HEARING TO RECEIVE TESTIMONY ON NATIONAL NUCLEAR SECURITY ADMINISTRATION MANAGEMENT OF ITS NATIONAL SECURITY LABORATORIES IN REVIEW OF THE DEFENSE AUTHORIZATION REQUEST FOR FISCAL YEAR 2014 AND THE FUTURE YEARS DEFENSE PROGRAM

TUESDAY, MAY 7, 2013

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

The subcommittee met, pursuant to notice, at 2:34 p.m. in room SR–222, Russell Senate Office Building, Senator Mark Udall (chairman of the subcommittee) presiding.

Committee members present: Senators Udall 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: Casey Howard, assistant to Senator Udall; Lenwood Landrum, assistant to Senator Sessions; and Peter Schirtzinger, assistant to Senator Fischer.

OPENING STATEMENT OF SENATOR MARK UDALL, CHAIRMAN

Senator UDALL. The Subcommittee on Strategic Forces will come to order.

Welcome, gentlemen.

I have a short opening statement. I will turn to my colleague, Senator Fischer, and then we are very much looking forward to a round of questions and answers.

This afternoon, we will receive testimony from the National Nuclear Security Administration's, or as it is also known NNSAs, laboratories for fiscal year 2014. We will receive testimony from Dr. Charles McMillan, the Director of the Los Alamos National Laboratory; Dr. Paul Hommert, the Director of the Sandia National Laboratory; and Dr. Parney Albright, the Director for the Lawrence Livermore National Laboratory.

In addition, we will receive testimony from Dr. Charles Shank, who is co-chairing the National Academy of Sciences study on the quality of science and engineering at the labs. Dr. Shank is appearing in his personal capacity because the study is not yet complete.

I am interested in understanding five issues with the laboratories, and I believe this will apply to all of the witnesses. I would like to share those five issues with everybody here.

First, are the laboratories resourced properly to meet their mission over the next 5 years? The administration has gone to great lengths in a time of great budgetary uncertainty, and sequestration to give the NNSA an increase of 4.1 percent. If the resources are not adequate, I would like to hear where and why.

Second, how good is the quality of science and engineering, and are we keeping the right mix of key personnel over the next 5 years for the labs to meet their mission? There will be increased requirements in the years to come to life-extend our stockpile without testing. Are we training people now and are we retaining those who we need to train to meet this challenge?

Third, are we able to meet and maintain our infrastructure needs that will allow us to respond to the upcoming challenges with our stockpile?

Dr. McMillan, specific to you, I would like your frank and honest assessment of what happened and what went wrong with the CMRR project and what is the path forward. Plutonium science is not a commercial industry, and it has been a core mission of Los Alamos since the Manhattan Project and is integral to ensuring our stockpile works as intended. Do you think that mission, particularly its science base, will weaken over the next 10 years?

In that third category, Dr. Albright, I am interested in—based on my understanding, the restructuring at the National Ignition Facility is underway because we did not achieve sustained fusion of the target. What is your opinion of this restructuring and what do you think the consequences are of not achieving ignition to maintaining the stockpile in the future?

Fourth and finally, what do you think of the health overall of your laboratories over the next 5 years? The B61 program and related efforts are causing large hiring at Sandia, but can it be sustained with all the other efforts underway? What about the physics laboratories at Los Alamos and Livermore? B61 is not a physics program. Are you loosing key personnel and momentum? I need to hear from all of you about this.

The laboratories are great assets of our Federal Government. They have a critical national security mission of using some of our best scientific minds to maintain our stockpile to ensure we do not need to test in the future. We need to maintain the effectiveness of the laboratories to carry out this important mission now and in the future.

So, again, thank you for your attention. I very much look forward to your answers and the give and take that we will have.

And let me turn to Senator Fischer for any opening comments that she might wish to make.

STATEMENT OF SENATOR DEB FISCHER

Senator FISCHER. Thank you, Mr. Chairman.

I too would like to welcome the directors of our National laboratories and express my appreciation to all the men and women who work across the nuclear weapons enterprise. Without them, we could not maintain a strong and effective nuclear deterrent.

There is little disagreement that the nuclear weapons complex must be modernized. A November 7, 2010, White House factsheet underscored the commitment of the President to ensure the modernization of our nuclear infrastructure by increasing funding by $4.1 billion over the next 5 years—and that is for fiscal year 2012 to 2016—for the NNSA weapons activities. This included funding necessary to complete construction of uranium processing and plutonium handling facilities. Unfortunately, due to a combination of congressional funding cuts and reordered administration priorities, today we are some 34 percent, or $1.4 billion, below that stated commitment to add $4.1 billion.

According to the commander of the U.S. Strategic Command, General Kehler, fiscal uncertainty remains a primary concern across the budget, and some programs have the potential to accrue additional risk in subsequent years if projected efficiencies in the nuclear weapons complex are not realized or if fiscal year 2014 appropriations are significantly less than the fiscal year 2014 budget request.

I will be anxious to hear how these funding shortfalls impact your laboratories and whether the lab directors believe they can carry out their primary missions of certifying the stockpile, extending the life of our aging nuclear weapons, and building a truly responsive nuclear infrastructure. I look forward to your testimony, gentlemen.

Thank you.

Senator FISCHER. Thank you, Senator Fischer.

Let us get right to it. I think we will alternate with 8-minute rounds, and I will recognize myself for the first 8-minute round. Dr. McMillan?

Oh, I am sorry. I was so eager to get to have the give and take. Yes, you do have an opportunity for opening statements. Please, Dr. McMillan, I will recognize you and then, in turn, we will recognize the other great scientists at the table here. Thank you.

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

Dr. MCMILLAN. Thank you, Chairman Udall and Senator Fischer. Thank you for the opportunity to be here today.

I am Charlie McMillan. I am the Director of Los Alamos National Laboratory. I have submitted written testimony. I would ask that that be included for the record.

Today I will touch on opportunities to improve the nuclear security enterprise. I think that addresses some of the questions you had asked.

As I stated before this committee last year, NNSA governance will play a role in determining both our efficiency and effectiveness as we address looming mission and budget challenges coming. The recently appointed members of the congressional panel on NNSA governance bring many decades of experience and leadership. I believe the panel will deliver recommendations that will foster a stronger relationship between DOD, NNSA, and the laboratories. In my view, governance is a piece of the puzzle, but there are other challenges as well as opportunities.

The President's 2014 budget request is encouraging. But since the 2010 nuclear posture review, as you said, Senator Fischer, we are more than $1 billion from where we had expected to be when we laid out the nuclear posture review. In today's fiscal environment, we will be challenged to execute the strategies that we have laid out, and in my view, we must find new ways to deliver the capabilities the Nation needs.

The time has come to challenge conventional wisdom. This applies to big box nuclear facilities. It applies to future life extension projects, and it applies to work that our designers undertake at the laboratories. Put simply, we must implement a strategic risk assessment that balances value and cost. We must develop new approaches to sustain the stockpile in a more efficient manner.

I am proud of the way that the Los Alamos team has challenged assumptions, and with our NNSA partners, we have presented a proposal for modular facilities that we believe deliver a win-win solution that provides plutonium capabilities without a big box nuclear facility. It provides a shorter acquisition period, smaller annual costs, and simpler standardized construction. It delivers capability when we need it rather than no capability until a full big box is completed.

In the stockpile, my colleagues and I are applying similar methodologies today. Recently subject-matter experts have been empowered to propose and evaluate some rather daring ideas to attack tough problems that have resisted conventional solutions. We can and, in my view, should do more.

