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GOVERNANCE, OVERSIGHT, AND MANAGEMENT OF THE NUCLEAR SECURITY ENTERPRISE TO ENSURE HIGH QUALITY SCIENCE, ENGINEERING, AND MISSION EFFECTIVENESS IN AN AGE OF AUSTERITY

HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

HEARING HELD
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HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON STRATEGIC FORCES,
Washington, DC, February 16, 2012.

The subcommittee met, pursuant to call, at 11:11 a.m. in room 2212, Rayburn House Office Building, Hon. Michael Turner (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. MICHAEL TURNER, A REPRESENTATIVE FROM OHIO, CHAIRMAN, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. TURNER. Call the Strategic Forces subcommittee to order.

Good morning. I want to welcome everyone to today's hearing on governance, management, and oversight of the nuclear security enterprise in the age of austerity.

I also want to thank Mr. Langevin for being here today serving in the capacity of ranking member, but Loretta Sanchez was unable to be here today. And, he was expressing to me that the Cannon Tunnel in getting here was closed. And so, it impeded his trip here.

But, we greatly appreciate you taking the time to serve and represent our ranking member in this hearing.

Everyone here knows that this is a very busy week here on Capitol Hill: budget request week.

This hearing is not like most of the hearings that are taking place however, in that it is not looking directly at a particular agency's fiscal year 2013 budget request.

However, it is a hearing that has major implications for the future of the National Nuclear Security Administration, NNSA, and therefore, its budget.

This hearing will examine longstanding, well-documented, and fundamental concerns with the way NNSA manages its labs and plants, problems that are unnecessarily costing taxpayers many hundreds of millions of dollars each year and impeding NNSA's ability to accomplish its mission.

In today's fiscal environment, we cannot afford such inefficiency and waste, particularly when we are seeing major cuts to the pledged nuclear modernization funding in this year's budget request.

In 1999, Congress passed the NNSA Act which split out NNSA as a semi-autonomous agency within the Department of Energy,

DOE, driven by this subcommittee, and in particular by my friend Mac Thornberry, who is with us today, and Ellen Tauscher.

This legislation sought to address major mismanagement and security problems at DOE. In particular, a 1999 report by the President's Foreign Intelligence Advisory Board spurred Congress into action saying DOE was a "dysfunctional bureaucracy that has proven it is incapable of reforming itself."

An earlier report by the Galvin Commission "revealed a counterproductive Federal system of operation for DOE's national labs," saying, "The current system of governance of these laboratories is broken and should be replaced by a bold alternative."

The Galvin Commission noted that problems included "increased overhead cost, poor morale, and gross inefficiencies as a result of overly prescriptive congressional management and excessive oversight by the Department." And an "inordinate internal focus at every level of the laboratories on compliance issues and questions of management processes which takes a major toll on research performance."

NNSA was created to address these problems and enable the nuclear security enterprise to be more effective, more focused, and more efficient.

Twelve years after the creation of NNSA, the question for this hearing is: Has it worked?

Have these problems been addressed?

To prepare for this hearing, the committee staff put together an overview of the many reports in the past 10 years that have examined NNSA's management and governance of its labs and plants.

It is not an exhaustive list. But, it is illustrative of what various assessments have determined are NNSA's administrative problems.

I ask that the hearing memo prepared by the staff be entered into the record for this hearing.

[The information referred to can be found in the Appendix on page 113.]

Mr. TURNER. I want to quote from just a few of these myriad studies that the staff have reviewed. And here is a finding from a 2009 assessment by the Stimson Center which was paid for by NNSA itself.

It stated, "The implementation of the NNSA Act failed to achieve the intended autonomy for NNSA within the Department of Energy. The labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well."

And here are a few quotes from the bipartisan Strategic Posture Commission's report in 2009.

First, "The Governance structure of the NNSA is not delivering the needed results. This governance structure should be changed. In the commission's view, the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being. It is time to consider fundamental changes."

And also, "Despite the efforts of thousands of dedicated and competent civil servants, Federal oversight of the weapons enterprise needs significant improvement." NNSA "may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate."

"The leadership of all three weapons laboratories believes that the regulatory burden is excessive, a view endorsed by the Commission. That burden imposes a significant cost and less heavy-handed oversight would bring real benefits."

Reading these reports, the point of criticism about excessive, ineffective, and unnecessary bureaucratic processes and confused and redundant management relationships sounds eerily similar to the reports that spurred the creation of NNSA in 1999.

So, the answer is: No, NNSA hasn't been working as intended, and many of the problems remain.

But we have our witnesses here today to help us understand if that answer is correct.

Our first panel, we have gentlemen representing two distinguished organizations that have spent considerable time examining NNSA management and governance of the nuclear security enterprise.

They are Dr. Charles Shank, Co-Chair, National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories, and Senior Fellow, Howard Hughes Medical Institute.

We also have the Honorable Charles B. Curtis, who is a member of the National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories, and Senior Advisor, Center for Strategic International Studies, also President Emeritus and board member Nuclear Threat Initiative. And, he has served as the former Deputy Secretary of Energy, 1994 to 1997.

We also have Mr. Eugene Aloise, Director of Natural Resources and Environment at the Government Accountability Office.

Dr. Shank and Secretary Curtis are here to present the results of a National Academies of Science study that was mandated by this subcommittee in the fiscal year 2010 National Defense Authorization Act.

In the conference report accompanying that bill, the conferees explained that the study should provide "an even handed, unbiased assessment of the quality of the scientific research and engineering at the labs, and assessment of the factors that influence" such quality.

I understand that the portion of this study that was recently completed, and that we will be discussing today, focuses on the latter: management related factors that influence the quality of science and engineering at the labs.

I will let Dr. Shank and Secretary Curtis speak to their report. But I want to highlight a few of their study committee findings.

First, in the view of their committee, "the relationship between NNSA and its labs is broken, to an extent that very seriously affects the labs' capability to manage for quality, science, and engineering. There has been a breakdown of trust and an erosion of the partnering between the laboratories and NNSA to solve complex science and engineering problems. There is conflict and confusion over management roles and responsibilities of organizations and individuals."

The National Academies report also finds that the level of detailed transactional level management and oversight that NNSA

applies to the labs is causing significant inefficiencies and risking the quality of science and engineering at the labs, saying, "There is a perception at the three laboratories that NNSA has moved from partnering with the laboratories to solve scientific and engineering problems, to assigning tasks and specific science and engineering solutions with a detailed implementation instructions."

"This approach precludes taking full advantage of the intellectual and management skills that taxpayers' dollars have purchased. The study committee found similar issues in transactional oversight of safety, business, security, and operations. Science and engineering quality is at risk."

Our first panel of witnesses also features Mr. Eugene Aloise from GAO [U.S. Government Accountability Office]. Mr. Aloise and GAO have spent decades examining NNSA and DOE defense programs before it.

I understand GAO continues to have major concerns about the inconsistency and inaccuracy of NNSA's management and cost data across the enterprise.

I hope you will help us understand what is causing these chronic problems and what actions NNSA or Congress could take to address them.

Finally, our second witness panel is comprised of three former directors of the NNSA laboratories who have been asked to share their direct experiences leading and managing the organizations responsible for carrying out NNSA's mission within the management and oversight, processes, procedures, and structures set up by the Federal Government.

They are Dr. Michael Anastasio, Director Emeritus, Los Alamos National Laboratory and Director Emeritus, Lawrence Livermore National Laboratory.

We also have Dr. George Miller, Director Emeritus, Lawrence Livermore National Laboratory, and Ambassador C. Paul Robinson, Director Emeritus, Sandia National Laboratories.

These gentlemen bring a wealth of experience to our witness table. And, I hope they will share their experience by reflecting on the findings and recommendations of the National Academies report and the GAO.

I also hope that they will share any concrete, actionable recommendations they have for improving governance and management of the labs.

Before I pass things over to Mr. Langevin, I would like to say that we all need to recognize that, alone, simply moving boxes on an organizational chart isn't going to solve these problems.

It is going to take leadership, both from the Administration and up here on Capitol Hill. As well as a consensus on why NNSA's mission is so important. And what needs to be done to move that forward.

Ranking Member Sanchez and I have agreed to take a hard look at these issues over the next few months and work together to help address the concerns of the National Academies study group, the Strategic Posture Commission, and all of the others.

I want to thank our witnesses for joining us today. And with that, I will turn to Mr. Langevin for his opening comments.

[The prepared statement of Mr. Turner can be found in the Appendix on page 39.]

STATEMENT OF HON. JAMES R. LANGEVIN, A REPRESENTATIVE FROM RHODE ISLAND, SUBCOMMITTEE ON STRATEGIC FORCES

Mr. LANGEVIN. Thank you, Mr. Chairman.

And, I just want to say on behalf of Ms. Sanchez that she wanted to be here. But couldn't because of a family emergency, but appreciates the work that the panel is doing and for you being here today.

With that, I'd like to join Chairman Turner in welcoming our witnesses: Dr. Shank, the Honorable Charlie Curtis, Mr. Aloise, Dr. Anastasio, Dr. Miller, and Ambassador Robinson.

Thank you.

I am also pleased that we have statements from Ambassador Brooks and Dr. Sieg Hecker.

And Mr. Chairman, I would ask that the letter from Dr. Colvin and Dr. Logan, on behalf of the University Professional and Technical Employees union, also be submitted for the record.

[The information referred to can be found in the Appendix on pages 140, 144, and 134, respectively.]

Mr. TURNER. Without objection.

Mr. LANGEVIN. The impetus for the fiscal year 2012 National Defense Authorization's request for this National Academies of Science study was concerned about safety issues and about the effects of privatization of lab management at Los Alamos National Laboratories and Lawrence Livermore National Laboratory.

Specifically, members were concerned that increased costs of management fees and taxes and other associated costs might have decreased resources for programmatic work and affected morale.

In its version of the bill, the House sought a GAO study to assess the costs of the transition and the impacts on lab management and lab functions including safety, security, and environmental management.

The final conference report included the NAS [National Academies of Science] study of a broader scope that would examine whether the excellence in science and engineering was being preserved at the labs.

This study now comes over 10 years after the NNSA was created, and several years after a change in contracting structure for the labs, and offers an opportunity to assess the quality of science and management after a period of adjustment to a new contracting structure.

It also comes in the context of strategy based on an updated nuclear posture review and the constraints of a fiscal crisis.

Today, I hope to hear your insights to inform our oversight, and ensure that we retain the unique skills and capability upon which nuclear deterrent and nonproliferation efforts depend.

I would like to touch on three important points.

First, the need for an effective contract structure, governance and management that help attract and retain the quality of scientists and engineers dedicated to public service who underpin a

safe, secure, and reliable arsenal and contribute to the expertise behind successful nonproliferation efforts.

Second, the need for a process that ensures safety for workers and the public.

And third, the need for transparency, accountability, and clear lines of authority.

First, safety, security, and reliability of nuclear weapons depend on critical scientific skills. And, our labs must be able to attract some of the Nation's best scientists to the labs who want to serve their country.

Maintaining this expertise depends—that demands an interesting and important mission, challenging work, good equipment and tools, and good morale including a supportive work environment where scientists are valued and recognized.

So, the question is does the current structure and oversight provide clear expectations while enabling effective research including hypothesis-driven science?

Does it enable diverging views on potential technical solution?

And, does it provide stability in employment and opportunities for collaboration and success?

Mission success also demands a work environment that is safe for employees and for the public, which brings me to my second point.

This management and oversight responsibility of nuclear weapons research, sustainment, and production cannot be compromised. Accidents can and do happen including low-probability, high-consequence events.

No one expected the massive earthquake and tsunami at the Fukushima Daiichi power plant in Japan or the BP Deepwater Horizon explosion.

The reactor accidents at Savannah River that were hidden from the public for over 30 years, the environmental conditions which led to the raid and permanent shutdown of Rocky Flats, and the classified data scandals that rocked Los Alamos all resulted in part from a structure of flexible requirements and minimal Federal oversight.

Meanwhile, the Department of Labor has now approved more than 64,000 cases submitted to the Energy Employee Occupational Illness Program for radiation exposure and has paid out, more than $6.7 billion in compensation benefits.

Chairman Turner, and our committee members, and I are committed to the success of NNSA, the Nuclear Complex and its national security mission.

However, I fear that a nuclear accident, even a minor one, would have significant repercussions on the future of the Nuclear Weapons Complex. That is a consequence that we would all like to avoid.

Third, in an era of budget constraints, we must seek opportunities for improving efficiency across the complex as required, for example, in Section 3123 of the fiscal year 2012 National Defense Authorization Act, but also in terms of effective management.

With the $7.2 billion appropriated for weapons activities in fiscal year 2012, and a $7.6 billion request for fiscal year 2013, improving accountability and ensuring effective governance must be a priority.

Questions I have are: Are there clear lines of authority? Does the NNSA have sufficient subject matter expertise and consistent data necessary to effectively assess performance across the complex?

Is there sufficient accountability within NNSA from the contractors at the labs?

Is the structure set up to incentivize savings, maximize investment in programmatic work, perform realistic cost assessments, and planning to avoid cost escalation and scheduled delays, set priorities, and enable competition?

In this context, I'd like to add that I am pleased that the Department of Energy recently decided to resume the practice of making performance evaluations of the lab public, increasing transparency and accountability.

With that, I look forward to today's discussion. I was proud to read this statement on behalf of Ms. Sanchez. And again, she values the important work that you all are doing.

She apologizes that she couldn't be here. But then again, a family emergency demanded her elsewhere today.

With that, I thank our guests for being here. And I yield back to the chairman.

[The prepared statement of Mr. Langevin on behalf of Ms. Sanchez can be found in the Appendix on page 43.]

Mr. TURNER. I thank Mr. Langevin. And also recognize him as a former chair of this subcommittee, and appreciate his work with the subcommittee.

We have received written statements from each of these witnesses. And without objection, these statements will be part of the hearing record.

Without objection, I would also like to make part of the record a statement we received on this topic from Ambassador Linton Brooks, a former administrator for NNSA as well as a statement from Dr. Sig Hecker, former director of Los Alamos.

Both were invited witnesses, but were unable to participate.

We'll now turn to our witnesses. We are allotting 3 minutes for opening statements.

If you would summarize the written statement that you have, it will allow us to get to questions and the dialogue that we are expecting and hoping with the members.

And we are going to begin with Dr. Shank.

Dr. Shank.

STATEMENT OF DR. CHARLES SHANK, CO–CHAIR, NATIONAL ACADEMIES PANEL ON MANAGING FOR HIGH QUALITY SCIENCE AND ENGINEERING AT THE NNSA NATIONAL SECURITY LABORATORIES; SENIOR FELLOW, HOWARD HUGHES MEDICAL INSTITUTE

Dr. SHANK. Good morning, Mr. Chairman and members of the subcommittee.

My name is Charles Shank. I have had the privilege of being co-chair of the Committee on the Review of the Quality of Management and Science and Engineering Research at the DOE's National Laboratories. And, I am joined here today by the Honorable Charles B. Curtis who served with me on this study.

Our task was to look at the quality of science and engineering and management of the three National Security Laboratories: Los Alamos, Livermore, and Sandia.

The study was conducted in two phases. I am reporting on phase one, which was management.

Phase two will be a deep look at some selected areas of actual science and engineering activities at the laboratory.

And conduct of our study, it was done primarily through testimony and observation and looking through documents where the committee had broad and deep expertise for this study.

Our primary mode of gathering occurred with meetings here in Washington where we talked to NNSA experts, NNSA members of our current executives at the NNSA.

