands out for me is a chart that you produced, "Augustine's Checklist for an Acquisition Venture or a Formula for Failure." I've got a copy right here. I think my colleagues have copies. How did you produce this list? And, relative to the NNSA, are there three or four things that stand out on this list that might be common to the NNSA and probably other agencies and other human institutions?

Mr. AUGUSTINE. Well, Senator, transparency requires that I helped contribute to some of the problems on this list along my career. [Laughter.]

Senator UDALL. That's why you have even more legitimacy.

Mr. AUGUSTINE. I have studied—I've been interested in acquisition and program management. I worked for David Packard when he was in the Defense Department. He was one of my heroes. And I've studied a lot of people, and I've seen a lot of programs go badly, I've seen some go well, and I started putting together a list of what was the difference between the ones that went the way you'd hope and the ones that didn't. And this is a brief version of that list.

To your specific question, there are several things I would——

Senator UDALL. I'd hate to see the entire list. [Laughter.]

Mr. AUGUSTINE. The—there are many things on the list that one could apply, but the ones that stand out to me, one is to continue—these are—as you mentioned, if you do these things, you could be pretty sure a program will fail—one is to continually revise schedule and funding. Another is to divide management responsibility of—among several individuals. Get a headstart of work prior to fi-

nalizing goals, schedule, and cost. Share authority for project directions—direction, that is—with staff advisors. Eliminate independent checks and balances, particularly in the cost area—cost-estimating area. And the last one I would really cite would be, minimize a manager's latitude for judgment and rely on regulations instead. And I'm afraid we can check all six of those boxes.

Senator UDALL. Thank you for your frankness and for your insights.

I don't know if you were asked this earlier in the—if you have been——

Yes, let me recognize Senator Sessions for—he's got a comment.

Senator SESSIONS. I have to run and vote again, too, and I'm afraid I may not get back, which is a disappointment to me.

I believe you're exactly right. My general impression of this over years—like, who holds this group accountable? How does—it's almost like they—and everybody—one reason, I believe, it's psychological, it's like, "It's nuclear weapons." Whatever they say they need, we give. And then we've had political support from various people in various areas of the country, and things have built up over the years, and been protected over the years.

So, I just believe that this report you've submitted to us is very valuable. And I—I mean, to me, if we—I'll just ask you this one question, fundamentally. If we started over, it seems to me, and we decided we were going to refurbish our nuclear arsenal, wouldn't we just construct a building or so somewhere, or create something, and hire a lean group of people and get the job done? Now we've got these places all over the country, that have been there for 50–60 years, with people that claim, "Well, I do this," and, "I do this." And it all ends up costing a lot more.

My little joke, I guess it was, Why don't we just hire France to do this? I mean, they wouldn't spend this much money. Nobody would spend this much money. And we don't have money to waste. We're going broke. And the Defense Department is getting hammered. And I'm—we're talking about losing 100,000 soldiers in a few years, is a pretty—so, we've all got to work on it.

So, I just want to thank you, Mr. Augustine. You're famous for doing reports. So, you've done another good job for your country. We'll—Admiral Mies, you want to call this one Augustine IV or something? I mean, you've—but, thank you, because you have, both of you, just done a fabulous job, and all the committee members.

And I do think, Mr. Chairman, that we won't be able to fix everything. I understand that. But, some of the recommendations you make, I hope that we can effectuate. I believe it can help us create a good nuclear program at less cost. And that's what we're going to have to try to do.

Senator UDALL. Thank you, Senator Sessions.

I think we've reached the point where we could adjourn the hearing. I don't want to presuppose where your final recommendations land. I think we got a—we have a very good feeling for what you've observed and concluded. But, I want to thank both of you for taking the time. I know we compensate you handsomely in psychic rewards, but I would echo what Senator Sessions said, as well. And I think the—Mr. Augustine, the—I think the final conclusion, when it comes to what you do, is—I've never seen one of the reports

that—in which you've been involved, stay on the shelf—it's always in people's hands—because of the way you go about that important work.

So, let me thank both of you. And I will adjourn this hearing. I think we'll keep the record open for 3 more days, til the end of the week. And again, we look forward to your conclusions and hearing from you again.

So, the hearing of the Strategic Forces Subcommittee is adjourned.

[Whereupon, at 4:05 p.m., the subcommittee adjourned.]