Of course, stability, flexibility, and predictability will help us. These are three things that are absent in continuing resolutions. Because we have operated under continuing resolutions for the last several years, I have very little flexibility left at the laboratory for which I have responsibility to deal with that kind of uncertainty. Should we have another full-year CR in fiscal year 2014, I am concerned that it may well have negative impacts on the laboratory.

Thank you for the opportunity to speak this morning, and I look forward to your questions.

[The prepared statement of Dr. McMillan follows:]

Senator UDALL. Dr. McMillan, thank you for that. Thank you for your leadership at Los Alamos.

Let us turn to Dr. Hommert who is the Director of the laboratories at Sandia. Welcome.

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

Dr. HOMMERT. Chairman Udall, Senator Fischer, thank you for the opportunity to testify. I have submitted written testimony that I ask be part of the record.

I am Paul Hommert, Director of Sandia National Laboratories.

I would like to begin by putting by testimony in an overall context. In my view, we are now in an unprecedented time for the U.S. nuclear deterrent, a period when for the first time the nuclear weapons enterprise must address simultaneously three important imperatives: first, sustain a smaller and increasingly older legacy stockpile for many years to come; second, modernize the Nation's nuclear deterrent consistent with policy; and three, continue to ad-

vance and utilize the tools of stewardship and ensure an infrastructure that can support these imperatives.

Sandia is engaged in all these efforts, but for us, it is the modernization challenge that is the most dynamic since these efforts revolve so much around the non-nuclear components for which we are responsible.

The most significant of these efforts is the B61 life extension program. I am pleased to report that we are now nearly a year into full-scale engineering development on the B61, executing the minimum technical scope that addresses longstanding issues with the system and, when complete, will provide the Nation with the capability that will underpin the air leg of the triad for decades to come. Furthermore, I am pleased to report that we are currently on schedule and on cost.

Earlier today, I had the opportunity to show the chairman actual hardware of the joint radar module designed at Sandia and built at NNSA's Kansas City plant, which I brought today to give you a sense of how far along we are in design and development of the B61 life extension. This module replaces the vacuum tube radars in a number of our legacy B61 systems. Its advanced technology allows us to achieve a tenfold reduction in volume and greater capability. Furthermore, this module has been designed to be used in the Navy W88 alteration 370 and in the Air Force Mk21 fuze. This first-time-ever use of common technology results in a $170 million savings across these three programs.

I would like to make one last important point. To prepare our laboratory for executing these challenges, we have blended our experienced staff with early career scientists and engineers from the best universities in the country eager to work on national security challenges. With the continued support of the Congress, they and their colleagues will deliver an outstanding modernized deterrent for the Nation.

I look forward to your questions. Thank you.

[The prepared statement of Dr. Hommert follows:]

Senator UDALL. Thank you, Dr. Hommert.

Dr. Albright from, I should say, the Lawrence Livermore Laboratory. Welcome.

STATEMENT OF DR. PENROSE C. ALBRIGHT, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. ALBRIGHT. Chairman Udall and Senator Fischer, I am Parney Albright, the Director of Lawrence Livermore National Laboratory. I have submitted written remarks for the record I ask be included in the record.

So thank you for the opportunity to provide my perspective on the President's fiscal year 2014 budget request and its impact on the stockpile stewardship program. In the interest of time, I will just emphasize three main points in my oral remarks.

First, balanced investment is crucial to the stockpile stewardship program. The 2010 NPR recognized that two types of investments are essential for effective deterrence. First, we must modernize the stockpile. Life extension program-related activities at Livermore include work on the W78/88–1 life extension program and also con-

cept development for the long-range stand-off cruise missile. Timely execution of the planned life extension programs is important.

But life extension programs are not our only job. As both of you pointed out in your opening remarks, effective long-term deterrence also requires the laboratories sustain the capabilities, knowledge, and skills underpinning the science, technology, and engineering base.

An important component of the strategic hedge against technical surprise and changes in the national security environment that underpins our ability to do reductions in the stockpile is a healthy complex both in terms of workforce and capabilities. At Livermore, we have important theoretical and experimental capabilities such as the Sequoia supercomputer and the National Ignition Facility that allow us to assess and certify aging weapons, conduct significant finding investigations, develop options for life extension programs, innovate when needed, and provide that strategic hedge.

Second, the fiscal year 2014 budget request undermines the execution of some key stewardship activities. I am particularly concerned about the impact of the budget request and operations at the National Ignition Facility, a uniquely important stewardship facility that because of its unmatched capabilities to provide data that is relevant to the nuclear performance of weapons. The request cuts $80 million from the unsequestered fiscal year 2013 operating budget for NIF, a nearly 25 percent reduction that comes on top of a $30 million cut in the prior year. This will significantly limit our ability to utilize the National Ignition Facility and undermine the stewardship program.

Third, Livermore is ready and eager to improve the governance of the nuclear weapons enterprise, and we look forward to working with our partners in the Government in that regard.

I applaud this committee for helping to establish the commission to examine governance of the nuclear complex. I want to make a few observations about this, and I have more in my written remarks.

First, there should be a single voice that sets policy associated with the laboratories, and that voice should be close to the mission in order to weigh the impact of policy decisions on the delivery on the mission of the complex. Most specific implementation practices should be left to the federally funded research and development centers, the laboratories. We are partners executing a shared national security mission together. Governance should reflect that partnership. And because we are partners with the Government, I am advocate for getting the capabilities needed into the Government that are essential for establishing credibility with the various stakeholders, both in Congress, the Defense Department, and elsewhere.

Thank you again for the opportunity to testify, and I look forward to your questions.

[The prepared statement of Dr. Albright follows:]

Senator UDALL. Thank you, Dr. Albright.

Dr. Shank.

STATEMENT OF DR. CHARLES V. SHANK, CO-CHAIR, COMMITTEE TO REVIEW THE QUALITY OF THE MANAGEMENT AND OF THE SCIENCE AND ENGINEERING RESEARCH AT THE DEPARTMENT OF ENERGY'S NATIONAL SECURITY LABORATORIES

Dr. SHANK. Thank you for the opportunity to testify before this committee. For the last 2 years, I have served as co-chair of the National Research Council committee to study the quality of science and engineering at the Nation's national security laboratories. Last year, we issued phase I of our report on the management of science and engineering, and this year, we have a report that is in progress on addressing the quality of science and engineering at the laboratories. That report is being prepared. So what I am going to talk about today will be my personal impressions of the study and all the comments are my views.

First, in assessing quality, one needs to define it, and we decided to define it in terms of the ability of the laboratories to use science and engineering to address mission challenges, both in present and the future, questions such as are the mission needs being addressed today, is there a compelling plan for the future, are the laboratories recruiting and training the next generation of staff, are the tools and facilities on the cutting edge and adequate to meet the mission needs, is there a working environment sufficient to attract and retain high-quality staff.

Because it is no longer possible to test a weapon, understanding safety and reliability must rely and be inferred from science and engineering knowledge. Even though we have studied nuclear weapons for more than a half century, our need to understand science and engineering in detail is likely more compelling today than it has ever been. A detailed assessment of all the scientific activities in these very large laboratories is well beyond the scope of any NRC committee.

So we decided to focus on four areas that are really at the core of the missions in the laboratories. Those are weapons science, modeling and simulation, weapons design, and systems engineering.

Jumping to the overall high-level result, we found that the quality of science and engineering at the laboratories in all the areas that we examined are sufficiently of high level to allow the laboratories to effectively certify the safety and reliability of the stockpile. Nothing that we observed suggests that the science and engineering underpinning the stockpile stewardship and nonproliferation missions are currently compromised. The quality of these four areas of fundamental importance that we studied are very healthy and vibrant.