We also visited all three laboratories. And, we had evaluations where people were able to present their views from all levels of management.

There are three major areas of findings.

The first is looking at the issue of contracts. The contracts have existed for more than—many decades in some of the laboratories. They were recompeted in 2004. That led to the laboratories moving from a public entity, the University of California to an LLC that now manages the laboratory.

The bottom line is that while it is true that all labs have been under cost and funding pressure, we did not find a morale crisis related to the actions of the new contractors.

However, we should point out that the costs of the re-competed contracts are significantly greater than previous contracting arrangement, primarily due to contractor fees, state taxes, pensions, and other increase in costs.

One area that we would like to identify as a very positive move of the laboratories from weapons laboratories to our broadly national security laboratories serving a broad range of agencies as defined in a governance charter among those four agencies.

We think that that work helps bring the laboratories' capabilities to study scientific issues that are important to the broad set of agencies, and be able to, at the same time, maintain capability for their laboratories.

The final issue that I'd like to discuss is the serious issue that we identified between the relations between labs and NNSA oversight. The core issue is erosion of trust. And, this has led to transactional management and direct management of the laboratories in an overly prescribed formal way which has created a bias, we believe, against experimental work, and a concern by people at the laboratories that this could change the nature and character of the scientific enterprise there.

And, in closing, I would like to say that we need to recognize that, particularly at Los Alamos where there were problems over the last 5 years, extraordinary progress has taken place.

And, consistent with that increase and accomplishment in their operations, we think that consideration should be given to that strengthened performance to the point where they no longer need the special attention and degree of formality in their operations that they currently have.

Solutions to this problem will require efforts both on behalf of the laboratories and the NNSA to establish an atmosphere of trust in which one can then begin to think about an oversight.

When you do oversight on somebody you trust compared to somebody that you don't trust, there is a very different behavior. And, much work needs to be done in that area.

Thank you for your attention.

[The joint prepared statement of Dr. Shank and Dr. Curtis can be found in the Appendix on page 46.]

Mr. TURNER. Thank you, Dr. Shank.

Secretary Curtis.

STATEMENT OF HON. CHARLES B. CURTIS, MEMBER, NATIONAL ACADEMIES PANEL ON MANAGING FOR HIGH QUALITY SCIENCE AND ENGINEERING AT THE NNSA NATIONAL SECURITY LABORATORIES; SENIOR ADVISOR, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES; PRESIDENT EMERITUS AND BOARD MEMBER, NUCLEAR THREAT INITIATIVE; FORMER DEPUTY SECRETARY OF ENERGY, 1994–1997

Dr. CURTIS. Thank you, Mr. Chairman.

Dr. Shank has done a very good job at summarizing our observations. I only wanted to add a few thoughts of my own before the committee's questions as a way of emphasis.

As we have noted, the new contracting model has certainly added costs to Lawrence Livermore and Los Alamos, but we did not find that the contracting model by itself has impaired science, technology, and engineering competencies.

But a much larger and more significant threat to these competencies derives from the persistent level of mistrust that pervades the contract and managerial relationship.

As the subcommittee knows, these managerial relationships have been shaped over many years by a tumultuous history of management and oversight failures.

As a former chairman of the Laboratory Operations Board, which we set up to try and address the same issues that the committee is pondering today, I've had experience with the same frustration that the committee members have expressed with how can we make this thing get better.

We think that the current NNSA and laboratory-directed leaders have made considerable progress, but much more needs to be done. And, we think the peril to science and engineering competencies is so great that the stakes are enormously high.

Now, I want to make a very specific point here.

I think it is my view, I know shared by the committee members, that the conduct of high quality science and engineering inherently involves high standards of environmental care and safety.

Maintaining the public trust demands security and fiscal integrity as well. Indeed, mission effectiveness requires all four: environmental responsibility, safety, security, and sound fiscal controls.

However, science and engineering quality will surely erode if these ends are realized through an imposed operational formality that discourages initiative, biases against experimental work, or creates an unduly risk-averse environment.

Our committee strongly believes that NNSA laboratory leadership should work together to rebuild the trust relationship, more clearly define boundaries between program planning, direction and execution, and reduce the operational formality where possible, consistent with maintaining high standards of safety, security, and environmental responsibility and fiscal integrity, as Mr. Langevin has mentioned.

A rebalancing though seems clearly required. And this Congress has an important role here in its oversight process.

Oversight, Mr. Chairman, I know is a very difficult slog for the committee whose attention is commanded by so many important issues.

But much of the mistrust in this relationship indeed exists in the Congress itself who represent the public's views on the matter. So, the Congress needs to work with NNSA leadership and the laboratory directors to kind of rebalance the situation we're in.

It is not going to be done quickly. If we try to do it quickly or all at once, it will almost surely fail.

It's going to take years. But this effort is so important. It is essential to the mission effectiveness of this laboratory.

So, I commend these recommendations to the committee. And, I encourage the committee to continue the hard work of paying attention to this issue.

Thank you.

[The joint prepared statement of Dr. Curtis and Dr. Shank can be found in the Appendix on page 46.]

Mr. TURNER. Secretary, thank you for those comments.

As you noted, our hope through these panels is that we know we don't know the answers. We know the questions.

But with these panels, we know that you guys know the answers. And hopefully, we'll reach them.

Mr. Aloise.

STATEMENT OF EUGENE ALOISE, DIRECTOR, NATIONAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. ALOISE. Mr. Chairman, Mr. Langevin, members of the subcommittee, I am pleased to be here today to discuss our work on the governance oversight and management of the security enterprise.

DOE's and NNSA's management of the enterprise has been the subject of much criticism, as you mentioned, and DOE's management of its contracts is on GAO's high-risk list.

Although progress has been made, we continue to identify problems across the enterprise ranging from significant cost and schedule overruns on major projects, to ineffective oversight of safety and security at NNSA sites.

We agree that excessive oversight and micromanagement of contractors is not an efficient use of scarce Federal resources. However in our view, the problems we continue to identify in the enterprise are not caused by excessive oversight, but rather by ineffective oversight by NNSA and DOE.

And I'll talk about three of the areas we think better oversight is needed: management data, the management of major construction projects, and safety and security across the enterprise.

Regarding data, NNSA lacks reliable enterprise-wide management data on program, budgets, and cost. Specifically, we have reported the NNSA cannot identify total costs to operate and maintain essential weapons activities, facilities, and infrastructure.

This means that NNSA does not have the sound basis for making decisions on how to effectively manage its programs and projects, and lacks data that could help justify future budget requests or target cost savings.

The Administration plans to request $88 billion over the next decade to modernize the enterprise and ensure basic scientific, technical, and engineering capabilities are sufficiently supported, and the nuclear deterrent can be safe, secure, and reliable.

To adequately justify future budgets, NNSA must identify these capabilities and determine their cost. Without this data, NNSA risks being unable to make fully informed tradeoff decisions in our resource-constrained environment.

Regarding management of its major projects, in numerous reports we have found that NNSA continues to experience significant cost and schedule overruns on its major projects, principally because of ineffective oversight and poor contractor management.

For example, the cost to construct the UPF [Uranium Processing Facility] facility at Y–12 has arisen nearly sevenfold to between $4.2 billion and $6.5 billion.

Given NNSA's record of weak management of its major projects, we believe careful Federal oversight is critical to ensure that scarce resources are spent efficiently and effectively.

NNSA's oversight of safety and security is also being questioned. And numerous safety and security problems have occurred across the sites contributing in the shutdowns at Los Alamos and Lawrence Livermore National Labs.

Our work showed that the contributing factors to the safety and security problems were weak NNSA oversight, and a laboratory culture that did not prioritize safety and security in its daily operations.

In many cases, improvements have been made to resolve these problems, but better oversight is needed to ensure that the improvements are fully made and sustained.

And that concludes my statement, Mr. Chairman.

[The prepared statement of Mr. Aloise can be found in the Appendix on page 55.]

Mr. TURNER. Thank you. I'll start off the questions.

We have very important issues to discuss here. We appreciate your insights and your review of this issue.

Dr. Shank and Secretary Curtis, your National Academies Study Committee found, "The science and engineering performed by any laboratory can only be as good as the people employed. Thus, ensuring that high quality people are attracted to NNSA labs, that they are retained, is a necessary condition for the labs to carry out high quality science and engineering."

It seems pretty straightforward. Your report then goes on to say, "Assuming that the foundation of good people is available high

quality science and engineering, then, this requires good facilities and adequate resources, and operating processes that do not impede the ability of these scientists and engineers to perform at their highest levels."

So, my question is: Does the National Academies Study Committee believe that those key attributes for ensuring high quality science and engineering are in place?

In other words, do the labs have good facilities, adequate resources, and operating processes that don't impede high quality work?

Now, the question isn't asking, you know, do we not have high quality people. Because we know that we do. And they are endeavoring, of course, to deliver the highest quality.

But do these resources reflect the highest quality that we need from them and that we need from them in the future?

Now, I want to also cast my concern in light of recent discussion that has occurred between myself and Congressman Markey.

I am concerned that the impact on the labs' ability to attract and retain world-class scientists is affected by the fact that the current state of our facilities are that they are falling apart.

Congressman Markey just recently sent a letter calling for significant reductions in our support for our nuclear weapons infrastructure. And he went on to say, "It is insane to modernize and replace the uranium and plutonium processing facilities that support the U.S. nuclear deterrent when the plants we have now work just fine."

Now, we have up on the television some pictures of the current state of these facilities that Mr. Markey says work just fine. I know my current Ranking Member Sanchez and I have discussed how dirty and decrepit these facilities appear.

Also, I know our former chair, Mr. Langevin, has currently, and previously, has supported that these facilities need upgraded as has every member of this committee.

I think these pictures which are—I want to emphasize are unclassified photos—illustrates that we have a need for additional investment.

And I want to ask our panel, the Administration has recently announced that the chemistry and metallurgy research replacement facility at Los Alamos would be delayed.

It is a facility that we hope to attract topnotch plutonium scientists. And, you know, what is the impact of this on the labs' ability to conduct world-class scientists?

Dr. Shank, as a world-class scientist yourself, would you be attracted to work in these facilities? Do you believe we need to continue to invest?

If we are to say to scientists that your work is of the future, shouldn't we be providing them a facility that is a picture of the future?

Dr. Shank.

Dr. SHANK. I want to be very clear that the first portion of the report is talking about management. The second phase of the study will be actually looking at those facilities and asking questions and resources and capability that to be able to do the work are important.

Not as a part of the report, but as a scientist, having world-class facilities is absolutely essential. But also, you have to have the ability to operate those facilities in a way that you can actually get work done.

And, I think that that is where the trust and the erosion of trust has really created a problem. And, from the point of view of this study, something like plutonium is a very special kind of, very high-risk work that requires very special attention to detail.

It is a piece of the work that goes on in the laboratories, but not all of it.

We need a kind of oversight, but the kind of formality appropriate for the work.

But certainly as a scientist, speaking as a scientist, one cannot actually do the work without superb facilities.

Mr. TURNER. Secretary Curtis, your thoughts?

Dr. CURTIS. As Dr. Shank said, we did not examine the questions that are inherent in your statement in this phase. So, let me just draw on my past experience as an executive who oversaw these operations.

If you don't have a well-invested-in facility, it is very much more costly to do work in facilities such are depicted in your pictures. Because the risk of misadventure and mistake and accident are so consequential to the mission, then you have to maintain an even higher operational formality to do work in facilities that are not up to high standards.

So, you have to invest in this infrastructure as well as in the people that you expect to perform against it.

Mr. TURNER. I invited Congressman Markey to join me, including an invitation with our Ranking Member Sanchez, to tour these facilities so that we can see that they are not just fine, and that in fact, they do need additional investment.

We certainly hope that he will join us so that he can himself see the need, as these pictures clearly illustrate for investment so that they can reflect the quality of the intellectual capital of our scientists.

And I appreciate both of you acknowledging that.

I want to skip ahead a little bit, but in Dr. Miller's written statement on the second witness panel, he mentions that a review by NNSA in 2007 showed that the labs were subject to a 113 different NNSA and DOE directives that contained a total of 7,752 separate requirements.

This rose to a peak of 160 directives in 2009. It is now down to around 131, thanks to some streamlining.

Dr. Shank and Secretary Curtis, in your opinion, is it possible to effectively and efficiently manage labs under such constraints and still get high quality science and engineering?

Is it possible to be innovative which is basically what we are asking of these scientists?

In your opinion is having hundreds of directives, and many thousands of separate requirements, in the spirit of the model that the labs are supposed to be operated under, and that is again to encourage this innovation.

Your report also says that these layers of rules and regulations have created a major aversion to risk. And, that a major byproduct

of this has been to create a bias against experimental work because of the onerous processes sometimes required before running an experiment.

The bias is problematic because experimental science is at the very heart of the scientific method.

Could you please explain how this aversion to risk impacts the ability of the labs to conduct high quality science and engineering and perform their mission effectively and efficiently?

Dr. SHANK. In our testimony that we receive from scientists at various labs, one scientist told me that there were so many rules and regulations that he could no longer do his work.

When you get to the point where the majority of your time is spent responding to an overly prescriptive environment, that greatly impedes your ability to do the work.

So, this is a very serious issue.

I think the key core issue is if the laboratories are not trusted, each transaction must be monitored. If a system in which the laboratory has raised its level of capability to create a system of operation, one can then audit the system.

So, we have a circumstance where the oversight group treats the laboratories as if they are not trustworthy. That trust goes both ways. It's the cost of operating in a nontrustworthy environment.

We have to work to establish trust. Once you do that, you do not need thousands of directives.

Mr. TURNER. Secretary Curtis.

Dr. CURTIS. Yeah, this is the heart of the question here. And, it has got to be frustrating to the committee because as your opening statement, Mr. Chairman, pointed out, our observations are not new.

You have had report after report say much the same thing. Hopefully, we have added some additional dimension to this discussion.

When I chaired the Laboratory Operations Board, Dr. Shank as a lab director, as a member of that board, we undertook to take out of the regulations much of the detail of a requirement.

As committee knows from other regulatory discussions, you have command control regulations. You have performance regulations.

We tried to make a lot of the regulatory interface based on performance. And we moved to an appendix, a lot of the detail which was previously mandatory.

What we found in laboratory after laboratory is the people in the laboratory, and the people in the oversight structure of the department, continued to follow all the detail. Because they didn't trust each other that they would be entitled to modify that detail.

So, this trust issue, it sounds soft. But it's very, very important.

This is never going to get better until we find a way of reducing the operational formality, providing greater latitude for innovation, for clear boundaries, program planning and execution, and invest a level of trust in the people that we trust to provide for this nation's nuclear deterrent.

It's kind of a strange equation that we provide the Nation's most vital secrets. We entrust those to the scientists and engineers that we depend upon to perform this vital mission. But then we don't trust them in the execution.

And, by not trusting them in the execution, we introduce cost, inefficiencies that have been documented time and time again.

We can do both. We can have safe, environmentally responsible work that gives a higher latitude of trust to those that we rely on to execute the science and engineering.

Thank you.

Mr. TURNER. Thank you, Mr. Secretary.

Mr. Langevin.

Mr. LANGEVIN. Again, I thank the panel for your testimony here today.

So, the GAO and NAS question that I would like to pose to our panel, as we all know the safety and surety of the nuclear enterprise is of the utmost importance. And the NNSA plays a vital role in ensuring our Nation's nuclear deterrents.