Much has been said recently about an aging workforce that maintains the nuclear stockpile. Significant progress has taken place in the laboratories at NNSA to recruit a new generation of scientists and engineers. The enthusiasm around the capability of these new recruits is really quite impressive.

However, despite these encouraging trends, deterioration in the work environment can limit the Nation's ability to fully benefit from the laboratories' potential. Scientists and engineers expressed to us increasing concerns about impediments of performing experi-

mental work. Experimental work is needed to put into the codes that ultimately model and provide true understanding to the laboratories.

What has happened is that there are many factors that are driving costs to the point where experiments are becoming unaffordable. Many of the factors that drive these costs were talked about in our first study having to do with a loss of trust, excessive duplicative oversight, formality of operations, a culture of audit, risk avoidance across the entire NNSA enterprise without benefit in many cases of a risk-benefit analysis. Often we see an enormous enterprise devised to look at minutiae and often missing the big picture.

The risks inherent in doing an experiment need to be brought into balance with the risks associated with not doing the experiment. Small, incremental increases in safety in the conduct of experiments may, for example, require a disproportionate increase in cost. In no way would we be encouraging anyone to do experiments or any activity at the laboratories where appropriate safety precautions were not taken, but a look at costs and the cost-benefit, in my personal view, would be very important to make them more efficient.

All three laboratories maintain a high-quality recruiting effort, acceptance rates from graduate schools from which post docs and other staff are recruited—the people they have been able to recruit are impressive, and they have remained constant over the years.

However, there are some reasons for concern. A supporting and nurturing work environment fosters the ability of highly creative scientists and engineers to do their work while encouraging the retention of senior staff and the recruitment effectively of younger staff. And I am going to just pick out one area here which I find particularly important and something that to scientists means a great deal, and that is the ability of scientists to interact with each other.

Scientists in the national security laboratories are isolated from the world of broader science due to the classification and nature of their work. Recently imposed restrictions on traveling and conference attendance creates a kind of isolation. It limits career development, access to the latest scientific advances, and the ability of scientists and engineers to bring the full range of their relevant science to bear on work in the labs. From my own personal experience, many of the ideas that really helped advanced my personal science had to do with things that I learned in interactions at conferences.

But if you could imagine the need for someone to attend a conference requires a 60-day notice, followed by often not being able be told whether you could attend the conference or not, maybe just a days before, and then having to buy very expensive tickets to attend that conference. I must say in my personal experience as a scientist over the years, the only place that I have ever seen travel restrictions operating in this was with scientists from the former Soviet Union who were trying to attend conferences in the United States. They often did not show up at the last moment, and there was a process that none of us understood. And I think we are in a very similar environment at the moment.

In conclusion, the laboratories retain a core of talented and dedicated scientists and engineers who have very willfully and enthusiastically accepted responsibilities for stockpile stewardship and related activities. Constant vigilance will be required to assure that the work environment enables this workforce to perform at a high professional level in order to execute their mission.

[The prepared statement of Dr. Shank follows:]

Senator UDALL. Thank you, Dr. Shank.

Now we can go to some questions, and I will recognize myself for 8 minutes and then we will turn to Senator Fischer. So let me start with Dr. McMillan.

Dr. McMillan, as my opening statement mentioned, your major life extension project with the W76 warhead is closing out. The B61 life extension is primarily occurring at Sandia.

Are you having problems, given that situation, retaining key scientific personnel in the weapons program?

Dr. MCMILLAN. Not specifically for those reasons, Senator. What we are seeing—and this goes to some of the comments that Professor Shank mentioned—we are seeing some of our early- and mid-career folks leaving at rates that are higher than those who have been there for extended periods. But today, as I look forward to the life extension programs that are to be done—so here I am thinking particularly of the 88/78 that we talk about—I see challenges in that that remain for our weapons scientists. So I see the challenges remaining, but I do have growing concern for our mid-career and early-career workforce.

Senator UDALL. I know we will continue this discussion I think through the rounds of questions with the other lab directors.

Let me turn to the CMRR, which you are well aware of. Last year, the administration postponed the construction of the main portion of that building for at least 5 years. This caused quite a bit of controversy on many fronts. In your opinion—and you spoke to this in your statement too—what can we learn from this and what do you recommend going forward and why?

Dr. MCMILLAN. Let us see. Let me go back just a moment because we often think of CMRR as a recent phenomenon. I was talking to one of my predecessors. The issues of CMRR go back to about 1983.

The current design that we were working on until a year ago was a design that was put in place in 2003, and because of changes in program, changes in our understanding of the cost associated with that facility, and changes in budget, we—"we" meaning in particular the Government—have made a decision not to move forward with that right now, to delay it.

Over the last year, we at Los Alamos have worked very hard to try to develop other options, and in particular, the other option that we brought forward to the Government for consideration is something that we call the modular approach. We recognize that it has been very difficult to build a facility that really does everything at once. And so like we build submarines, one at a time, we are looking at the question, can we build one module at a time that will provide capability when it is finished so that we can use it, we can learn from that building, and if necessary, build another. So

that is the path forward we have laid out as an option for the Government.

Senator UDALL. Let me turn to plutonium science. Are you concerned about the quality of plutonium science with the deferral of the CMRR? And what can we do to maintain that quality of plutonium science?

Dr. MCMILLAN. So I am concerned that we maintain the quality of that science. As we have been looking at options, one of the things I have personally addressed with the team and I know they have addressed because they have come back and told me is that not only do we have to have the ability to build pits, we have to have the ability to do the scientific work that ensures those pits for today and for tomorrow. And so the options that we have put on the table are options that include the plutonium science.

Senator UDALL. I think I hear you saying that although it would be convenient to assume that plutonium science has discovered everything that there is to discover and that a plutonium pit is a plutonium pit, that that in fact is not the case. That is, of course, as well the culture of the laboratory that you head.

Dr. MCMILLAN. That is exactly correct, Mr. Chairman.

Senator UDALL. Constantly pushing forward looking——

Dr. MCMILLAN. That is right. We have studied plutonium now for 70 years. This is our 70th anniversary. There are still unknowns.

Senator UDALL. Thank you for that.

Dr. Hommert, I am going to turn to you and talk about the B61 life extension program. It is primarily a Sandia-led effort. Are you able to hire and maintain the right skills mix for the next 5 years to continue through the mission?

And then let me have you comment on the second part. What happens to these people after the B61 effort?

Dr. HOMMERT. To answer that, let me first put the laboratory in a little broader context. For over 30 years, the lab has diversified, and today we are truly a national security laboratory with roughly 50 percent or so of our staff working directly on the nuclear weapons program, including the B61, the other part of the laboratory involved in a wide range of other national security efforts.

When we were confronted with the challenge of staffing the B61, we have done that through a combination of two primary mechanisms. We have moved people with synergistic skills in engineering and program management and the right science from other programs to the B61 with a natural phasing to minimize the impact on these other programs. And of course, we have recruited because it is very, very important that we are training a new generation of scientists and engineers executing this program.

We have been successful in both of that, and today the program is staffed at a level consistent with our budget. And I will return to the budget comments, I am sure, shortly. And I also want to emphasize we have achieved that with essentially almost no change of the top-line employment at the laboratory. So, again, we have either replaced with new people separations or retirements or we have moved within the laboratory. So the top line is roughly constant.

Regarding the long term, as we look forward across the modernization efforts—there is the B61, the 88, the issues that my colleagues have mentioned in the 78/88—we see 10 to 15 years of very significant activities that we expect these young staff that we have brought to be gainfully employed executing those programs and, again, in a broad institution like ours, we do not anticipate any difficulty providing them with rewarding careers in national security for 30 years or more.

Senator UDALL. Let me turn to the replacement fuze for the W88 submarine warhead. You know it is also common or joint with the W87 ICBM warhead, and it should eventually work with the replacement of the W78 ICBM warhead.

Are you concerned about too much design work at Sandia possibly leading to concurrency at the production sites like the Kansas City plant?

Dr. HOMMERT. No, not really. I believe that the current plan—again, if we can execute the current as it is laid out—has given consideration to phasing the development. For example, the first production unit of the B61, which we hope will be in fiscal year 2019, budgets permitting, is phased very appropriately with completion of the W76–1 production. Similarly, because of a fair degree of commonality that we are doing on this, it is going to reduce the total production load that is required component by component, and that allows us to phase in and be able to accomplish what we need to do on the 88 and on the fuze because there is only a small section that we are doing on the 87. So overall, I believe that those plans are achievable, at least as currently laid out. Yes.

Senator UDALL. As is currently laid out. I think that is an important insight.

Let me ask a final question. It is my understanding that the Sandia contract is up for renewal in about 2 years' time, given that the combined Y12 Pantex contract could possibly reopen by the recent GAO review. Are you worried about a similar effect happening at Sandia and causing a disruption with the large workload that you have?

Dr. HOMMERT. Mr. Chairman, as a point of fact, our current contract expires September 30th of this year. There are two 3-month extensions possible that the NNSA can choose to elect. So I do not know personally the timing that the NNSA or the Department plans on this competition or recompete on the contract.

Ever since the announcement for that was made in December of 2011, our focus, particularly in these turbulent times, of staffing the B61 and executing the programs has been to minimize that disruption. The more certainty that can be brought not about the outcome of a competition but principally around the timing of a competition is helpful in minimizing the disruption. And naturally I am concerned that protracted uncertainty is not helpful, but I believe we can achieve what is on our plate if we can minimize that disruption and that is our intent.

Senator UDALL. Thank you.

Again, let me recognize Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

If I could, I would like to follow up, Dr. McMillan, on the plutonium strategy part, the CMR. You spoke about the modular ap-

proach. When was that modular approach to replace the CMR building first proposed, and why has it taken so long for the administration to assess the feasibility of that concept?

Dr. MCMILLAN. Let me maybe just add a little to my earlier comments because there is more to the strategy than just the modular approach. There really are three elements in our strategy.

The first is more effective use of facilities that we have today in part made possible by decisions that our partners in NNSA have made. As an example, with the newly constructed rule-out facility that is coming on line right now, we are being able to use analysis that was done in 1992 to move from a 6 gram administrative limit to a 26 gram administrative limit. That makes a big difference in how useful that facility is.

Second, because of changes in how much material we can send away from our facility—and this is particularly referring to PF4, which is our large plutonium facility. Cold War plutonium was very scarce. As a consequence, we had the ability to recover almost every gram of plutonium. That took up nearly a quarter of the floor space in PF4. So on one side of PF4, we were developing the technologies that will turn plutonium into oxide, and on the other side, we were recovering almost every gram. This did not make sense. And so we have proposed to the Government to say let us send more of that material to WIPP as an example. That reclaims very valuable floor space.

Yes, Senator?

Senator FISCHER. If I may interrupt, why did it not make sense? Because you did not have the space to store it in your facility and you wanted to store it elsewhere or why?

Dr. MCMILLAN. No. It did not make sense because we no longer had the shortage of plutonium that happened in the Cold War. That is why it did not make sense.

And so reclaiming that very valuable space is the second part of our strategy.

And the third part of the strategy is the modular construction.

Senator FISCHER. Are you still concerned, though, about reclaiming all of it?

Dr. MCMILLAN. No. We do not believe that that is necessary for the Government to do. And again, we have been working with our partners in NNSA to make that part of the policy environment in which we can operate.

So those three things taken together are what compose our plutonium strategy and why we believe that we can extend the life of PF4 by taking the highest risk materials out of that facility into the modules, use that very valuable nuclear space that we have in a way that was different than in the past.

And so a logical question is why did we not do this in 2003. The answer is we were in a different programmatic space in 2003. Today our partners have said let us look at other options. And this is part of what I mean when I say challenging assumptions. These are examples of assumptions we have challenged in the last year. And so the decision to delay CMRR, coupled with decisions about policy changes, have opened options we did not previously have.

Senator FISCHER. So do you believe then that the delays are happening because you are challenging the assumptions and looking to go the best way forward?

Dr. MCMILLAN. We believe that we can execute the strategy we have laid out, provided there is funding, in a time scale that meets the needs of the stockpile. We have worked very closely with General Kehler on what those time scales are, and we believe it is possible to meet those time scales starting now. However, I am concerned if we delay.

Senator FISCHER. I am learning about nuclear pits. So is it more affordable to have an approach where you are trying to achieve the stated requirements to produce the 50 to 80 new pits per year that I believe General Kehler has recommended? Do you have a plan for that? Are we going to be able to meet that 50 to 80?

Dr. MCMILLAN. In our current situation, without doing additional construction, we believe that we could produce up to about 30.

Senator FISCHER. Is that what we need, or do we need the 50 to 80?

Dr. MCMILLAN. If I can finish just a moment and then I will come back to that.

If we are able to put the modular approach in place and begin work on that, we believe that will get us to in excess of 50 pits per year. So that is the level.

Given the current assumptions about stockpile size and life extension programs, if we are able to start the production of order 30 a year in the early 2020s, we can meet the requirements that STRATCOM has, but if we can get to 50, that gives us some margin in case we slip on the time. It becomes a race with time. Nature is acting.

Senator FISCHER. Are there any technical risks in moving forward at that pace?

Dr. MCMILLAN. The place where the technical risk shows up is this strategy depends on something that we have described as pit reuse. Pit reuse is something that I think is a credible path forward, but what that does is that moves the risk from pit production risk to risk that is associated with certification. We have begun work in the last year since I last spoke to this committee that is very encouraging in that regard. And the words I used last year were "cautious optimism." Those words still stand, but there is continuing evidence to support that cautious optimism.

Senator FISCHER. So from your statements last year with the cautious optimism, you are still in that same place today.

Dr. MCMILLAN. I am with additional evidence to support that.

Senator FISCHER. Thank you, sir.

Dr. Albright and Dr. Hommert, on pit reuse, the existing pits that we have in the inventory that we are thinking about using—I have been told they are between 20 and 50 years old. Is that correct?

Dr. ALBRIGHT. Yes.

Senator FISCHER. Yes. Okay.

Do you understand the factors that are involved in reusing these pits and risks that might be there?

Dr. ALBRIGHT. So I think we have a pretty good understanding of the various factors involved. One of the factors that you imply

had to do with the aging of plutonium over time. And there has been a pretty concerted effort at both Los Alamos and at Livermore over the last decade or more that has been looking at plutonium aging, and we actually have samples that we keep in our laboratory—and Los Alamos does the same—that are 40, 50, 60 years old that so far show no—that support the conclusions that the last decade of study has implied, which is that these pits are good for many, many more decades to come.

The other issues associated with reuse revolve around pits that were designed for a conventional high explosive implosion that we now want to use in an insensitive high explosive regime—system. And there I think the science is a little bit more complicated, but I think both Los Alamos and Livermore would agree that we have developed approaches that we believe are low to medium risk associated with that and, frankly, are pretty confident that we can make this work. I think the real issue there, frankly, is going to be the certification process, you know, doing the kinds of experiments that do not just convince us but, frankly, convince the Navy and the Air Force that in fact these things work as we predict they will.

Senator FISCHER. So you have done experiments on them.