So, what can and should be done to strengthen NNSA's ability to perform effective quality assurance?

Dr. SHANK. I believe that the attention is paid to the work that a system be identified and that the labs be held accountable to that system. The laboratories have got to raise their level of performance.

And a much better way to do that would be the laboratories leading the activity and then being audited on the basis of what they actually do. Rather than laying out a prescriptive set of instructions which in the end become the end in themselves, rather than actually accomplishing the task.

Nobody wants to operate any laboratory which is not safe and secure, or in violation of any concern about security or act in an irresponsible way with funding.

But if all your effort is focused on fighting problems of an expectation that you are not trusted, the cost of that overwhelms the ability to actually give you the assurance that your project will be done in a safe environmental manner.

Mr. LANGEVIN. Mr. Curtis.

Dr. CURTIS. I think that we have tried to lay out in the report what we think needs to be done. Those are the three things.

You have to clearly define boundaries, then adhere to the boundaries, both of the overseer and the executer of these responsibilities.

We have to make sure that we are doing high standards of safety, environmental responsibility and security, and fiscal integrity as we execute this mission.

But there are ways of rebalancing the method by which we are assuring that, that I think will reduce a threat to the high quality science and engineering we demand, which we see as a continuing threat that if this isn't fixed, we're going to lose the capability in these laboratories. This has just got to be fixed.

So, the stakes are very, very high here.

Mr. LANGEVIN. Mr. Aloise.

Mr. ALOISE. Yes, I think we would agree with Dr. Shank and Mr. Curtis have said. We, for years, have said that when we are looking for NNSA to change to performance-based oversight rather than compliance-based oversight.

Rather than going in with a checklist and seeing if a number of policies and procedures have been issued in a year or the table is

12 inches away from the wall instead of 18 inches. We should be looking at the performance.

Are the labs doing what we have asked them to do? What the Congress and NNSA have asked them to do?

It should be based on performance.

Mr. LANGEVIN. So, to the panel, does the NNSA have the necessary expertise and leadership structure conducive to effective oversight?

Dr. SHANK. My feeling is yes, they do. They have many excellent people.

I think this is a doable circumstance, the environment in which they are working, the environment of mistrust.

And this goes both ways. It is not simply—sorry, I apologize.

Mr. LANGEVIN. That's a pretty ominous ring.

[Laughter.]

Dr. SHANK. My wife is in Hawaii and she doesn't recognize the time zone difference. So, I apologize.

The——

Mr. LANGEVIN. As long as we don't have to clear the room.

[Laughter.]

Dr. SHANK. I do believe there are excellent people there that are capable of doing the work. It is how it is structured. How the goals are put forward that could in fact make this whole thing work a lot better.

And I think if we work at these fundamental relationship issues, that is the core to actually making the whole enterprise work.

Dr. CURTIS. Let me make just one comment, so we don't lose track of it.

Tom D'Agostino and Neile Miller and Don Cook at NNSA, at the top, have made some very significant changes and progress in addressing this.

The lab directors, some of whom are sitting behind me, made very significant progress when they were in office in addressing this.

It's just that you are trying to unwind a burdened relationship that has been built up over 25 years or more.

And that is why when NNSA was created you didn't see the change that you were hoping to see, Mr. Thornberry's initiative, to free NNSA from some of the administrative burden from within the department.

So, the culture is deeply embedded. And, it is going to take a lot of work to fix that.

There are very good people on both sides of the equation working very hard—highly competent, skilled. You should be proud of them.

But it's a hard, hard problem.

We are dealing with a problem that developed over several decades and it's going to take a while to undo it.

Mr. ALOISE. I would just add that in our work we found that the NNSA site office people are not properly trained to do the kind of oversight they should be doing. And that is a major problem.

Mr. LANGEVIN. This question is more of the National Academy. A number of employees including the unions who provided testimony to the NAS panel, and at least one former lab director, have expressed concern that the private for-profit model is harming the

labs in that many senior scientists have chosen to leave. And production and research is driven by performance-based incentives.

The NAS report finds that the bureaucratic frustrations that are affecting all levels within the labs, "Are not traceable to the M&O [Management and Operating] contractor or contracts themselves, and found that the lab directors' primary objective remains to manage the laboratories in the public interest."

Do you feel that the criticism of some of these employees that the for-profit motive is harming the labs is valid?

Dr. SHANK. This is a very important concern. It is something that we took very seriously.

We asked the people who made those representations to us, give us examples. Give us data. Give us something other than feelings, because we cannot produce a report based on feelings.

So, we asked the question: Are the labs able to hire and retain people?

The retention rates before the contract change and after the contract change were both 4 percent. They have not changed at either Livermore or Los Alamos. So, we have not seen a change in retention.

There is an issue of cost. The cost of the contract is more.

But that is not the total increasing cost. There were costs due to a case in New Mexico having to do with the state gross receipts tax, which added $65 million, roughly $100 million for each laboratory. That has had an effect.

However at the same time that many of these things occurred when you changed the contract and the contractors, if you look at the actual contracts themselves, they are about the same.

And so, we could not identify a change in a contract that would lead to an issue.

But we do feel that the people who are running the laboratories before and after were the same kind of people, they did the job under the old contract, and the new contract. We did not see a difference in their behavior.

We asked Neile Miller were the incentives such that they were so large that they would distort the operational process. The reward for performance, or to some small narrow objective to get fee, seemed to be small enough not to greatly influence the lab directors.

The lab directors themselves told us they are focused on the public interest. And like all lab directors, they are "A" students and they want to do as well as they can.

They want to do the best job they possibly can. But the amount of money that is there is not the driving concern.

So in looking at this issue, we felt for this current set of lab directors and the current environment is not an issue.

But we do point out in the report that if these fees got to a level where it was driving what was going on in the laboratory, it could be a serious concern. And we said constant vigilance needs to be taken in looking at this to assure that the people who lead these labs do operate with the right set of incentives.

I should point out that Sandia Laboratories, which has a very high level of performance, has had a private contractor since its be-

ginning. So, the difference between private and not-for-profit is to us not a significant issue in the change.

Mr. LANGEVIN. So, next, what pressures, if any, result from a fee-based incentive system?

Dr. SHANK. The question is what——

Mr. LANGEVIN. What pressures, if any, result from a fee-based incentive system?

Dr. SHANK. A fee-based incentive system is designed to reward performance. And, a risk could be if the fee is so large and the task is not properly defined that you might accomplish the task, get rewarded the fee, and not perform the overall need for function of the laboratory.

A great deal of effort, I know, is involved in making sure that those incentives are properly directed. But if not properly directed, they could create a problem.

We did not see a problem that would drive behaviors for fee that would distort the actual value of those laboratories for the country. But it is a reasonable concern.

Mr. LANGEVIN. My last question if I could is: Has the privatization of the labs contributed to the loss of senior personnel?

I know you said that the retention rates were about 4 percent both before and after privatization, but what about senior level personnel?

Dr. SHANK. I believe that some of the labs—one, the move from the University of California's manager to the LLC, they no longer were employees of the University of California. And some people chose to leave because they were near retirement.

We asked for a list of significant people that have left the laboratory that affect the laboratory operation for the people who expressed that concern. We were not given information that was different than what we were able to understand.

We asked that from the labs, the lab directors, and from the people who made the accusations, or that expressed the concerns. We could not verify that on a major scale.

Mr. LANGEVIN. Thank you.

Thank you, Mr. Chairman, I yield back.

Mr. TURNER. Mr. Thornberry.

Mr. THORNBERRY. Thank you, Mr. Chairman.

I just want to ask about a couple of things.

Can you explain to me a little more what you mean by a lack of trust?

You know, over the years, a lot of the issues have been security-related issues. Where of course there had to be some change in security practices by necessity.

But is it primarily a chafing under the requirements for security?

Is it more about money oversight, or research priorities?

What is that lack of trust—how can you narrow that down a little more to explain from whence it arises?

Dr. SHANK. There has been a record of performance failures, more at Los Alamos than at the other laboratories that created a great deal of concern.

If we look back to some of the things that grow the idea of recompetition, there were issues. I believe an enormous amount of effort has taken place, specifically at Los Alamos, to try to upgrade, mod-

ernize their systems, create an attitude of understanding the importance of security, and attention to safety.

And enormous progress has been made there.

If you are in an environment where people have failed to live up to expectations, it is not surprising that that trust issue will carry over into the future.

We hope that increased performance, the laboratories will earn the kind of trust which would then lower the level of formality. But some of this has been earned, and some of this is probably as you described, chafing under regulations.

But I believe that some of the mistrust has been earned. But there also has to be an opportunity to earn that trust back.

When you manage somebody that you don't trust, you put a whole set of restrictions and requirements. If you read 7,000 requirements, it is because I really don't trust what you are doing.

If I trusted what you are doing, I would begin to look at your outputs, and sample and audit what you do, and have you work with national standards as opposed to a step-by-step transactional oversight.

That has to be earned. That is the salvation of actually making this whole system work. It is really fixing that interface and that relationship.

No change in contract will fix that. It really is working at that relationship issue.

Mr. THORNBERRY. One other issue, you mentioned several times in your all's report, LDRD [Laboratory Directed Research and Development]. And I have had lots of debates in this room over the years, usually with people on my side of the aisle, about what percentage of a laboratory budget the director could direct according to merit.

Is that a major issue or a small issue?

Is it symptomatic of this larger question of overregulation from NNSA or is that just one of the consequences of this lack of trust?

That there has not been the amount of discretion that the laboratory directors had in the past to manage new projects.

Dr. SHANK. There are two issues there.

There is one, the LDRD, which is an approved program. It's one that remains the key tool for developing new scientists and associated science that is important to the laboratories.

Recognize that physicists are not trained in weapons design at universities. When they come to the laboratory, having an opportunity to work with some very closely associated science, gives them an opportunity to develop these scientists.

And if you look at some examples given in our report where people have worked on LDRD and ultimately became part in leadership, some of the leadership back here probably began with LDRD—a very important piece.

We also point out in the report that a restrictive—changes in the budget categories, narrowly defining budget categories, has removed the ability of the laboratory to do what they once did historically—was to have a larger fraction of their budget to actually have scientific programs and create a robust core weapons research program.

That may be a whole range of issues. I don't know what the motivations are. But they no longer have that additional flexibility.

So, it is left with LDRD.

So, LDRD is very important. But the lack of flexibility has come from the description of more, what are called B and R codes that really restrict what the laboratories can do with the funding.

So, both of those are issues.

Dr. CURTIS. I am going to take a little risk in responding to this question. I think over the years the Congress has been appropriating money in smaller and smaller packages which restrict the latitude of those charged with the administration of the laboratories and programs, to respond to the dynamic and the change in their programs as they develop.

I think at the root of that is that the Congress doesn't trust the administrators, NNSA, and the laboratories sufficiently.

LDRD is in essence an account that the laboratories administer without prior definition or instruction.

Congress has not liked that for a long time. But they recognize the value that it has produced for the laboratories and the conduct of this mission.

But the two things are in tension.

It is a highly valuable ability for the laboratories to develop talent, to recruit to the laboratories, and to—over time it accomplished their mission.

But it always makes the Congress uneasy because they are controlling the purse as some view with sufficient direction, as they feel they are responsible to do.

I think the Congress should go the other way. I think they really need over time to appropriate in larger packages of money. And give more trust, confidence, and latitude to those that they are depending upon to do the job, especially when you are dealing with vital national security issues.

Mr. THORNBERRY. Thank you.

Mr. TURNER. Thank you.

Mr. Larsen.

Mr. LARSEN. Thank you, Mr. Chairman. On the last point, there is a glare there, I can't—Dr. Curtis, Mr. Curtis, Honorable Curtis, Dr. Shank, with regards to this issue of B and R codes, is it, what does that stand for, B and R?

Mr. LARSEN. Budget and reporting, B and R codes. Okay.

Did NAS actually evaluate and conclude that NNSA should not be making changes to B and R codes?

Or are you just saying that's a problem?

Did your study make a recommendation or make a conclusion on it?

Dr. SHANK. We heard from the laboratory directors in testimony, they no longer had the flexibility to do the kind of research programs they have done historically, because of the narrowly described budget codes——

Mr. LARSEN. Did you conclude——

Dr. SHANK. I——

Mr. LARSEN [continuing]. That that was a good thing or bad thing or make any decisions—make any determination about that?

Dr. SHANK. Well, from the perspective of our report, which was to look at science and engineering, we saw less science and engineering, fundamental science, taking place at these laboratories than maybe you would have seen 15 or 20 years ago, and that has come about because of this set of restrictions.

I think the detailed impact of that is best asked to the next panel who will describe what that has meant to them in terms of their core research capability.

Mr. LARSEN. Great, I will do that.

So, what should we care about the labs doing? Did you conclude that?

Make any conclusions about what we, as members of Congress, what should we care about the labs doing?

Dr. SHANK. Well, I think you should care that they are accomplishing——

Mr. LARSEN. I am sorry.

And what did you conclude in your study? I want to be more clear about—so, you are commenting on the NAS study.

What did the study conclude about what Congress should care about what the labs are doing?

Dr. SHANK. From our study what Congress should care about would be that the laboratories be permitted to execute their mission responsibilities in a cost-efficient, safe, environmental, and responsible way.

Mr. LARSEN. But you also said that one of your recommendations is that this committee, presumably Congress, should endorse your committee's recommendation that the maintenance of the stockpile remains the core mission of the lab.

Is that about right?

Dr. SHANK. Absolutely correct.

Mr. LARSEN. So, what activities would the labs give up or what would become secondary if that were to be the case?

Dr. SHANK. Well, the maintenance of the stockpile is the core issue——

Mr. LARSEN. Right——

Dr. SHANK. In order to actually achieve that issue, we felt the new four-agency governance model gave the laboratories the opportunity to develop science and engineering capabilities that they would not be able to form under current austerity conditions.

So, that enables their core activity by being able to work in these broader arrangements where you now think of them more in national security laboratories, so they serve national need in a broad range of areas.

But in the end, their primary responsibility, their core responsibility, is maintenance of the stockpile.

Mr. LARSEN. Perhaps the directors, when they come up here and get prepared for the question, and just maybe make it part of your testimony about the relationship between the austerity—the lack of dollars, or the lack of the dollars you want, and the impact that that has on what you want to do versus the management issue.

If there are some ways we can sort of separate those things a little bit, so we are attacking the right problem.

Is the management structure between NSA and DOE and the labs on target?

And this gets back to Mr. Thornberry's work of the late 1990s and early 2000s about trying to find just the right relationship.

You make any recommendations on that to the study?

Dr. SHANK. We expressed a concern about the relationship. We did not make a recommendation how to redefine or reorganize the national—or the DOE and NNSA.

Mr. LARSEN. Right.

Just a moment, Mr. Chairman, sorry—oh, yes, this issue of trust.

Can you give me some specifics?

So, I want to talk about trust and the lack of it. But even from reading your report, it sounds more like a management discussion about trust as opposed to, here are the specific problems.

Here is who we don't trust. Here is what we don't trust. Here is why we are not being trusted.

And it comes across frankly, by complaining about trust as opposed to here are some actual circumstances where we feel we are not being trusted or the actions being taken by NNSA show they don't trust us.

Dr. SHANK. Let me give you an example that really had an impact on me.

At one of the laboratories a young woman was hired. She was setting up her laboratory. Her laboratory required an optical bench, which floats on an air cushion.

She spent a week determining—answering the question whether the table would blow up before she would be allowed to inflate the table.

No other laboratory in the country would have that level of formality of operation to require to be able to do that.

Why did this occur?

If I trusted the laboratory to be able to have a system in place to actually be able to operate facilities without a step-by-step-by-step requirement, exhaustive requirement, it would be quite different.

Similar work done at one of these national laboratories ought to be the same as it was at Bell Laboratories, where I was when I grew up as a scientist, or IBM Laboratories today.

They should be operating the same way. They do not.

The cost overhead of the excessive formality is a major impact. And, the real concern to us when we listen to young people, it really is creating a bias about how long do I need to invest my career in experimental work at one of these laboratories because of this burden.

So, we pay a cost for that excessive formality.

And a way in which, if you trusted the organization, you would have a certified system of how you operate the laboratory. And you'd audit the system.

We audit and give orders and instruction for every motion.

Mr. LARSEN. Thank you, Mr. Chairman.

Mr. TURNER. Dr. Shank, thank you for concluding with that very impassioned description.

You know, from my community, Dayton, Ohio, came the Wright Brothers who brought us into human flight. And I can't imagine what the rules and regulations would look like if Government had to tell them how they should have done their experiments.

We might all still be on trains.

So, gentlemen, thank you so much.

We are going to turn to our second panel.

We are very lucky to have Dr. Michael Anastasio, director emeritus, Los Alamos National Laboratory, director emeritus, Lawrence Livermore National Laboratory.

We have Dr. George Miller, director emeritus, Lawrence Livermore National Laboratory. And Ambassador C. Paul Robinson, director emeritus, Sandia National Laboratories.

We'll pause for a moment as we have a shift between the first panel and the second panel.

But we are very glad to have them here.

Gentlemen, we want to thank you all for being here. You have prestigious careers as heading the NNSA labs. We appreciate you taking the time to share your insight with us.

And we will begin with Dr. Anastasio.

STATEMENT OF DR. MICHAEL R. ANASTASIO, DIRECTOR EMERITUS, LOS ALAMOS NATIONAL LABORATORY; DIRECTOR EMERITUS, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. ANASTASIO. Thank you, Chairman Turner, and other members of the subcommittee.

I appreciate the opportunity to testify today. And I just want to put a disclaimer in that my remarks are going to be my personal views and not the views of any of the laboratories or any of the other organizations.

And during my career I have witnessed many historic events and dramatic changes in the National Security Enterprise, yet the laboratories' dedication to mission and quality of science has remained.

However, the future of an age of austerity, as you pose it, is really—raises significant near-term and long-term challenges to a high quality science and engineering mission effectiveness.

So, I want to spend a minute or two discussing these challenges. And then in my written testimony, I have made some modest recommendations.

I think the first point is the context in which the Nuclear Security Enterprise operates. There's lots of issues that drive my concerns.

There was a great bipartisan agreement that was satisfying for me with the Nuclear Posture Review in 2010 and the accompanying budget plan, the 1251 report.

But already the consensus around that is wavering. And inevitably that's going to lead to differing expectations of the enterprise and an inability to set and carry out priorities consistently over time.

And as the financial pressure mounts, that's going to exacerbate these problems.

Second is that the external entities who peer into NNSA also drive concerns, because they generate a significant risk aversion within NNSA. When they get criticized from external bodies, they become risk-averse. And that manifests itself in a lack of trust of the sites. We should make sure that we don't do anything that

causes an embarrassment of the NNSA. And, that generates a growing focus on compliance at the expense of delivering on the mission.

My experience at Los Alamos, as I think about oversight and management, is instructive for me in considering how to handle the enterprise-wide problem.

And at Los Alamos, we were able to increase the effectiveness at the laboratory in delivering its mission, while at the same time absorbing over $225 million per year of new costs.

However, it is going to be hard for my successor to make further gains because there is continued growth in unfunded requirements and transactional oversight.

There is an inexorable trend toward ever deeper involvement and direction of how activities are done, rather than evaluating the outcomes and see if they meet expectations.

At the same time, new directives and new interpretations of directives are promulgated from both the NNSA and outside organization like the Defense Nuclear Facilities Safety Board, to drive down operational risk and demanding more and more paperwork to demonstrate compliance.

And, those who establish the requirements don't have responsibility for the program. And, those who are responsible don't really know what is going on in the field.

Safety and security, environmental protection must be paramount. However, we need to have a balanced program and balance risks across all activities, so whether that's mission accomplishment to operational excellence.

We really need to strengthen that balance across the enterprise.

And so, let me end with my long-term concern which is for the health of science at these institutions.

And already, we have seen some anecdotal evidence that the environment we are working under is driving away some of our best mid-career scientists. And, as we confront the financial pressures, I am concerned that it's going to force program modifications that will lead to impacts.

And, history would suggest that those impacts are going to fall disproportionately on science and engineering in order to protect the near-term milestones of the program.

And, if that happens, then we run the risk of losing the capabilities of these world-class organizations. And we may not be able to recover.

So, let me stop there.

Thank you, Mr. Chairman, I will be happy to answer any questions.

[The prepared statement of Dr. Anastasio can be found in the Appendix on page 75.]

Mr. TURNER. Thank you so much.

Dr. Miller.

STATEMENT OF DR. GEORGE H. MILLER, DIRECTOR EMERITUS, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. MILLER. Thank you very much, Mr. Chairman, and members of the subcommittee for the opportunity to provide my comments on this important issue. And more importantly, thank you for your

long-term support of this critically important program to the country.

Based on nearly 40 years of watching this enterprise and leading Livermore for the last 5 years, I would like to summarize five main points.

First of all at the top level, there's a lot of very positive outcomes that I think the Congress and NNSA and the country should be proud of.

The laboratories still have extraordinary people, Stockpile Stewardship is working, and we have the capabilities of these laboratories being more broadly applied to the problems facing the country.

And in fact, Secretary Chu and Mr. D'Agostino have recognized the need for governance reform.

I also believe that right now the U.S. faces enormous challenges for which science and technology has the ability to contribute significantly. And, we cannot afford to waste a single precious dollar or precious science technology and engineering resource on bureaucratic inefficiency.

In my view, the laboratories are under severe stress in their ability to perform these missions. And they are increasingly constrained by the manner of the Federal oversight and the way in which it is implemented.

There's been a lot of discussion this morning already about transactional oversight in which individual activities are monitored rather than process oversight, which looks at the system and the performance.

I will give you two ways in which you can look at this.

At each of the NNSA sites, there are typically more than 100 Federal officials on site to watch on a daily basis what we do. If you go to the Jet Propulsion Lab, it's less than 30. They have a budget approximately the size of Livermore, actually slightly less.

If you go to the way the—within NNSA, the way naval reactors operates, you see only a small number of people.

Another example is the oversight of our safety, health, and environmental programs. At Livermore the plan for 2012 has more than 1,000 audits and inspections in the plan. In addition to that, there are hundreds of self-assessments by the laboratory itself.

To contrast, the best commercial practice is startling. We have been on a path at Livermore for several years to implement the international standards, both our environmental systems, our safety systems, and our quality control systems.

The process of maintaining those systems typically requires one audit a week and a few people. This, in my view, across the complex amounts to hundreds of millions of dollars, perhaps upwards of $0.5 billion in cost inefficiency.

As we have said many times this morning in the first panel, and I am sure we will talk about it again, in my view, the issue is the fundamental breakdown in the relationship between the Federal Government and the laboratories—the principal reason that the federally funded research and development centers were formed in the first place.

In a very tangible way, I think of this in a sports analogy.

We are all engaged in the game. And our game is national security. That's why we do what we do.

The referees are important. The referee is the contract. But the referee is not the game.

And, I think it is important that we focus on why we are here.

Trust is often used—I think trust is a good word. But unfortunately, it has a lot of emotional overtones. I think it is important to understand when I use that word, what I mean by it.

And, it's really a recognition that each of the partners has an important and very distinct role to play. It's important that we have a mutually respectful relationship in which that relationship can be borne out and focused on the accomplishment of our job, which is national service.

I think there are a number of positive actions that can take place to move us back towards the partnerships that have served the country so well.

Again, my summary, the country is facing major challenges. And we cannot afford, in this environment, to waste a single bit of our science and technology and engineering talent on bureaucratic inefficiencies.

I would ask you to think of three things as you summarize this hearing.

We need to work on restoring trust. We need to eliminate transactional oversight. And we need to turn over management of these institutions to the organizations that were hired to manage them.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Miller can be found in the Appendix on page 80.]

Mr. TURNER. Thank you.

Ambassador Robinson.

STATEMENT OF AMB. C. PAUL ROBINSON, DIRECTOR EMERITUS, SANDIA NATIONAL LABORATORIES

Dr. ROBINSON. Thank you very much. It is a pleasure to talk about an issue that I have been watching for 45 years——

There we are. Thank you.

I've been watching this problem for 45 years and it only gets worse. It is a system that is truly broken.

I would like to start at the beginning.

When the need for a Manhattan Project was seen—Leslie R. Groves, the guy who built the Pentagon, and was at the Army Corps of Engineers, was asked to be in charge. They knew it was going to be a big project.

He was given advice by the scientific leaders at the time, gee, be careful, Governments have no track record, no positive track record whatsoever about handling projects of research and development. And particularly anything that requires innovation Government will slow it down or block it completely.

They also wisely decided not to draft all the scientists, which was one of the suggestions on the table. But in the end, asked if the University of California would manage the scientific effort for the Government, and that is the GOCO, Government-owned, contractor-operated, was born.

Now, one of those advisors was James Conant, one of the top science advisors to President Truman. He was asked once what can our country do to really get those benefits of science from the Manhattan Project, and keep them going forward to propel our country in the future?

He said, I think the best thing that we can do is choose men and women of brilliance, back them heavily, then leave them alone to do their work.

Now, if there is anything you cannot accuse this system of, it is leaving people alone to do their work. The bureaucratic obstructions that started as with every 5 or 6 years you could see it increasing dramatically under the Atomic Energy Commission, until people said, gee, that's just not working.

It then became, for 3 years, the Energy Research and Development Administration, and then the Department of Energy, and this latest change was NNSA within the Department of Energy.

How bad has the oversight gotten?

And, let me use a different word for oversight that is more common, I think, at all three labs. The micromanagement is killing us.

And, you're right. People are not ready to do those jobs. And the Government keeps growing and growing and growing in size.

Just look at the plod. They outnumber us enormously now. And they seek to find roles to keep busy.

And this is a surprise. I hope you have heard of this. But to me it was one of the biggest wake-up calls I ever had when my first laboratory director, Harold Agnew, who was a noted scientist, rode in with the bombs at Hiroshima.

He was a physicist trained by Enrico Fermi. He was appointed lab director and was going to do it for 10 years.

He left early and said I am just completely frustrated.

He said I know you can't fire people anymore, but could you please just not let them come to work. And the rate of science productivity and the inventions and things that we can harness for the security of this country going forward will go up at least a factor of three instantly.

Now that was 30 years ago. It's gotten a whole lot worse since. And, I say in my testimony, it is time you have got to take a tremendously strong action.

Bureaucracies never reform themselves. The cost structure is just enormous for all the overhead activities.

You are required to do what-if exercises before you can do anything. And, it is frustrating.

Now, I am pleased to tell you we hit on a wonderful way to make sure we are still hiring the best people. We have the professors at the best colleges, 33 strategic universities, finding the best students for us and saying, gee, you know, you need to come to Sandia and work.

And, we bring them in. And, they cannot believe the constraints that they are being asked to work under.

I believe—well, one of the big reports that you can now read online was "Science the Endless Frontier," which was written to summarize after World War II all the great science that had been done and accomplished, including in the Manhattan Project.

It said we've got to pay attention to frontier science and move it forward if the country is going to maintain its lead.

Things are at stake over what's been allowed to happen. And, I agree with these gentlemen. I think we are going to lose the capability overall unless major changes come.

I suggested to you the time when it flourished the best, it was under the Department of War, now the Department of Defense. They cared about what the answer was, the missions. They are the people who have to use those weapons that we design.

They cared about the answer. No one in the present system seems to care about the mission.

It is, How are you doing all of your trivial chores? That's what we want to look at.

I believe that it is time to move it to the Department of Defense, which is now a civilian institution which was the reason it was not placed there originally. And, we have had 60 years of it being a civilian institution. And, I believe the change in leadership would be dramatic enough to stop this nonsense and get us on a better path.

Thank you.

[The statement of Dr. Robinson can be found in the Appendix on page 91.]

Mr. TURNER. Well, thank you all for being frank and specifically, the ambassador for his passion there at the end.

And Dr. Miller, when you presented your testimony you said, "presently the NNSA laboratories are under severe stress in their ability to perform their vital missions because they are substantially and increasingly constrained by the manner in which Federal management and oversight is implemented.

I believe the impact is well in excess of hundreds of millions of dollars of work per year across the complex."

A 2001 study by DOE's Lawrence Berkeley National Lab suggested that implementing streamlining of administrative and operational requirements would allow labor reductions and cost avoidances between 10 percent and 30 percent in net resource savings would be realized. The resources saved in administrative and operational support areas could be immediately applied to critical mission and institutional needs.

This is serious money. And, the money could be going to accomplish the mission as all three of you are focusing on.

Can you give examples of where you might find these cost savings?

What do you think Congress could do to change these inefficiencies and what do our other witnesses think?

I think it is so important that—and when you guys were giving your descriptions, you keep going to the issue of the mission. You know, everyone is for environmental safety. Everyone is for security and safety in the processes.

But, innovation and the mission is what is so important. And, if we are focusing on one or the other, we are certainly costing the ability for innovation.

Perhaps, we could begin with Dr. Anastasio.

Ideas of efficiencies, cost savings, and other items that you might wish to identify. We are seriously looking at a to-do list for this upcoming bill. And, your participation is so important.

Dr. ANASTASIO. Well, Thank you, Mr. Chairman.

I would suggest, my experience in the laboratory, when I tried to do this internally because of course the laboratories suffer from bureaucracies just like everyone else, and to try to meet that challenge internally.

I found that the only way to attack this problem is to reduce the budgets—reduce the dollars available to do indirect activities.

And you have to enforce that by reducing the number of people who are doing that. You can't just take the money away, because then the people have to go do something else. And they will find another way to—

So, it is really—reduce the budget and number of people who are engaged in oversight and indirect activities. That doesn't mean not do oversight, because I agree with Mr. Aloise that doing oversight a different way is what we really need to do.

And, not transactional as we have all said, but do it in a performance-based way. And, there are plenty of accountability mechanisms in place already with our new contracts to hold us accountable, because we should be accountable.

But, do it in a way that doesn't audit every—and there is just so many examples of counterproductive things.

When we had a computer—security problems at Los Alamos, one net result is for many tens of computer systems, we had to write many, many hundreds of pages of security plans on how we are going to protect those systems.

And, we spent 18 months writing thousands of pages of documentation. And at the same time, the security threat as we all read in the newspaper from cyber is changing every hour.

So, how could 18 months' worth of paper, you know, make you more secure? Actually, it makes you less secure because the people who are writing the documents should be the one who are figuring out how to protect us.

Mr. TURNER. Dr. Miller, anything you want to add to your previous comment?

Dr. MILLER. Yes, again, I think this is a terribly important issue. I agree very much with Mike's comments. And they are echoed in my written testimony.

Again, the example that I use is the integrated number of Federal onsite—the integrated Federal onsite presence across the complex. If you compare that to any other Federal model, you know, Jet Propulsion Lab, applied physics lab at Johns Hopkins, you know, the way the Navy Strategic Security Program operates their plants, which do high explosives.