Dr. ALBRIGHT. Some experiments have been done. In fact—let us see. I am not sure what I can say here.

Dr. MCMILLAN. If I may, we did nuclear tests back in the day of nuclear testing that used the concepts that both Livermore and Los Alamos are considering.

Dr. ALBRIGHT. Right. I was not really sure I could talk about that.

Senator FISCHER. On the older ones that are 40 to 60 years old?

Dr. ALBRIGHT. No. The plutonium experiences that were done were not that old, but what was important about those experiments is that they were pits that were designed in a conventional high explosive system and were actually being tested. They had, in fact, been certified and were about to be deployed into the stockpile, and then they just did not. They were actually going to be deployed in an insensitive high explosive environment. And these are pits that are very, very, very similar to the ones that under consideration right now.

Senator FISCHER. Thank you so much. My time is out.

Senator UDALL. Thank you, Senator Fischer.

Dr. Albright, let me continue visiting with you. I mentioned that at the National Ignition Facility last year I do not think we achieved sustain fusion, or burn as I think it is known. That milestone is important, I think, for the stockpile stewardship program. Can you explain what effect we will see because of not achieving sustained fusion when it comes to our understanding of the weapon and any other comments you might have?

Dr. ALBRIGHT. Sure. So let me actually start by pointing out that the National Ignition Facility is to this day doing many, many, many experiments in support of stockpile stewardship. We actually have a demand for about over twice the number of experiments, requests that we can actually satisfy in the facility today.

The particular stewardship experiments that you are referring to have to do with thermonuclear burn. And there was a requirement

or a milestone that passed last year without our achieving thermonuclear burn at NIF.

The weapons issues that are associated with that have to do primarily with the uncertainties and the physics associated with what is called "boost." And this is a process that occurs right at the end of an implosion of a primary and is one of the remaining physics uncertainties that we have about the operation of nuclear weapons.

In our computer codes, we have—my colleagues would call them—"adjustable parameters." I call them "fudge factors." We have parameters in the codes that we tune to replicate our experience with underground tests that we would prefer to actually have based on scientific fact. And that allows us then to assess options for life extension programs and to, frankly, just better understand the operation of a nuclear weapon if we were able to achieve fusion ignition at NIF.

I would also like to point out that the National Ignition Facilities were reviewed by many, many external panels, National Academy of Sciences. We had a panel that Bob Byer led who was former President of the American Physical Society. There have been numerous NNSA reviews. And every one of them has made the point that although a perhaps more deliberate approach is needed to try to achieve ignition and more time is needed, that there are no reasons to believe that ignition cannot be achieved at the National Ignition Facility.

So we continue to do experiments. Actually this more deliberate approach has been applied over the last year or so, and I can tell you it is showing very good dividends.

Senator UDALL. Thank you for that elaboration.

Let us turn to the life extension of the ICBM W78 warhead. You are the lead for that work. My understanding is that the administration is pursuing an evaluation of an interoperable warhead for the W78 and the submarine W88 warhead. And I realize this is early in the concept assessment phase, but in terms of risk, how risky is this effort, say, compared to straight life extensions of the W88 and the W78 warheads?

Dr. ALBRIGHT. That is a very good question. My view is it is actually very low risk. I think all the components that are involved have been nuclear-tested in the past. There are some potential issues that are more on the engineering side having to do with both the mass properties and making sure that the nuclear explosive package that we develop can fly in both an SLBM, as well as an ICBM. And then there are also interface issues that are more in the Sandia realm associated with interfacing with the submarine-based weapons system and the Air Force weapons systems. But these are all, I think, very, very doable.

Senator UDALL. Let me ask a question that I think you are ready for. Does the fiscal year 2014 budget request enable you to meet your commitments to maintaining the existing stockpile?

Dr. ALBRIGHT. So I think that there are significant impacts in the fiscal year 2014 budget request. With regard to the W78/88 life extension program, we believe that there is enough funding in the fiscal year 2014 budget to support some of the things the administration wants to do like an early down-select. However, there are some technology maturation issues that are not funded and are the

kinds of things you want to do early in the program. You do not do technology maturation late in the program, and therefore, if you do not fund those when you need to fund them, you add risk to the program. So I think that is an issue.

I also think, as I pointed out in my opening remarks, what the laboratories do is more than just maintain the existing stockpile. We also provide a workforce and a set of capabilities that is needed again to conduct significant finding investigations, to be able to assess issues that pop up under surveillance, and again, to provide a hedge against technological surprise and changing national security conditions. And I do believe that the fiscal year 2014 budget does significant damage to some of the scientific capabilities at the laboratory in that regard.

Senator UDALL. Is it fair to say that if you are in a position where you, at best, furlough people, at worst, you are laying people off, you cannot just, if the conditions change, retrieve those people, rebuild that workforce overnight? And you all operate in a unique market, if I could use that term.

Dr. ALBRIGHT. I think that is correct. When these people leave the laboratory, you lose them. They are gone forever. As I think Dr. McMillan pointed out earlier, the ability—and actually Dr. Shank made the same point. We are in a unique market that requires years of training and expertise. You do not just become a nuclear weapons designer overnight. And as Dr. Hommert pointed out, you bring in young people, you pair them up with older people, and they develop that expertise over time. To do that and then to show them the door is in my view not a good policy.

Senator UDALL. Yes. I was intrigued, to put it mildly, to hear—and I think Senator Fischer may already know this—that you and the other laboratories often are competing with Google and Twitter and a lot of the new tech businesses for the kind of minds and work ethic that you all need.

Dr. ALBRIGHT. So it is interesting. It is interesting you say that. I actually took a tour of the Twitter site about 3 weeks ago. I am in the Bay Area, and it is a different universe, I will say. You know, we are never going to offer our people free lunches and we are never going to be able to offer—or a massage room, which is what they had.

But what we do offer is the ability to work with the very best in the country on mission. You know, the people who come to our laboratories come because they want to make a difference, and the kinds of things that we do in our laboratory make a difference. And as long as they feel that they can make that difference, we can retain them. They are working with the best facilities, the National Ignition Facility, DART over at Los Alamos, MESA at Sandia, and they work with the very best people. We still remain a destination for the very best and brightest in this country. I really worry about whether we can sustain that in the current environment.

Senator UDALL. Thank you for those insights.

Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

If I may, I would like to get into a little more detail on the W78 and 88 and also the LEP. For the three of you gentlemen, last year I believe the committee was informed that the LEP was being de-

layed 2 or 3 years, and you mentioned the current status on that. I am probably doing a rhetorical question here. Do you believe that there is sufficient funding in the out-years so that you are going to keep that 2025 date for the first production unit?

Dr. HOMMERT. Well, I can start. Let me just say for the 78/88, we are still at a very early stage. In the space for my laboratory, I feel like the work that we are doing and executing today on the 61, the 88 Alt 370, and the Mk21 fuze, in addition to the early study that we did a feasibility study on interoperability, position us quite well to support with adequate funding, which needs to begin not for a few years yet, a date in the mid next decade. So from a Sandia perspective, I think we are in a reasonably good position to support that if these other activities are supported on the currently established schedules, and I have some concern about that. But under that assumption.

I do believe—and I will let my colleagues comment—that as a perhaps not entirely uninformed observer of their responsibilities on that effort, that we should be beginning now to take on the certification challenges associated with the nuclear explosive package because I do believe that there are risk issues there, although I have great confidence in my two sister laboratories that they can achieve that. But I believe that that is what should begin and begin soon.

Senator FISCHER. If there are limits to the funding that these other activities would receive, does that then limit the scope of your mission?