I mean, that is where the huge leverage is in my mind.

And the way you do it is again, as I suggest, for many of our activities the core environmental activities, the core safety programs, the core quality programs, there are international standards to which every business in this country, that wants to really stay in business, that's the way they operate.

And they are process-oriented, rather than transactionally oriented ways of doing oversight.

Mr. TURNER. Ambassador.

Dr. ROBINSON. Let me take on the example of safety as well.

You would think that the labs must be bad performers in safety. That's not the case.

All of the labs have had excellent overall statistics. They would rank better than any industrial organization in similar work.

And so you ask, well, why is the Department of Energy, which kept safety—as I say in my testimony that was a direct violation of the NNSA legislation which said nothing was supposed to be governed directly from DOE, but through NNSA.

Safety and security organizations were never given the responsibility of NNSA, but people, not even associated with the mission do that.

Now, the costs of doing safety are enormous. But yet the attention that one would get if you were out in industry or at university would be very, very little because your performance was so good.

So, performance statistics ought to be driving what level of oversight you have earned. It does not within the current system.

And, the costs go up, not only the costs for doing safety which is an end in itself within the Department of Energy, but the lost time of people having to—before they can take any experimental action, writing for months.

I did have one other mental picture I wanted you to carry away. When we put all of the Department of Energy rules and orders together in a bookshelf—they are bound in documents—it was four shelves high and four feet wide of thousands and thousands and thousands of pages.

And we challenge anyone to open up at random, as many times as they would like, and read and see if you thought anything contributed to safety from all the effort that had been put together in writing those rules and orders.

Mr. TURNER. Thank you. That is great, I think, visualization of part of the problem.

Dr. Anastasio, your statement mentions the Defense Nuclear Facilities Safety Board, DNFSB, as contributing to the burdensome oversight of the NNSA enterprise.

Would you please explain how could we ensure that DNFSB is able to conduct thorough effective and value-added safety oversight of nuclear enterprise?

And, what other thoughts do you have with respect to how to remedy that obvious problem?

Dr. ANASTASIO. I think a simple idea in my mind for whether it is the DNFSB, or NNSA itself, or DOE, or anybody else who's imposing new requirements, that we ought to require that those requirements are accompanied ahead of time with a cost benefit analysis.

Which is, okay, so there is no—everybody is going to want better security or better safety and so forth. But a question is how do you balance that risk against the risk of not being able to accomplish a mission, but a risk of losing the science capability to do your future work.

So, those are all risks that are all important. And so, a good manager, and an effective organization, has to balance all those risks against each other. And you have to keep them in balance. That's what a lab director has to do as well as anybody else that runs and organization.

And so, you have to go evaluate to make a change here, how does that affect everything else that goes on? And how do I keep all these things in balance?

And right now, the system we have is the people who are looking at the operational issues, whether it is the Defense Board or anybody else, you know, are not required to look at that balance. They are just required to focus on the one issue that they are responsible for.

And to get that integrated view of the balance, that is the thing that is missing. So, requiring some kind of cost benefit study, it's not just about dollars.

But to force the system to think, what are the impacts? Is it worth this extra bit of safety to have this other impact on my effectiveness on executing the program?

Mr. TURNER. No, I appreciate—one of the things that we can never quite capture in a cost benefit analysis is an "innovation lost cost." Because the——

Dr. ANASTASIO. And if that—excuse me, Mr. Chairman, and if that was in a—you know, we don't do the cost benefit at all.

Mr. TURNER. Right. Right.

Dr. ANASTASIO. And so——

Mr. TURNER. Right, so, on a cost——

Dr. ANASTASIO [continuing]. Following down that path in my mind would——

Mr. TURNER. Right——

Dr. ANASTASIO [continuing]. Be something that would be useful.

Mr. TURNER. We want our brilliant people to be doing brilliant things, not menial tasks as you have all been pointing out.

And, I know that that is part of what you have nurtured as directors. And, we certainly hope to use your expertise so that we can unleash that innovation once again.

Turning then to Mr. Larsen.

Mr. LARSEN. Thank you, Mr. Chairman.

I'll just have a few questions and head over to the Navy Posture hearing here in a few minutes.

So, I won't take my 3 minutes or 5 minutes to whatever we have, but thanks for coming. It is good to see you all again, even in this circumstance.

I would note that it was said earlier that there is no morale crisis at—the previous panel said they, in the report, found no morale crisis at the labs despite the increasing costs.

I can tell you the increasing cost causes me a morale crisis. And so, we will have to hopefully look into that.

Yeah, one of the basic questions has to do with the management structure. Again, we have dealt with this in the last 2 years or 3 years, so our last—really focused our hearings on this.

The NAS didn't seem to, you know, didn't seem to say you needed necessarily to change the management structure, the one we have been struggling with. Is that part of the issue here or not?

Or is it changes within it that need to be——

Dr. MILLER. Yeah, I mean, I think that each of the different management structures that you can consider autonomous—semi-autonomous would have an agency (?).

Each one of those has strengths and weaknesses which I know that you will carefully consider.

My view, the fundamental issue is the one we have been discussing. And that is the internal relationship, you know, which we have characterized as trust. That is the fundamental issue.

If you have that, in my view, any of the relationships can be made to work.

Mr. LARSEN. Yeah.

Dr. ANASTASIO. My view also is that we talk about trust. I would like to use a different term which is behaviors. It is about the behaviors of people.

And, I think the National Academy pointed out, if you read the contracts we have, the new contracts——

Mr. LARSEN. Right.

Dr. ANASTASIO. There is nothing egregious in those contracts. It is the way that the people who are involved interpret what the contract says.

And, they use that interpretation. And it is the behaviors of the people that drive behaviors in the workforce inside the laboratory who become risk-averse as well.

And so, it just compounds itself. And, that is the source of the problem.

So, you have to find a way to change the behaviors of people. And, if you can't do that, the structural changes are not going to matter. In effect, they will hurt things because I went through a process at Los Alamos of changing contracts. And let me say, that was very distracting to the workforce.

You know, it was very distracting to our ability to accomplish missions. So, going through that change someone else can evaluate whether that was the right or the wrong thing to do.

But let me say, it was very disruptive. And, it took several years for us to get focus back on the fundamental issues.

So, if you go through change, you better be sure that the outcome is going to be worth, you know, the disruption that it causes.

And for me, unless you tackle the behavioral issues of everybody—and it is not what the leadership says only, it is how does that leadership commitment translated down to the workforce at the working level, and is there alignment of that whole organization——

Mr. LARSEN. Yes.

Dr. ANASTASIO [continuing]. To accomplish the same thing. That behavioral part is key to making these kinds of changes.

Mr. LARSEN. I will just note Ambassador Robinson's testimony is very clear in seeking a full change in the management structure, and taking it out of DOE, putting it into DOD as an independent agency.

So, I will leave it at that.

And just one last question: One of the recommendations is to rebalance the relationship, sets of principles, and laying them out in an MOU [Memorandum of Understanding] between NNSA and its laboratories.

Does something like that not exist now?

Is there not a defining document that says this is how we will relate to each other?

Dr. ANASTASIO. Not that I am aware of.

Mr. LARSEN. Would it be helpful?

Dr. ANASTASIO. I think it's important to have, as Dr. Miller said, clear sense of roles and responsibilities that each of us have.

You know, what is our job? What am I supposed to do? What are my authorities?

What are my responsibilities for as a lab director, as a Federal workforce and so forth, and have that clear and then hold each other accountable to carry that out.

I think that is very worthwhile.

I think it is also true with Congress. And, how is that relationship with Congress? And, what are each of our roles?

And, I would harken back to a comment someone else made earlier which is the number of budget control levels are also restricting our ability to be effective managers at the sites because budgets are developed at best 18 months ahead of time before you get the budget.

Priorities clearly change in that period of time. And yet, it is very hard for us to respond to those changes in priorities. So, there is a number of issues like that.

Mr. LARSEN. Thank you, Mr. Chairman.

Mr. TURNER. Gentlemen, before we end the hearing, I have one more question that I would like to ask of you that if you would please answer in writing in the next week or so to our committee staff. And we'll, of course, provide it to you in writing also, but to include it in the record.

Many studies and reports over the past 10 years, including the 2009 Strategic Posture Commission, recommended eliminating duplicative NNSA and DOE regulation of any lab functions that are already regulated by external bodies, such as health and occupation safety, by the Occupational Health and Safety Administration, OSHA, and letting these external bodies regulate and oversee those regulations.

I would like to know if you agree, if you see cost savings that might be realized by such a move.

Why hasn't this done before now?

And is there anything else that in that question that you see in your insight, that we need to know and take into consideration?

I would like to thank both our first and second panel, both for your commitment and dedication to these issues, your time today, and what I am sure will be a continued dialogue as we try to struggle with this issue in looking to put together this year's National Defense Authorization Act where we hope to have provisions that relate to this issue with your assistance.

Thank you all.

[Whereupon, at 12:55 p.m., the subcommittee was adjourned.]

A P P E N D I X

FEBRUARY 16, 2012

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

FEBRUARY 16, 2012

Statement of Hon. Michael Turner

Chairman, House Subcommittee on Strategic Forces

Hearing on

Governance, Oversight, and Management of the Nuclear Security Enterprise To Ensure High Quality Science, Engineering, and Mission Effectiveness in an Age of Austerity

February 16, 2012

Good morning. I want to welcome everyone to today's hearing on Governance, Management, and Oversight of the Nuclear Security Enterprise in an Age of Austerity.

Everyone here knows that this is a very busy week on Capitol Hill: budget request week. This hearing is not like most of the hearings that are taking place this week, in that it isn't looking directly at a particular agency's fiscal year 2013 budget request. However, it is a hearing that has major implications for the future of the National Nuclear Security Administration (NNSA) and, therefore, its budget. This hearing will examine long-standing, well-documented, and fundamental concerns with the way NNSA manages its labs and plants—problems that are unnecessarily costing taxpayers many hundreds of millions of dollars each year and impeding NNSA's ability to accomplish its mission. In today's fiscal environment we cannot afford such inefficiency and waste—particularly when we're seeing major cuts to the pledged nuclear modernization funding in this year's budget request.

In 1999, Congress passed the NNSA Act, which broke out NNSA as a "semi-autonomous" agency within the Department of Energy (DOE). Driven by this subcommittee—and in particular by my friends Mac Thornberry and Ellen Tauscher—this legislation sought to address major mismanagement and security problems at DOE. In particular, a 1999 report by the President's Foreign Intelligence Advisory Board spurred Congress into action, saying DOE was a "dysfunctional bureaucracy that has proven it is incapable of reforming itself."

An earlier report by the Galvin Commission "revealed a counterproductive Federal system of operation" for DOE's national labs, saying "the current system of governance of these laboratories is broken and should be replaced with a bold alternative." The Galvin Commission noted that problems included "increased overhead cost, poor morale, and gross inefficiencies as a result of overly prescriptive Congressional management and excessive oversight by the De-

partment," and "inordinate internal focus at every level of these laboratories on compliance issues and questions of management processes, which takes a major toll on research performance."

NNSA was created to address these problems and enable the nuclear security enterprise to be more effective, more focused, and more efficient. Twelve years after the creation of NNSA, the question for this hearing is: Has it worked? Have these problems been addressed?

To prepare for this hearing, I asked the committee staff to put together an overview of the many reports in the past 10 years that have examined NNSA's management and governance of its labs and plants. It's not an exhaustive list, but it is illustrative of what various assessments have found over the decade NNSA has been in existence. I ask that the hearing memo prepared by the staff be entered into the record.

I want to quote from just a few of these myriad studies the staff reviewed. Here's a finding from a 2009 assessment by the Stimson Center, which was paid for by NNSA itself:

> *"The implementation of the NNSA Act failed to achieve the intended autonomy for NNSA within the Department of Energy. The Labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well."*

And here are a few quotes from the bipartisan Strategic Posture Commission's report in 2009:

> *" . . . the governance structure of the NNSA is not delivering the needed results. This governance structure should be changed . . . In [the Commission's] view, the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being. It is time to consider fundamental changes."*
>
> *"Despite the efforts of thousands of dedicated and competent civil servants, Federal oversight of the weapons enterprise needs significant improvement . . . The NNSA was formed to improve management of the weapons program and to shelter that program from what was perceived as a welter of confusing and contradictory DOE directives, policies, and procedures. Despite some success, the NNSA has failed to meet the hopes of its founders. Indeed,* ***it may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate*** *. . . "*
>
> *"The leadership of all three weapons laboratories believes that the regulatory burden is excessive,* ***a view endorsed by the Commission****. That burden* ***imposes a significant cost and less heavy-handed oversight would bring real benefits*** *. . . "*

Reading these reports, the pointed criticisms about excessive, ineffective, and unnecessary bureaucratic processes and confused and redundant management relationships sound eerily similar to the reports that spurred the creation of NNSA in 1999. So the answer

to my earlier rhetorical question appears to be: "No, NNSA hasn't worked as intended, and many of the same problems remain."

But we have our witnesses here today to help us understand if that answer is correct. On our first panel, we have gentlemen representing two distinguished organizations that have spent considerable time examining NNSA management and oversight of the nuclear security enterprise. They are:

Dr. Charles Shank
- Co-Chair, National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories
- Senior Fellow, Howard Hughes Medical Institute

The Honorable Charles B. Curtis
- Member, National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories
- Senior Advisor, Center for Strategic and International Studies
- President Emeritus and Board Member, Nuclear Threat Initiative
- Former Deputy Secretary of Energy, 1994–1997

Mr. Eugene Aloise
- Director, Natural Resources and Environment, Government Accountability Office

Dr. Shank and Secretary Curtis are here to present the results of a National Academies of Science study that was mandated by this subcommittee in the FY2010 National Defense Authorization Act. In the conference report accompanying that bill, the conferees explained that the study should provide "an even-handed, unbiased assessment of the quality of the scientific research and engineering" at the labs and an assessment of the "factors that influence" such quality. I understand that the portion of the study that was recently completed—and that we'll be discussing today—focuses on the latter: management-related factors that influence the quality of science and engineering at the labs.

I will let Dr. Shank and Mr. Curtis speak to their report, but I want to highlight a few of their study committee's findings:

> *"In the view of this committee, the relationship between NNSA and its [labs] is broken to an extent that very seriously affects the Labs' capability to manage for quality science and engineering. There has been a breakdown of trust and an erosion of the partnering between the Laboratories and NNSA to solve complex science and engineering problems; there is conflict and confusion over management roles and responsibilities of organizations and individuals."*

The National Academies' report also finds that the level of detailed, transactional-level management and oversight that NNSA applies to the labs is causing significant inefficiencies and risking the quality of science and engineering at the labs, saying:

> *"There is a perception . . . at the three Laboratories that NNSA has moved from partnering with the Laboratories to solve scientific and engineering problems, to assigning tasks and specific science and engineering solutions with detailed imple-*

mentation instructions. ***This approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased****. The study committee found similar issues in transactional oversight of safety, business, security and operations. Science and engineering quality is at risk . . . "*

Our first panel of witnesses also features Mr. Eugene Aloise from GAO. Mr. Aloise and GAO have spent decades examining NNSA and DOE Defense Programs before it. I understand GAO continues to have major concerns about the inconsistency and inaccuracy of NNSA's management and cost data across the enterprise. I hope you will help us understand what is causing these chronic problems and what actions NNSA or Congress could take to address them.

Finally, our second witness panel is comprised of three former directors of the NNSA laboratories, who have been asked to share their direct experiences leading and managing the organizations responsible for carrying out NNSA's mission within the management and oversight processes, procedures, and structures set up by the Federal Government. They are:

Dr. Michael R. Anastasio

- Director Emeritus, Los Alamos National Laboratory
- Director Emeritus, Lawrence Livermore National Laboratory

Dr. George H. Miller

- Director Emeritus, Lawrence Livermore National Laboratory

Ambassador C. Paul Robinson

- Director Emeritus, Sandia National Laboratories

These gentlemen bring a wealth of experience to our witness table, and I hope they will share that experience by reflecting on the findings and recommendations of the National Academies report and the GAO. I also hope they will share any concrete, actionable recommendations they have for improving governance and management of the labs.

Let me say that we all need to recognize that, alone, simply moving boxes on an organizational chart isn't going to resolve these problems. It is going to take leadership, both within the Administration and up here on Capitol Hill—as well as a consensus on why NNSA's mission is so important and what needs to be done to move forward. Ranking Member Sanchez and I have agreed to take a hard look at these issues over the next few months and work together to help address the concerns of the National Academies study group, the Strategic Posture Commission, and all of the others.

Thank you to all of our witnesses for joining us today—we look forward to the discussion.

Statement of Hon. James R. Langevin on Behalf of

Hon. Loretta Sanchez, Ranking Member,

House Subcommittee on Strategic Forces

Hearing on

Governance, Oversight, and Management of the Nuclear Security Enterprise To Ensure High Quality Science, Engineering, and Mission Effectiveness in an Age of Austerity

February 16, 2012

I would like to join Chairman Turner in welcoming our witnesses, Dr. Shank, The Honorable Charlie Curtis, Mr. Aloise, Dr. Anastasio, Dr. Miller, and Ambassador Robinson.

I am also pleased that statements from Ambassador Brooks and Dr. Sieg Hecker, and the letter from Dr. Colvin and Dr. Logan on behalf of the University Professional and Technical Employees union are submitted for the record.

The impetus for the FY2010 National Defense Authorization's request for this National Academy of Sciences Study was concern about safety issues and about the effects of the privatization of lab management at Los Alamos National Laboratories and Lawrence Livermore National Laboratory.

Specifically, members were concerned that increased costs of management fees and taxes and other associated costs might have decreased resources for programmatic work and affected morale.

In its version of the bill, the House sought a GAO study to assess the costs of the transition and the impacts on lab management and lab functions, including safety, security, and environmental management. The final conference report included an NAS study of broader scope that would examine whether the excellence in science and engineering was being preserved at the labs.

This study now comes over 10 years after the NNSA was created and several years after a change in contracting structure for the labs, and offers an opportunity to assess the quality of science and management after a period of adjustment to the new contracting structure. It also comes in the context of strategy based on an updated Nuclear Posture Review and the constraints of the fiscal crisis.

Today, I hope to hear your insights to inform our oversight and ensure that we retain the unique skills and capability upon which our nuclear deterrent and nonproliferation efforts depend.

I would like to touch on three important points:

(1) the need for an effective contract structure, governance and management that help attract and retain the quality of scientists and engineers dedicated to public service who underpin a safe, secure and reliable arsenal and contribute the expertise behind successful nonproliferation efforts;

(2) the need for a process that ensures safety for workers and the public; and

(3) the need for transparency, accountability, and clear lines of authority.

First, safety, security, and reliability of nuclear weapons depend on critical scientific skills, and our labs must be able to attract some of the Nation's best scientists who want to serve their country.

Maintaining this expertise demands an interesting and important mission, challenging work, good equipment and tools, and high morale, including a supportive work environment where scientists are valued and recognized. And so I would like to explore these questions:

- Does the current structure and oversight provide clear expectations while enabling effective research, including hypothesis-driven science?
- Does it enable diverging views on potential technical solutions?
- Does it provide stability in employment and opportunities for collaboration and success?

Mission success also demands a work environment that is safe for employees and for the public, which brings me to my second point.

This management and oversight responsibility of nuclear weapons research, sustainment, and production cannot be compromised. Accidents can and do happen, including low-probability, high-consequence events.

No one expected the massive earthquake and tsunami at the Fukushima Daichi power plant in Japan, or the BP Deepwater Horizon explosion.

The reactor accidents at Savannah River Site that were hidden from the public for over 30 years, the environmental conditions which led to the raid and permanent shutdown of Rocky Flats and the classified data scandals that rocked Los Alamos all resulted in part from a structure of flexible requirements and minimal Federal oversight. Meanwhile, the Department of Labor has now approved more than 64,000 cases submitted to the Energy Employee Occupational Illness Program for radiation exposure, and has paid out more than $6.7 billion in compensation benefits.

Chairman Turner, our Committee members and I are committed to the success of NNSA, the nuclear complex and its National Security mission. However, I fear that a nuclear accident, even a minor one, would have significant repercussions on the future of the nuclear weapons complex. That is a consequence that we would all like to avoid.

Third, in an era of budget constraints, we must seek opportunities for improving efficiency across the complex, as required, for example, in section 3123 of the FY2012 National Defense Authorization Act, but also in terms of effective management.

With $7.2 billion appropriated for weapons activities in FY12 and a $7.6 billion request for FY13, improving accountability and ensuring effective governance must be a priority.

- Are there clear lines of authority?

- Does NNSA have sufficient subject matter expertise and consistent data necessary to effectively assess performance across the complex?
- Is there sufficient accountability within NNSA and from the contractors at the labs?
- Is the structure set up to incentivize savings, maximize investment in programmatic work, perform realistic cost assessments and planning to avoid cost escalation and schedule delays, set priorities, and enable competition?

In this context, I would like to add that I am pleased that the Department of Energy recently decided to resume the practice of making performance evaluations of the labs public, increasing transparency and accountability.

I look forward to the discussion today.

Thank you, Mr. Chairman.

Testimony of

Dr. Charles V. Shank
Senior Fellow
Howard Hughes Medical Institute
and
Co-Chairman
National Research Council Committee on Review of the Quality of the Management and of the Science and Engineering Research at the DOE's National Security Laboratories

And

The Honorable Charles B. Curtis
President Emeritus and Board Member
Nuclear Threat Initiative
and
Member
National Research Council Committee on Review of the Quality of the Management and of the Science and Engineering Research at the DOE's National Security Laboratories

Before the

Strategic Forces Subcommittee
House Armed Services Committee

February 16, 2012

Good morning Mr. Chairman, Ranking Member Sanchez, and members of the subcommittee. My name is Charles V. Shank. I am a Senior Fellow at the Howard Hughes Medical Institute. I had the privilege of chairing the *Committee on Review of the Quality of the Management and of the Science and Engineering Research at the DOE's National Security Laboratories* at the National Research Council. I am accompanied by the Honorable Charles B. Curtis who served with me on this study committee. The National Research Council is the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology.

Study Task:

The FY2010 Defense Authorization Act mandated that NNSA task the National Research Council (NRC) to study the quality and management of Science and Engineering (S&E) at the three National Security Laboratories: Los Alamos National Laboratory, Lawrence Livermore Laboratory and Sandia National Laboratory. The study is being conducted in two phases. Phase one concerns management of S&E and the second phase to come will look in detail at selected S&E subject areas. Our report today addresses the management of the three NNSA laboratories with specific emphasis on how management affects the quality of the science and engineering. "Quality of S&E" for the purposes of the report measures the expertise and accomplishments in those areas of science and engineering that are necessary to accomplish the laboratories' missions. "Quality of the management of S&E" measures management's capability to build, maintain and nurture S&E expertise for current and future mission needs. Management includes government (primarily NNSA and its three site offices), operations (M&O) contractors, and on-site laboratory management.

Conduct of the Study:

To conduct the first phase, the NRC formed a study committee whose membership was carefully chosen to provide broad and deep applicable expertise and experience in the management of science and engineering at major research and development laboratories. The committee members include former directors of major government and industry laboratories, current and former laboratory executives, and others with relevant experience and expertise.. The primary mode of gathering information was through presentations and testimony from, and discussions with, a substantial number of experts. These included current and former managers and technical staff associated with the NNSA, the DOE, and the laboratories, and the site offices. The study committee's meetings included visits to each of the three laboratories for extensive discussions with laboratory staff, as well as open public comment sessions at which current and former laboratory employees, union representatives, and others were given the opportunity to share their views and

experiences. The committee also examined the most recent available management and operations (M&O) contracts, performance evaluation plans (PEP), performance evaluation reports (PER), contract management plans, parent organization oversight plans, and other similar documents for each of the three laboratories.

The issue of management of these three laboratories is complex, and has a long history. Within the mandated terms of reference of the study, the committee concluded that the basic questions before it are: (1) how well does the current management system support the conduct of quality science and engineering now and into the future? (2) are there significant management problems that need to be solved? (3) to what extent are these problems the result of the change in contractors at LANL and LLNL? (4) what are the most important problems, and what does the committee recommend to resolve those problems? The committee set as its goal the production of a short report that focuses on what it found to be most important. Accordingly, our report addresses four topics: the contracts; research base and the evolution of the mission; the broken relationship; and management of S&E at the laboratories. We will speak to these, and then conclude by our observations concerning the future.

Study Findings:

Contracts

The contracting relationships between the DOE and its laboratories have in some cases endured for many decades. In 2004, Congress mandated that the long-standing contracts with the University of California to manage Lawrence Livermore and Los Alamos national laboratories (LLNL and LANL) be re-competed. As a result, these two contracts were awarded to two independent LLCs that both include Bechtel Corporation and the University of California. Subsequently, Congress developed concerns about the quality of science and engineering at the Laboratories, including whether changes in contracts and contractors may have had a deleterious effect on the quality of science and engineering.

The study committee heard testimony that LLNL and LANL were having morale crises as a consequence of the change of management from a public entity to a for-profit contractor. A number of current and former employees of these laboratories expressed concerns about deterioration of morale at the laboratories along with ongoing or potential declines in the quality of science and engineering. Many attributed those inferred trends to the new M&O contracts and contractors. **While it is true that all three labs have been under cost and funding pressure, we did not find a morale crisis related to actions of the new contractors.** The costs of the re-competed contracts are significantly greater than the previous contracting arrangements; this is due primarily to the changes in contractor fees, state taxes, and pensions. Some have been concerned that contractors pursuing fee might not act in the public interest. The laboratory directors stated that while fee is important, their primary objective remains to manage the laboratories in the public interest.

This concern is an important one and constant vigilance will be required.

Evolution of the Mission

An evolution of the laboratory missions to "National Security Laboratories" is well underway. Deputy NNSA Administrator Don Cook presented to the Committee a vision for the laboratories, including a governance charter among four agencies (the Departments of Energy, Homeland Security, and Defense, plus the Office of the Director of National Intelligence) to take advantage of the S&E capabilities of these three laboratories. In a time of constrained budgets, broadening the mandate to a national security mission helps preserve S&E expertise by working on problems posed by partner agencies. Access to this problem set helps the NNSA laboratories to recruit and retain S&E capabilities beyond what could be achieved solely with available funds in the stockpile stewardship program. While such work for others (WFO) is very important for the future of S&E at the laboratories, all three of the laboratory directors were very clear that maintenance of the stockpile remains the core mission of the labs.

The committee recommends that Congress recognize that maintenance of the stockpile remains the core mission of the labs and that other national security mission work contributes to the accomplishment of that mission and in that context the Congress should consider endorsing and supporting in some way the evolution of the NNSA laboratories to National Security Laboratories as described in the July 2010 four-agency Governance Charter for an Interagency Council on the Strategic Capability of DOE National Laboratories.

A crucial part of the laboratories' ability to conduct their missions is derived from Laboratory Directed Research and Development (LDRD), the primary source for internally directed R&D funding. Among its other benefits, LDRD provides a major resource for attracting, supporting and training staff at each laboratory.

The committee recommends that Congress and NNSA maintain strong support of the LDRD program as it is an essential component of enabling the long-term viability of the laboratories.

Historically, the laboratories had another source of discretionary research spending. The weapons program (at each laboratory) had the flexibility to use part of its budget to fund a robust research program, in support of the core weapons mission. Currently, the weapons program budget is subdivided into so many categories with so many restrictions that this important flexibility is effectively lost. This loss in funding flexibility has significantly reduced the amount of core program research being performed at the laboratories. This lessens the appeal of the laboratories when recruiting.

The committee recommends that Congress reduce the number of restrictive budget reporting categories in the Nuclear Weapons Program and permit the

use of such funds to support a robust core weapons research program and further develop necessary S&E capability.

Relationship between the labs and NNSA oversight

We observe that the relationship between NNSA and its National Security Laboratories is broken. This very seriously degrades the ability to manage for quality S&E. Both NNSA and the laboratories recognize the importance of quality S&E, and each believes it is working to achieve that goal, but their dysfunctional relationship seriously threatens that common goal. This is not a new observation, as it has been discussed in previous reports. There has been a breakdown of trust and an erosion of the partnering between the laboratories and NNSA to solve complex S&E problems.

The basic substantive relationship between NNSA and the laboratories is an FFRDC partnership. The management relationship is a GOCO relationship. The FFRDC relationship is based on a partnership between the government and the laboratory in which the government decides what problems need to be addressed, and the contractor determines how best to address those problems. There is a perception among staff at the three laboratories that NNSA has moved from partnering with the laboratories to solve scientific and engineering problems to assigning tasks and specific S&E solutions with detailed implementation instructions. This approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased. Similar issues are found in transactional oversight of safety, business, security and operations. Science and engineering quality is at risk when laboratory scientists and engineers are not encouraged to bring forth their creative ideas in partnership with NNSA to solve problems vital to our national security.

There is conflict and confusion over management roles and responsibilities of organizations and individuals. For example, the committee heard reports of mid-level issues being elevated to the laboratory director level because there was no clarity about how to resolve disputes between a laboratory and an NNSA Site Office. These factors do not encourage the stable management that is necessary to ensure success of long-term investment and planning. Another example was a recent instance in which NNSA HQ tried to overrule a Laboratory's best scientific judgment about how to carry out a scientific task. Subsequently, language appeared in a Congressional report opposing that NNSA instruction. A better mechanism should be established for resolving technical disputes, and they should definitely not be elevated to top NNSA management and congressional levels. **A technical advisory committee, established at the NNSA level, would be a helpful mechanism for filling this gap in S&E management. More generally, such an advisory committee could monitor progress on other aspects of roles and responsibilities.**

This erosion of the trust relationship is especially prominent with respect to Los Alamos, where past failures in safety, security, and business practices attracted much national attention and public criticism. But it has also spilled over to Lawrence Livermore and Sandia National Laboratories. The loss of trust in the ability of the laboratories to maintain operational goals such as safety, security, environmental responsibility and fiscal integrity has produced detailed scrutiny by NNSA HQ and site offices and increased aversion to risk. A major byproduct of this has been to create a bias against experimental work. The bias is problematic because experimental science is at the very heart of the scientific method.

The committee recommends that NNSA and each of the Laboratories commit to the goal of rebalancing the managerial and governance relationship to build in a higher level of trust in program execution and laboratory operations in general.

The committee recommends that NNSA and the Laboratories agree on a set of principles that clearly lay out the boundaries and roles of each management structure, and also that program managers at headquarters, the Site Offices, and in the laboratories be directed to abide by these principles.