Dr. HOMMERT. Well, let us see. If these activities I have just outlined are not funded in the schedules that we laid out really last year in preparation for fiscal year 2013 for full scale engineering development, then you have a variety of issues that occur.

Senator FISCHER. And how do you prioritize then?

Dr. HOMMERT. Well, I think in my mind it is clear that the B61 is a high priority. It has a number of drivers. There are some technical issues, which we will not talk about in detail here, that are real drivers for that early next decade. And so we really need to progress on that. The Navy has some very clear drivers also for the 88 Alt. All three have issues. There are different scope activities. The current schedules, I think, have the right priorities in terms of timing.

The concern is that if those slip significantly, you are then—going back to an earlier point that the chairman made—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 78/88. There is a sequencing and phasing here that is important to adhere to.

Dr. ALBRIGHT. So I referred earlier to some of the technology maturation efforts that are needed on the 78, that if you defer these, you are adding risk in my view to the program.

The other key risk factor, I think, is whether or not we can—without going into the detail, the most likely option for the primary on the 78/88 does require the stand-up and operation of plutonium pit production capabilities at Los Alamos. And so any delay by the Government—any delay in funding to get that stood up—and that

really has to start now—is going to add significant schedule risks to the program.

Dr. MCMILLAN. And to build on what my colleague just said, the strategy we have proposed is a proposal that is based on that schedule, the schedule of producing the pits that will be required for the 78/88. And so if we are able to start, I have high confidence in the team at Los Alamos and their ability to deliver on that.

The other role that we will play at Los Alamos is a peer review role for our colleagues at Livermore. I think this is one of the values that the Nation gets from having two laboratories such as the ones we represent. So we will play that role in the 78/88 as well.

Senator FISCHER. Thank you.

It is my understanding that you are looking at a warhead that is suitable for an ICBM and also the SLBM. Correct?

How is that coming along?

Dr. HOMMERT. Well, let us see. Again, we did an early feasibility study, and I would say that was positive on our ability to do that. There is a lot of devil in the details in this, as our Navy and Air Force colleagues remind us frequently. And so there is more work to be done in a concept phase in what we call 6–2. There will, undoubtedly, be some adjustments as we go along, but in the space of arming, firing, and fuzing and in the support of different security features, I am confident that the modular approach that we are pioneering now with examples like you have there will afford us flexibility we have not had in the past. So I do believe there is much to be had here, but there is a fair amount of work that has to yet be done to determine how far and how effectively we can implement such a concept.

Dr. ALBRIGHT. Yes. I would just add one area where there was a potential risk I think was taken off the table when the Air Force made the decision on the reentry body that they wanted us to design to. That helped a lot.

You know, I think in the early concept phase we identified some issues associated with what are called the mass properties of the warhead. This has to do with where the center of mass is in its various moments because the SLBM flies differently than the ICBM does, and the PBB and the reentry body fly differently. But I think we have got to the point now where we are pretty well convinced that that is very doable.

Senator FISCHER. Thank you very much.

Senator UDALL. Thank you, Senator Fischer.

Dr. Shank, let us turn to the good work you are doing. In phase I of your report last year—I think you alluded to this in your opening statement—you mentioned a lack of trust and micromanaging between the NNSA and the personnel at the weapons labs. Does the recent Y12 break-in and claims of lack of Federal oversight give you any pause? And what do you intend to do in terms of your final report as to clarifying this or further expanding on what you have viewed, what you have observed?

Dr. SHANK. Certainly Y12 is a very different kind of an institution from the National labs. So it is not something we looked at and not something that our report had anything to say about.

My own personal opinion, as you look at dealing with that issue, there are serious growth issues having to do with Y12 that to me,

if the answer is to put another layer of oversight rather than fix and make more effective and make sure that the oversight is efficient and effective, I do not see a solution to the problem. So I certainly would not change anything that we had in our report having to do with that, having said that it is not the same kind of institution as the laboratories, but that it is a matter of doing oversight effectively, efficiently, and rather than looking at low-level details, look at the most important issue. In the case of the Y12, what could be more important than protecting that stockpile or that material?

Senator UDALL. Let us talk about retention of scientists and engineers. Are you worried about retaining key personnel at the two physics laboratories, which of course are Los Alamos and Livermore?

Dr. SHANK. I think constant vigilance is going to be required in retaining those employees. Things are clear that currently there has been a slowdown in the market for such people. As the economy recovers, I think that is going to be more of a challenge. I think if you look at issues of working in an audit environment, working in an environment where your ability to grow as a scientist are restricted by the issues that I raised in conference travel and a lack of attention to the work environment, yes, I think there is a risk.

I think that on the up side, the kind of people that we are talking about and I heard about here with my colleagues to the right—described the kind of people they get. They are very motivated by the mission. And I think that when I talk to young people in the laboratories, you can clearly see they were motivated by the mission but very concerned about what was going to happen with their career with the trends in the work environment.

Senator UDALL. Let me turn to a question and comments I am sure you would have on the capacity of the labs to do non-defense-related research. It has often been said that one of the great strengths of these labs is their capacity to apply multi-disciplinary teams to fields outside the weapons area. The human genome project is an example of this kind of work.

What are your thoughts on this potential and to what extent should we be encouraging or supporting the labs to continue these scientific pursuits?

Dr. SHANK. In our first report, we lauded the five-agency agreement that took advantage of the unique skills of the laboratories to work on broader national defense programs. I think all of the laboratory directors, when I have heard them speak, say that their number one mission is the nuclear weapons complex. Things that add to that support that mission. So in terms of what we have looked at and what we think the laboratories are capable of, there is an enormous amount of work that can be done of a very broad nature that in the end support that I think particularly at Sandia where they have a very large "work for others" program that, as we heard, very successfully helps them address mission needs as they arrive. And I think there is a very large area in that work space where the laboratories can be useful.

Senator UDALL. Let me direct a common question to all of you. I actually have a series of them. But in stockpile stewardship, it

was one of the great successes in the 1990s when we saw the development of tools and people to maintain the existing stockpile without testing. Do you believe it was and continues to be a successful program, and what do we need to do to keep it on track? And I will start here and we will move across. Dr. McMillan?

Dr. MCMILLAN. Thank you, Mr. Chairman.

I have had the privilege of spending the leadership portion of my career, most of the last 20 years, working on stockpile stewardship. And I believe that today the results we are seeing from stockpile stewardship exceed the expectations I, for one, had when we started nearly 20 years ago. It is an investment that the country has made, and it is an investment that is paying off handsomely in our understanding of the stockpile today. In my annual assessment of the stockpile just last year, I saw results in understanding nuclear tests that were done during the period of nuclear testing that we did not understand and that today, because of the investments the country has made in stewardship, we understand. So I believe those investments have paid off handsomely in our ability to assess the certification and to certify systems as they go in.

Dr. HOMMERT. I certainly agree with my colleague. He and I were actually together sort of on the ground floor of this program in the middle 1990s. I also believe it has exceeded our expectations. I think it leaves the country in an enormously strong position to deal with whatever might be thrown at us because of the deeper understanding we have. For example, that component which will go into AF&F, arming, firing, and fuzing assembly, for the Navy will be certified to radiation conditions for the first time without underground testing, as well as without certain fairly expensive-to-operate above-ground facilities with, I believe, great confidence because of the tool sets we have put in place over the last 10 years.

I also believe that we would not have the robust talent that we have just been talking about if we did not have the facilities and capabilities that stewardship put into the laboratories that has allowed us to attract the individuals that we now are using.

And the last point I would say is that there is a natural transition here. We must continue to work the stewardship issues. But I also think it is fair to challenge us that we have to demonstrate the value of these investments in how we execute modernization. And I believe we have begun to do that in cost management and in our ability to qualify and certify with great confidence, and I believe we are well positioned to do that.