For example, the committee suggests that, among other measures, the Site Manager the Director and/or Deputy Director of each laboratory apply a team-based process to identify and agree on eliminating certain oversight procedures that are simply not necessary or related to the overall goals of the Laboratory. Similarly, some mechanism should be established to filter program tasks at both the headquarters level and at the laboratory senior management level to assure that each tasking is necessary and consistent with the agreed management principles.

The committee recommends that the goal of rebalancing the relationship and the set of principles laying out the boundaries and roles of each management structure be memorialized in memoranda of understanding between NNSA and its Laboratories. Performance against these understandings should be assessed on an annual basis over a five-year period and reported to Congress.

The Future

A key to ongoing laboratory success has been a strong focus on the long-term and on maintaining deep technical capability. Looking forward, the new management structure of the Laboratories, which relies on the introduction of industrial and other private sector partners, must assure that this long-term focus is maintained in words and
deeds.

A great deal of work that has been accomplished over the years in safety and security has required extensive effort by the NNSA and the laboratories. We believe these efforts have been strengthened to the point where they no longer need the

current level special attention to assure high quality results in laboratory operations.

The committee recommends that NNSA, Congress, and top management of the Laboratories recognize that the safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced over time consistent with maintaining high quality efforts in these areas, so that they not impose an excessive burden on essential S&E activities.

The committee recognizes that this cannot happen unless the broken relationship is fixed, but the committee also recognizes that these operational problems contributed to the broken relationship.

CHARLES V. SHANK served as Director of the E.O. Lawrence Berkeley National Laboratory from 1989 until his retirement in 2004. He received his PhD in electrical engineering from the University of California at Berkeley in 1969, after which he spent 20 years at Bell Laboratories, as both a researcher and director. His research at Bell Labs introduced the use of short laser pulses to the study of ultrafast events, allowing researchers to gain a better understanding of how energy is stored and transferred within materials. During his 15-year leadership of Lawrence Berkeley Lab, it emerged as a leader in the field of supercomputing and joined with two other national labs to form the Joint Genome Institute, a major contributor to the decoding of the human genome. While LBL Director, Shank also had a triple appointment as professor at the University of California at Berkeley in the Department of Physics, Department of Chemistry, and Department of Electrical Engineering and Computer Sciences. He has since severed all his ties to the University of California. Dr. Shank is now a Senior Fellow at the Howard Hughes Medical Institute's Janelia Farm Research Campus. In addition to his election to the NAS and NAE, Dr. Shank has received the R.W. Wood Prize of the Optical Society of America, the David Sarnoff and Morris E. Leeds awards of the IEEE, the George E. Pake Prize and the Arthur L. Schawlow Prize of the American Physical Society, and the Edgerton Award of the International Society for Optical Engineering. He has served on a number of NRC boards and committees and chaired one study, a decadal survey of optical science and engineering. Dr. Shank currently serves as chair of the Science Advisory Board for Sandia National Laboratories.

CHARLES B. CURTIS

Charles Curtis is Senior Advisor to the Center for Strategic and International Studies; President Emeritus and Board Member of the Nuclear Threat Initiative, a charitable organization working on National Security issues; and Chairman of the Board of the World Institute for Nuclear Security headquartered in Vienna, Austria, an international non-governmental organization organized to promote the sharing of best practices for the physical protection and security of nuclear materials and high risk radiological materials.

Mr. Curtis serves on the Boards of Edison International, of Southern California Edison and of the Putnam Funds. He holds degrees from the University of Massachusetts-Amherst and Boston University School of Law.

Mr. Curtis has 18 years of governmental service, was a practicing attorney for 15 years and served 10 years as a foundation executive.

His governmental service includes service as a supervisory staff attorney at the Department of the Treasury (1965-1966); Special Counsel and Branch Chief for Market Regulation at the Securities and Exchange Commission (1967-1971); lead securities and energy counsel for the House Interstate and Foreign Commerce Committee (1971-1977); Chairman of the Federal Power Commission (1977); Chairman of the Federal Energy Regulatory Commission (1977-1981); Under Secretary, Deputy Secretary and Acting Secretary of the Department of Energy (1994-1997).

Mr. Curtis has served as a member of the Nuclear Weapons Council; the Congressional Commission on Maintaining Nuclear Weapons Expertise; the Independent Panel for the Quadrennial Defense Review; the Defense Policy Board; the Defense Department's Threat Reduction Advisory Panel; and the first Advisory Committee to the National Nuclear Security Administration. He is a current member and Vice Chair of the State Department's International Security Advisory Board.

United States Government Accountability Office

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Testimony

Before the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

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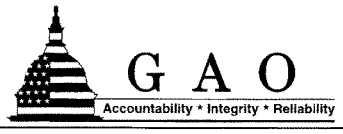
NATIONAL NUCLEAR SECURITY ADMINISTRATION

Observations on NNSA's Management and Oversight of the Nuclear Security Enterprise

Statement of Gene Aloise, Director
Natural Resources and Environment



GAO-12-473T

February 16, 2012

GAO
Accountability * Integrity * Reliability
Highlights

Highlights of GAO-12-473T, a testimony before the Subcommittee on Strategic Forces, Committee on Armed Services, House of Representatives

NATIONAL NUCLEAR SECURITY ADMINISTRATION

Observations on NNSA's Management and Oversight of the Nuclear Security Enterprise

Why GAO Did This Study

The National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is responsible for managing its contractors' nuclear weapon- and nonproliferation-related national security activities in laboratories and other facilities, collectively known as the nuclear security enterprise. GAO designated DOE's management of its contracts as an area at high risk of fraud, waste, and abuse. Progress has been made, but GAO continues to identify problems across the nuclear security enterprise, from projects' cost and schedule overruns to inadequate oversight of safety and security at NNSA's sites. Laboratory and other officials have raised concerns that federal oversight of the laboratories' activities has been excessive. With NNSA proposing to spend tens of billions of dollars to modernize the nuclear security enterprise, it is important to ensure scarce resources are spent in an effective and efficient manner.

This testimony addresses (1) NNSA's ability to produce budget and cost data necessary to make informed management decisions, (2) improving NNSA's project and contract management, and (3) DOE's and NNSA's safety and security oversight. It is based on prior GAO reports issued from August 2000 to January 2012.

DOE and NNSA continue to act on the numerous recommendations GAO has made in improving budget and cost data, project and contract management, and safety and security oversight. GAO will continue to monitor DOE's and NNSA's implementation of these recommendations.

View GAO-12-473T. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

What GAO Found

NNSA has successfully ensured that the nuclear weapons stockpile remains safe and reliable in the absence of underground nuclear testing, accomplishing this complicated task by using state-of-the-art facilities as well as the skills of top scientists. Nevertheless, NNSA does not have reliable enterprise-wide management information on program budgets and costs, which potentially increases risk to NNSA's programs. For example, in June 2010, GAO reported that NNSA could not identify the total costs to operate and maintain essential weapons activities facilities and infrastructure. In addition, in February 2011, GAO reported that NNSA lacks complete data on, among other things, the condition and value of its existing infrastructure, cost estimates and completion dates for planned capital improvement projects, and critical human capital skills in its contractor workforce that are needed for its programs. As a result, NNSA does not have a sound basis for making decisions on how to most effectively manage its portfolio of projects and other programs and lacks information that could help justify future budget requests or target cost savings opportunities. NNSA recognizes that its ability to make informed decisions is hampered and is taking steps to improve its budget and cost data.

For more than a decade and in numerous reports, GAO found that NNSA has continued to experience significant cost and schedule overruns on its major projects. For example, in 2000 and 2009, respectively, GAO reported that NNSA's efforts to extend the operational lives of nuclear weapons in the stockpile have experienced cost increases and schedule delays, such as a $300 million cost increase and 2-year delay in the refurbishment of one warhead and a nearly $70 million increase and 1-year delay in the refurbishment of another warhead. NNSA's construction projects have also experienced cost overruns. For example, GAO reported that the cost to construct a modern Uranium Processing Facility at NNSA's Y-12 National Security Complex experienced a nearly seven-fold cost increase from between $600 million and $1.1 billion in 2004 to between $4.2 billion and $6.5 billion in 2011. Given NNSA's record of weak management of major projects, GAO believes careful federal oversight of NNSA's modernization of the nuclear security enterprise will be critical to ensure that resources are spent in as an effective and efficient manner as possible.

NNSA's oversight of safety and security in the nuclear security enterprise has also been questioned. As work carried out at NNSA's sites involves dangerous nuclear materials such as plutonium and highly enriched uranium, stringent safety procedures and security requirements must be observed. GAO reported in 2008 on numerous safety and security problems across NNSA's sites, contributing, among other things, to the temporary shutdown of facilities at both Los Alamos and Lawrence Livermore National Laboratories in 2004 and 2005, respectively. Ineffective NNSA oversight of its contractors' activities contributed to many of these incidents as well as relatively lax laboratory attitudes toward safety procedures. In many cases, NNSA has made improvements to resolve these safety and security concerns, but better oversight is needed to ensure that improvements are fully implemented and sustained. GAO agrees that excessive oversight and micromanagement of contractors' activities are not an efficient use of scarce federal resources, but that NNSA's problems are not caused by excessive oversight but instead result from ineffective departmental oversight.

Chairman Turner, Ranking Member Sanchez, and Members of the Subcommittee:

Thank you for the opportunity to discuss our work on the governance, oversight, and management of the nation's nuclear security enterprise. As you know, the National Nuclear Security Administration (NNSA), a separately organized agency within the Department of Energy (DOE), is responsible for managing its contractors' nuclear weapon- and nonproliferation-related national security activities in research and development laboratories, production plants, and other facilities known collectively as the nuclear security enterprise.[1] With the moratorium on underground nuclear testing that began in 1992 and the subsequent creation of the Stockpile Stewardship Program, the mission of the nuclear security enterprise changed from designing, building, and testing successive generations of weapons to extending the life of the existing nuclear weapons stockpile through scientific study, computer simulation, and refurbishment.

Ensuring that the nuclear weapons stockpile remains safe and reliable in the absence of underground nuclear testing is extraordinarily complicated and requires state-of-the-art experimental and computing facilities as well as the skills of top scientists in the field. To its credit, NNSA consistently accomplishes this task, as evidenced by the successful assessment of the safety, reliability, and performance of each weapon type in the nuclear stockpile since such assessments were first conducted in 1995. NNSA's three nuclear weapon design laboratories are heavily involved in this assessment process and, over the past decade, the United States has invested billions of dollars in sustaining the Cold War-era stockpile and upgrading the laboratories.

Nevertheless, DOE's and NNSA's management of the nuclear security enterprise has been the subject of much criticism. The department's problems are long-standing. For example, we have designated DOE's management of its contracts as an area at high risk of fraud, waste,

[1] Specifically, NNSA manages three national nuclear weapon design laboratories—Lawrence Livermore National Laboratory in California, Los Alamos National Laboratory in New Mexico, and Sandia National Laboratories in New Mexico and California. It also manages four nuclear weapons production plants—the Pantex Plant in Texas, the Y-12 National Security Complex in Tennessee, the Kansas City Plant in Missouri, and the Tritium Extraction Facility at DOE's Savannah River Site in South Carolina. NNSA also manages the Nevada National Security Site, formerly known as the Nevada Test Site.

abuse, and mismanagement because of the department's record of inadequate management and oversight of its contractors. In January 1995, we reported that DOE's laboratories did not have clearly defined missions that focus their considerable resources on accomplishing the department's changing objectives and national priorities.[2] Noting that the laboratories have made vital contributions to the nation's defense and civilian science and technology efforts, we reported that DOE had not coordinated these laboratories' efforts to solve national problems but had instead managed each laboratory on a program-by-program basis. The establishment of NNSA as a semi-autonomous agency within DOE in 2000 was intended to correct these long-standing and widely recognized DOE management problems, which had been underscored by significant cost overruns on major projects and security problems at the national laboratories.[3]

NNSA's creation, however, has not yet had the desired effect of fully resolving these management problems. Progress has been made, but NNSA and DOE's Office of Environmental Management remain on our high-risk list.[4] Furthermore, we continue to identify problems across the nuclear security enterprise, ranging from significant cost and schedule overruns on major projects to ineffective federal oversight of safety and security at NNSA's sites. Concerns have also been raised by national laboratory and other officials that DOE's and NNSA's oversight of the laboratories' activities has been excessive and that the safety and security requirements the laboratories' are subject to are overly prescriptive and burdensome, which has resulted in a negative effect on the quality of science performed at these laboratories.

My testimony today discusses NNSA's management of the nuclear security enterprise. It focuses on our reports issued from August 2000 to January 2012 on (1) NNSA's ability to produce adequate budget and cost

[2] GAO, *Department of Energy: National Laboratories Need Clearer Missions and Better Management*, GAO/RCED-95-10 (Washington, D.C.: Jan. 27, 1995).

[3] GAO, *Department of Energy: Views on the Progress of the National Nuclear Security Administration in Implementing Title 32*, GAO-01-602T (Washington, D.C.: Apr. 4, 2001); GAO, *NNSA Management: Progress in the Implementation of Title 32*, GAO-02-93R (Washington, D.C.: Dec. 12, 2001); and GAO, *Department of Energy: NNSA Restructuring and Progress in Implementing Title 32*, GAO-02-451T (Washington, D.C.: Feb. 26, 2002).

[4] GAO, *High-Risk Series: An Update*, GAO-11-278 (Washington, D.C.: February 2011).

data necessary to make informed management decisions; (2) NNSA's project and contract management; and (3) NNSA's oversight of safety and security performance in the nuclear security enterprise. Detailed information about scope and methodology can be found in our issued reports. We conducted the performance audit work that supports this statement in accordance with generally accepted government auditing standards. Those standards require that we plan and perform audits to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

DOE is responsible for a diverse set of missions, including nuclear security, energy research, and environmental cleanup. These missions are managed by various organizations within DOE and largely carried out by management and operating (M&O) contractors at DOE sites. According to federal budget data, NNSA is one of the largest organizations in DOE, overseeing nuclear weapons and nonproliferation-related missions at its sites. With a $10.5 billion budget in fiscal year 2011—nearly 40 percent of DOE's total budget—NNSA is responsible for providing the United States with safe, secure, and reliable nuclear weapons in the absence of underground nuclear testing and maintaining core competencies in nuclear weapons science, technology, and engineering.

Under DOE's long-standing model of having unique M&O contractors at each site, management of its sites has historically been decentralized and, thus, fragmented. Since the Manhattan Project produced the first atomic bomb during World War II, NNSA, DOE, and predecessor agencies have depended on the expertise of private firms, universities, and others to carry out research and development work and efficiently operate the facilities necessary for the nation's nuclear defense. DOE's relationship with these entities has been formalized over the years through its M&O contracts—agreements that give DOE's contractors

unique responsibility to carry out major portions of DOE's missions and apply their scientific, technical, and management expertise.[5]

Currently, DOE spends 90 percent of its annual budget on M&O contracts, making it the largest non-Department of Defense contracting agency in the government. The contractors at DOE's NNSA sites have operated under DOE's direction and oversight but largely independently of one another. Various headquarters and field-based organizations within DOE and NNSA develop policies and NNSA site offices, collocated with NNSA's sites, conduct day-to-day oversight of the M&O contractors, and evaluate the contractors' performance in carrying out the sites' missions.