Dr. ALBRIGHT. So I think it has actually been an extraordinarily successful program. I was not part of the laboratories when this was founded, but I certainly was an observer from the sidelines. And I think nobody expected it to be as successful as it has been. It is basically founded on the idea that through scientifically grounded understanding of how a nuclear weapon operates, coupled with simulations of that theory and then experiments that challenge the assumptions associated with that that we can substitute for the Cold War paradigm of constant design and nuclear tests out in the desert. And so far that has worked out extraordinarily well. We have, for example, found issues with our weapons that we would not even have found out about in a nuclear test. We have actually found out about them through modeling and simulation

and have been able to repair them, things that we would not have found out except through the stockpile stewardship program.

I will point out again, echo the point that this is really all about the generation of people that we are developing. I just appointed an acting director for my weapons program who came to the laboratory in 1998. That is 6 years after the last nuclear test. And as we proceed forward with the W78 and 88 and the LRSO and the series of LEPs, the number of people who we are going to have attached to these programs who were ever even in their youth associated with a nuclear test is diminishing rapidly to zero. So this is really an essential program for sustaining the stockpile.

Senator UDALL. Dr. Shank, do you care to comment?

Dr. SHANK. The only comment that I can make is that the ability and the focus of the laboratories in recruiting the next generation of weapons designers and engineers and scientists has really produced remarkable results, and I think that gives me a good feeling that they will be successful in the future, providing the work environment and all the other things that allow them to work at their very highest potential will be fulfilled.

Senator UDALL. Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman.

Dr. Shank, in your opening remarks, you referred to a study and you said that your views were your own when you commented on that. You said that experiments are becoming unaffordable. Is that correct?

Dr. SHANK. Correct.

Senator FISCHER. You referenced regulations and duplication and a lack of trust, and you said we are often missing the big picture. So how do you believe we can improve the NNSA then?

Dr. SHANK. That is a very good question. In my last testimony, I will describe what I had said.

First, this is public money, Federal money. It must have Federal oversight. It is absolutely essential for the trust and the ability of the Congress to be able to support this work that there be oversight. However, I believe that we could do a much more efficient oversight, and efficient oversight would come about rather than overseeing each detail, each action, we would put together a system much like a bank puts together a system. It does not look at any transaction but, in fact, looks at a system that is maintained by the laboratory and audits that so that there is a responsibility of the laboratories to be transparent and auditable in what they do. And at the same time, this gets efficiently done in a very cost-effective way with fewer people by putting the onus on the laboratories to be able to operate in a system that has been accepted and verified and one in which it can be audited.

I spent the first 20 years of my career in private industry. If private industry did oversight of its work the way that we do at these national laboratories, it would be very difficult for them to survive financially. I think that we ought to look and realize that every time we spend money in doing something in an oversight issue which could be done more effective and efficiently, we are losing an opportunity. So I want to make very clear not just less oversight, more effective and more efficient oversight, look at things that are very, very important and give you an answer that you trust that

the work is being done. If you look at the laboratories as untrustworthy institutions, then the kind of oversight that you are going to have is going to be one in which you want to look at every transaction. So the laboratory has to do work to raise their level of confidence and capability so they can be trusted to do this. So the core issue is trust. The long-term goal is efficiency.

Senator FISCHER. Thank you, sir.

I would ask all the lab directors then how you would describe your relationship with the NNSA with your lab and what do you believe should be the central focus of this newly created congressional advisory panel. If you would like to each take a turn at that, please.

Dr. MCMILLAN. First, let me agree with Professor Shank. I believe oversight is important for both the Government and the laboratories to ensure that we have processes and programs that can lead to trust. I continue to see growth in that area in our interactions over the last year with NNSA. I continue to believe that there is opportunity for growth, and I look forward to the congressional commission that has been appointed because on that commission, I see many people with many decades of experience, and I believe there are opportunities through that commission to bring additional strength to that relationship.

Dr. HOMMERT. I clearly think this is an area that is very fundamental to our ability to continue to perform cost effectively and for the environment for our staff. I do believe that the relationship needs a fresh look. I think there may be structural issues in the way NNSA is positioned inside the Department of Energy. I believe that the panel that has been established has absolutely the right expertise to take a hard look at that. You know, I would say, along with Dr. McMillan, I see some things that are positive. We have tried to move to a more strategic performance evaluation plan.

On the other hand, I continue to experience a very high level of detail scrutiny that makes it difficult for me, I believe, to get the focus on continuous improvement in our performance in operational aspects, whether it be safety or security. We are not perfect in these regards. We need to continuously improve. But that will not be achieved by fairly detailed compliance efforts that are not looking at overall larger improvement efforts among our workforce.

So there is room for improvement here, and I think that the congressional panel is well staffed to do that. And we look forward to interacting with them.

Senator FISCHER. Do you believe that if the focus is not so much on every single detail and you have a panel that you are hopeful that they are going to maybe take that broader look, will that help with your time tables on different projects?

Dr. HOMMERT. It could. It could help because——

Senator FISCHER. And also with costs then as well.

Dr. HOMMERT. Absolutely. There are some significant costs. And time tables are usually driven—I did not get a comment to talk about the 2014 budget, but budget limitations can impact time tables. If you can execute more efficiently, more cost efficiently, that relieves some of that pressure. It will allow you to hold schedule. That is important. That will not happen overnight, but I do believe there is opportunity there.

You know, a statistic. Last year, we had 73 independent external governmental audits within the space of a year. That is one every 3 and a half days. You have to have a certain amount of staffing to interact at that level. Any individual one, entirely appropriate for the Government to do, but you might expect there is a bit of duplication and there is a bit of process that is not always the most efficient use of resources. So there is some opportunity here, yes.

Senator FISCHER. On those audits, how many agencies did they come from?

Dr. HOMMERT. The majority of those are from aspects of the DOE and, of course, the GAO was involved in that. But there are different components of the DOE, whether that be what is called HSS or NNSA itself or the IG, all appropriate organizations and again each individually an appropriate examination. But when you sit on our side of the equation, it can be a fairly significant burden and the potential for duplication is there.

Senator FISCHER. Do you keep track of the hours of work that go into these audits and kind of itemize them by duplication?

Dr. HOMMERT. Senator, would you like to join our management staff? You are cluing in on some pretty good questions. [Laughter.]

Senator FISCHER. I look at this as common sense.

Dr. HOMMERT. Thank you.

We have looked at it in selective cases and it is significant. The cost of these things certainly runs in the millions.

And again, I want to emphasize that audits and external oversight are absolutely appropriate.

Senator FISCHER. Yes, they are.

Dr. HOMMERT. It is how you hone it and make it efficient.

Senator FISCHER. Thank you.

Dr. Albright, just a few minutes.

Dr. ALBRIGHT. Yes. I will try to keep it brief.

I think my colleagues have actually covered most of this. You know, this is not the first study that we have done on this topic. There have been a number of studies over the last 5 or 6 years. They all pretty much have come to the same diagnosis and maybe some slight differences in what the cure might be.

I think you have assembled an incredibly talented panel of people who have a deep insight and history into NNSA and the governance process. So I am looking very much forward to what they come up with.

A couple of observations. One is—and Dr. Hommert alluded to this—you do not have, in my view, a clear set of roles, responsibilities, authorities, and accountabilities on the Government side. So you have NNSA headquarters. It has got its beliefs about what its roles and responsibilities are. You have DOE headquarters. You have what is formerly known as the Albuquerque Service Center. You have the site offices. I have 100 people at my site office. You have about the same. And even within the site offices, you have contracting officers and then you have the site office manager, and they do not always agree and they are all setting policy.

So getting that clarified and, furthermore, getting it focused on—you know, as you make policies on oversight, you have to make that cost-benefit trade that Dr. Shank referred to in terms of how it impacts the mission. The easiest thing you could do, if you want-

ed no safety or security issues, is to just put a big brick wall up around the laboratories and not let anybody in. That will take it down to zero. So there is a cost-benefit calculus.

Then, frankly, I think the other thing that Dr. Shank alluded to is we have to have clear roles, responsibilities, authorities, and accountabilities between the Government and the laboratory management. We have at our laboratories a view as to what our responsibilities are for managing the laboratory in terms of our HR policies, our business practices, our safety and security. The problem in part is that we also have about 1,000 people in the Government who also think they have those same roles and responsibilities and authorities and accountabilities. And so that is how you get into this transactional oversight regime and where we are in a position then of having large numbers of people on our staff kind of there to kind of feed the beast without any real value add.

So I really look forward to this commission and seeing what they come up with.

Senator FISCHER. Thank you.

Thank you, Mr. Chair.

Senator UDALL. Thank you, Senator Fischer.

I have one more question. We are counting down to the 4 o?clock time frame which we were going to attempt to end the hearing. This has been very valuable.

I know we were talking about this question I am going to ask you. So take that into account. The 2010 posture review mandating the NNSA to undertake a wide range of life extension programs, as well as replacing unique and costly facilities. The problem that I think we face in the Congress is the poor track record of the NNSA when it comes to maintaining cost, scope, and schedule from prior projects. If there is a single issue that you think stands out leading to this poor track record, what would you identify that to be?

Dr. McMillan, I do not know if you want to wade in first, but we will ask you to do so.

Dr. MCMILLAN. The one-word answer would be stability. If we can have stability that gives us the predictive ability to do things, then we can move forward. If it is constantly changing, it makes it almost impossible for us to do what we would like to do as well as I know you would like to do.

Senator UDALL. Thank you.

Dr. HOMMERT. I would echo that. I will give you as an example the B61. We laid out what we call a weapon development cost report in June 2012. It laid out a 12-year program. We believe that if we want to execute that program on schedule, on cost, then adhering to that plan is the most effective way to do that. When we have either changes in requirements or even, I think, going back to our previous topic where we do not have the most effective partnership working between the laboratories and the NNSA, all of that can lead to uncertainty, can lead to changes that have the net result of adding cost, adding delays into performance. And so these are areas I think we have to really focus on.

I believe we have in front of us, across all of the topics we have touched on today, some sound plans. We just now, I think, need to focus on executing those plans, minimizing changes to require-

ments, minimizing uncertainties in, quite frankly, the funding profiles that we need to execute them.

Dr. ALBRIGHT. Yes, I would echo all of that.

I think you also should not lose sight of some of the successes that have occurred within the nuclear weapons complex when we do have that kind of stability. One example I would point to is in high performance computing. We have had a longer than a decade record of delivery, partnership with industry, and delivery of capability that, frankly, exceeds anything anybody would have expected on cost, on schedule. And I think that is in large part due to the fact that we had a good partnership with the Government in how we executed that part of the program. We had stability in the requirements. We all knew where we were trying to go and we were allowed to do that.

Senator UDALL. Fair enough. It is important to acknowledge those successes.

Dr. Shank, you have the last word here.

Dr. SHANK. I think the laboratories have tremendous potential. I hope that we can get a focus and help fixing some of those issues that allow them to be better managed. But I think you have got great people and I have great confidence they are going to deliver on their mission.

Senator UDALL. And I think, again, I heard you say the core issue is trust. If we are able to generate some additional efficiency, we will build trust. Is that an accurate way of——

Dr. SHANK. Trust and performance.

Senator UDALL. And performance. Thank you for that.

Senator Fischer, do you have other questions?

Senator FISCHER. I just have a couple quick ones here. Dr. Hommert wants to talk about the budget. So last year, you expressed some concern about the impact of funding shortfalls on these different programs, especially over the next 5 to 10 years. You said we run a huge risk in our ability to continue to do stockpile assessments and to conduct future life extension programs.

So given that we now have some 34 percent or that we are some 34 percent short in that funding increase, that $1.4 billion shortfall, that was promised in November of 2010, is your concern now greater than it was last year?

Dr. HOMMERT. Well, I would answer it this way. I think from where we were last year—an example I gave is the B61. We have now gone through a very elaborate, detailed process of estimating the cost to execute that program and we have shared that with the Government. And they have put it together across the entire enterprise.

My concern is that our ability to hold to that schedule requires that the funding in the key years—in the case of the 61, 2014, 2015, 2016—be consistent with that plan. From what I can tell now as a result of sequestration in 2013 and what we see in the 2014 budget, we are going to slip off of that plan not dramatically but slip enough that in my view we will see schedule impact. Schedule impact will lead to cost growth. So I do have some concern.

And furthermore, when that happens, you begin to pressurize the entire program and it puts more pressure on our ability to do the adequate surveillance that we need to do, et cetera.

So I think we need to pay close attention to this going forward. These schedules are visible. They have cost impacts. And they are, right now, I think under some pressure. And so my sentiment remains the same as last year.

Senator FISCHER. And my last question for you then, sir. As a Nebraskan who has been to STRATCOM and understands the importance of STRATCOM, you are the only one of the three lab directors who testified during the New START hearings. Do you think we have lived up to our modernization commitments?

Dr. HOMMERT. Let us see. I would say very positively that the challenge that we faced in 2010 to transfer the policy level NPR direction, which is what we testified or basically spoke to in 2010, into executable plans—there has been great progress made on that. Now our challenge is collectively between the administration and the Congress to fund those executable plans. That is a challenge in this fiscal environment. We understand that. And so we will have to see how we trod through that.

So on the one hand, I am encouraged that we have made the right kind of progress from policy to plans. Now my concern is can we execute them. And that challenge sits in front of us. When we are funded, as that little component indicates, these institutions will execute without question.

Senator FISCHER. You do remarkable work, all of you, and I thank you for being here today.

Senator UDALL. Dr. Hommert, I assume you want this wonderful mechanism back. [Laughter.]

Dr. HOMMERT. I do actually, yes.

Senator UDALL. It is a work of art. We appreciate, because I know Senator Fischer and I are both visual learners, you bringing a—it is not a prop. It is an aid and it is also an example——

Dr. HOMMERT. And it is going to fly in a development unit in a couple months. So it will be in the air.

Senator UDALL. That is what we do the best, which is innovate. It is how we are going to continue to see our economy grow and prosper.

Let me just, again, thank you for your expertise, for your time, for the very thoughtful testimony. I know you—I think Senator Fischer would join me in acknowledging this—pursue your mission because it is important, because you believe in it. But I also want to acknowledge, on the part of this subcommittee and the SASC at large and America at large, the great important work you do, that you are unheralded. This is a dangerous world. I know we believe at some point we will have peace broadly distributed around our planet, but until we do, we have got to be strong and through that strength comes peace. So thank you.

We will keep the record open for questions—that is directed at our colleagues—until the close of the business Thursday.

We do have a markup we are going to conduct soon as the SASC moves forward to the NDAA introduction. A busy week for—I think this is the most important subcommittee in the whole Senate—Strategic Forces. We have a hearing tomorrow with NNSA on environmental remediation. GAO, I think, is going to join us. Then we have another hearing on Thursday.

So with that, the Subcommittee on Strategic Forces is adjourned.

[Whereupon, at 4:04 p.m., the subcommittee adjourned.]