NNSA Does Not Have Reliable Enterprise-Wide Management Information on Program Budgets and Costs

As we have reported since 1999, NNSA has not had reliable enterprise-wide budget and cost data, which potentially increases risk to NNSA's programs. Specifically:

- In July 2003 and January 2007, we reported that NNSA lacked a planning and budgeting process that adequately validated contractor-prepared cost estimates used in developing annual budget requests.[6] Establishing this process was required by the statute that created NNSA—Title 32 of the National Defense Authorization Act for Fiscal Year 2000.[7] In particular, NNSA had not established an independent analysis unit to review program budget proposals, confirm cost estimates, and analyze budget alternatives. At the request of the Subcommittee on Energy and Water Development, Senate Committee on Appropriations, we are currently reviewing NNSA's planning and budgeting process, the extent to which NNSA has

[5] M&O contracts are agreements under which the government contracts for the operation, maintenance, or support, on its behalf, of a government-owned or -controlled research, development, special production, or testing establishment wholly or principally devoted to one or more of the major programs of the contracting federal agency. Federal Acquisition Regulation, 48 C.F.R. § 17.601.

[6] GAO, *Nuclear Weapons: Opportunities Exist to Improve the Budgeting, Cost Accounting, and Management Associated with the Stockpile Life Extension Program,* GAO-03-583. (Washington, D.C.: July 28, 2003), and GAO, *National Nuclear Security Administration: Additional Actions Needed to Improve Management of the Nation's Nuclear Programs,* GAO-07-36. (Washington, D.C.: Jan. 19, 2007).

[7] 50 U.S.C. § 2452.

established criteria for evaluating resource trade-offs, and challenges NNSA has faced in validating its budget submissions. We expect to issue a report on this work later this year.

- In June 2010, we reported that NNSA could not identify the total costs to operate and maintain essential weapons activities' facilities and infrastructure.[8] Furthermore, we found that contractor-reported costs to execute the scope of work associated with operating and maintaining these facilities and infrastructure likely significantly exceeded the budget for this program that NNSA justified to Congress.

- We reported in February 2011 that NNSA lacked complete data on (1) the condition and value of its existing infrastructure, (2) cost estimates and completion dates for planned capital improvement projects, (3) shared-use facilities within the nuclear security enterprise, and (4) critical human capital skills in its M&O contractor workforce that are needed to maintain the Stockpile Stewardship Program.[9] As a result, NNSA does not have a sound basis for making decisions on how to most effectively manage its portfolio of projects and other programs and will lack information that could help justify future budget requests or target cost savings opportunities.

- In September 2011, we reported that, because of different accounting practices, NNSA could not accurately estimate planned cost savings that might result from a consolidated management contract for two of its production sites.[10] Similarly, in January 2012, we reported on efforts NNSA sites have taken to streamline support functions and generate cost savings in a time of growing federal deficits and

[8] GAO, *Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities*, GAO-10-582. (Washington, D.C.: June 21, 2010).

[9] GAO, *Nuclear Weapons: NNSA Needs More Comprehensive Infrastructure and Workforce Data to Improve Enterprise Decision-making*, GAO-11-188 (Washington, D.C.: Feb. 14, 2011).

[10] GAO, *Modernizing the Nuclear Security Enterprise: The National Nuclear Security Administration's Proposed Acquisition Strategy Needs Further Clarification and Assessment*, GAO-11-848. (Washington, D.C.: Sept. 20, 2011).

uncertainty over future federal budgets.[11] We found that it was difficult to compare or quantify total savings across sites because guidance for estimating savings is unclear and the methods used to estimate savings vary between sites.

The administration plans to request $88 billion from Congress over the next decade to modernize the nuclear security enterprise and ensure that base scientific, technical, and engineering capabilities are sufficiently supported and the nuclear deterrent can continue to be safe, secure, and reliable. To adequately justify future presidential budget requests, NNSA must accurately identify these base capabilities and determine their costs. Without this information, NNSA risks being unable to identify return on its investment or opportunities for cost savings or to make fully informed decisions on trade-offs in a resource-constrained environment.

NNSA, recognizing that its ability to make informed enterprise-wide decisions is hampered by the lack of comprehensive data and analytical tools, is considering the use of computer models—quantitative tools that couple data from each site with the functions of the enterprise—to integrate and analyze data to create an interconnected view of the enterprise, which may help to address some of the critical shortcomings we identified. In July 2009, NNSA tasked its M&O contractors to form an enterprise modeling consortium. NNSA stated that the consortium is responsible for leading efforts to acquire and maintain enterprise data, enhance stakeholder confidence, integrate modeling capabilities, and fill in any gaps that are identified. The consortium has identified areas in which enterprise modeling projects could provide NNSA with reliable data and modeling capabilities, including capabilities on infrastructure and critical skills needs. In addition, we recently observed progress on NNSA's development of an Enterprise Program Analysis Tool that should give NNSA greater insight into its sites' cost reporting. The Tool also includes a mechanism to identify when resource trade-off decisions must be made, for example, when contractor-developed estimates for program requirements exceed the budget targets provided by NNSA for those programs. A tool such as this one could help NNSA obtain the basic data

[11] GAO, *Department of Energy: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Sites*, GAO-12-255. (Washington, D.C.: Jan. 31, 2012).

it needs to make informed management decisions, determine return on investment, and identify opportunities for cost saving.

NNSA Needs to Make Further Improvements to Its Management of Major Projects and Contracts

A basic tenet of effective management is the ability to complete projects on time and within budget. However, for more than a decade and in numerous reports, we have found that NNSA has continued to experience significant cost and schedule overruns on its major projects, principally because of ineffective oversight and poor contractor management. Specifically:

- In August 2000, we found that poor management and oversight of the National Ignition Facility construction project at Lawrence Livermore National Laboratory had increased the facility's cost by $1 billion and delayed its scheduled completion date by 6 years.[12] Among the many causes for the cost overruns or schedule delays, DOE and Livermore officials responsible for managing or overseeing the facility's construction did not plan for the technically complex assembly and installation of the facility's 192 laser beams. They also did not use independent review committees effectively to help identify and correct issues before they turned into costly problems. Similarly, in April 2010, we reported that weak management by DOE and NNSA had allowed the cost, schedule, and scope of ignition-related activities at the National Ignition Facility to increase substantially.[13],[14] Since 2005, ignition-related costs have increased by around 25 percent—from $1.6 billion to over $2 billion—and the planned completion date for these activities has slipped from the end of fiscal year 2011 to the end of fiscal year 2012 or beyond.

[12] GAO, *National Ignition Facility: Management and Oversight Failures Caused Major Cost Overruns and Schedule Delays*, GAO/RCED-00-271 (Washington, D.C.: Aug. 8, 2000).

[13] Ignition-related activities consist of the efforts separate from the facility's construction that have been undertaken to prepare for the first attempt at ignition—the extremely intense pressures and temperatures that simulate on a small scale the thermonuclear conditions created in nuclear explosions.

[14] GAO, *Nuclear Weapons: Actions Needed to Address Scientific and Technical Challenges and Management Weaknesses at the National Ignition Facility*, GAO-10-488 (Washington, D.C.: Apr. 8, 2010).

- We have issued several reports on the technical issues, cost increases, and schedule delays associated with NNSA's efforts to extend, through refurbishment, the operational lives of nuclear weapons in the stockpile. For example, in December 2000, we reported that refurbishment of the W87 strategic warhead had experienced significant design and production problems that increased its refurbishment costs by over $300 million and caused schedule delays of about 2 years.[15] Similarly, in March 2009 we reported that NNSA and the Department of Defense had not effectively managed cost, schedule, and technical risks for the B61 nuclear bomb and the W76 nuclear warhead refurbishments.[16] For the B61 life extension program, NNSA was only able to stay on schedule by significantly reducing the number of weapons undergoing refurbishment and abandoning some refurbishment objectives. In the case of the W76 nuclear warhead, NNSA experienced a 1-year delay and an unexpected cost increase of nearly $70 million as a result of its ineffective management of one the highest risks of the program—the manufacture of a key material known as Fogbank, which NNSA did not have the knowledge, expertise, or facilities to manufacture.

- In October 2009, we reported on shortcomings in NNSA's oversight of the planned relocation of its Kansas City Plant to a new, more modern facility.[17] Rather than construct a new facility itself, NNSA chose to have a private developer build it. NNSA would then lease the building through the General Services Administration for a period of 20 years. However, when choosing to lease rather than construct a new facility itself, NNSA allowed the Kansas City Plant to limit its cost analysis to a 20-year life cycle that has no relationship with known requirements of the nuclear weapons stockpile or the useful life of a production facility that is properly maintained. As a result, NNSA's financing decisions were not as fully informed and transparent as they could have been. If the Kansas City Plant had quantified potential cost savings to be realized over the longer useful life of the facility, NNSA

[15] GAO, *Nuclear Weapons: Improved Management Needed to Implement Stockpile Stewardship Program Effectively*, GAO-01-48 (Washington, D.C.: Dec. 14, 2000).

[16] GAO, *Nuclear Weapons: NNSA and DOD Need to More Effectively Manage the Stockpile Life Extension Program*, GAO-09-385 (Washington, D.C.: Mar. 2, 2009).

[17] GAO, *Nuclear Weapons: National Nuclear Security Administration Needs to Better Manage Risks Associated with Modernization of Its Kansas City Plant*, GAO-10-115 (Washington, D.C.: Oct. 23, 2009).

may have made a different decision as to whether to lease or construct a new facility itself.

- We reported in March 2010 that NNSA's plutonium disposition program was behind schedule in establishing a capability to produce the plutonium feedstock necessary to operate its Mixed-oxide Fuel Fabrication facility currently being constructed at DOE's Savannah River Site in South Carolina.[18] In addition, NNSA had not sufficiently assessed alternatives to producing plutonium feedstock and had only identified one potential customer for the mixed-oxide fuel the facility would produce. In its fiscal year 2012 budget justification to Congress, NNSA reported that it did not have a construction cost baseline for the facility needed to produce the plutonium feedstock for the mixed-oxide fuel, although Congress had already appropriated over $270 million through fiscal year 2009 and additional appropriation requests totaling almost $2 billion were planned through fiscal year 2016. NNSA stated in its budget justification that it is currently considering options for producing necessary plutonium feedstock without constructing a new facility.

- In November 2010, we reported that NNSA's plans to construct a modern Uranium Processing Facility at its Y-12 National Security Complex in Oak Ridge, Tennessee, had experienced significant cost increases.[19] Originally estimated in 2004 to cost from $600 million to $1.1 billion, estimated construction costs had more than doubled from $1.4 billion to $3.5 billion. Costs have continued to rise since we issued our report. As of September 2011, NNSA estimated that the facility would cost from $4.2 billion to $6.5 billion to construct—a nearly seven-fold cost increase. We are currently reviewing the cost and schedule estimates for another multi-billion dollar NNSA construction project—the Chemistry and Metallurgy Research Replacement nuclear facility at Los Alamos National Laboratory—at the request of the Subcommittee on Energy and Water Development,

[18] GAO, *Nuclear Nonproliferation: DOE Needs to Address Uncertainties with and Strengthen Independent Safety Oversight of Its Plutonium Disposition Program*, GAO-10-378 (Washington, D.C.: Mar. 26, 2010). Mixed-oxide fuel contains plutonium blended with natural uranium, reprocessed uranium, or depleted uranium.

[19] GAO, *Nuclear Weapons: National Nuclear Security Administration's Plans for Its Uranium Processing Facility Should Better Reflect Funding Estimates and Technology Readiness*, GAO-11-103 (Washington, D.C.: Nov. 19, 2010).

Senate Committee on Appropriations. We plan to issue our report next month.

As discussed above, NNSA remains on our high-risk list and remains vulnerable to fraud, waste, abuse, and mismanagement. DOE has recently taken a number of actions to improve management of major projects, including those overseen by NNSA. For example, DOE has updated program and project management policies and guidance in an effort to improve the reliability of project cost estimates, better assess project risks, and better ensure project reviews that are timely, useful and identify problems early. However, DOE needs to ensure that NNSA has the capacity—that is, the people and other resources—to resolve its project management difficulties and that it has a program to monitor and independently validate the effectiveness and sustainability of its corrective measures. This is particularly important as NNSA embarks on its long-term, multibillion dollar effort to modernize the nuclear security enterprise.

NNSA's Oversight of Safety and Security in the Nuclear Security Enterprise Has Been Questioned

Another underlying reason for the creation of NNSA was a series of security issues at the national laboratories. Work carried out at NNSA's sites may involve plutonium and highly enriched uranium, which are extremely hazardous. For example, exposure to small quantities of plutonium is dangerous to human health, so that even inhaling a few micrograms creates a long-term risk of lung, liver, and bone cancer and inhaling larger doses can cause immediate lung injuries and death. Also, if not safely contained and managed, plutonium can be unstable and spontaneously ignite under certain conditions. NNSA's sites also conduct a wide range of other activities, including construction and routine maintenance and operation of equipment and facilities that also run the risk of accidents, such as those involving heavy machinery or electrical mishaps. The consequences of such accidents could be less severe than those involving nuclear materials, but they could also lead to long-term illnesses, injuries, or even deaths among workers or the public. Plutonium and highly enriched uranium must also be stored under extremely high security to protect it from theft or terrorist attack.

In numerous reports, we have expressed concerns about NNSA's oversight of safety and security across the nuclear security enterprise. With regard to nuclear and worker safety:

- In October 2007, we reported that there had been nearly 60 serious accidents or near misses at NNSA's national laboratories since

2000.[20] These incidents included worker exposure to radiation, inhalation of toxic vapors, and electrical shocks. Although no one was killed, many of the accidents caused serious harm to workers or damage to facilities. For example, at Los Alamos in July 2004, an undergraduate student who was not wearing required eye protection was partially blinded in a laser accident. Accidents and nuclear safety violations also contributed to the temporary shutdown of facilities at both Los Alamos and Livermore in 2004 and 2005. In the case of Los Alamos, laboratory employees disregarded established procedures and then attempted to cover up the incident, according to Los Alamos officials.[21] Our review of nearly 100 reports issued since 2000 found that the contributing factors to these safety problems generally fell into three key categories: (1) relatively lax laboratory attitudes toward safety procedures; (2) laboratory inadequacies in identifying and addressing safety problems with appropriate corrective actions; and (3) inadequate oversight by NNSA.

- We reported in January 2008 on a number of long-standing nuclear and worker safety concerns at Los Alamos.[22] These concerns included, among other things, the laboratory's lack of compliance with safety documentation requirements, inadequate safety systems, radiological exposures, and enforcement actions for significant violations of nuclear safety requirements that resulted in civil penalties totaling nearly $2.5 million.

- In October 2008, we reported that DOE's Office of Health, Safety, and Security—which, among other things, develops, oversees, and helps enforce nuclear safety policies at DOE and NNSA sites—fell short of fully meeting our elements of effective independent oversight of

[20] GAO, *Nuclear and Worker Safety: Actions Needed to Determine the Effectiveness of Safety Improvement Efforts at NNSA's Weapons Laboratories*, GAO-08-73 (Washington, D.C.: Oct. 31, 2007).

[21] For additional information on the 2004 temporary shutdown of facilities at Los Alamos, see GAO, *Stand-Down of Los Alamos National Laboratory: Total Costs Uncertain; Almost All Mission-Critical Programs Were Affected but Have Recovered*, GAO-06-83 (Washington, D.C.: Nov. 18, 2005).

[22] GAO, *Los Alamos National Laboratory: Information on Security of Classified Data, Nuclear Material Controls, Nuclear and Worker Safety, and Project Management Weaknesses*, GAO-08-173R (Washington, D.C.: Jan. 10, 2008).

nuclear safety.[23] For example, the office's ability to function independently was limited because it had no role in reviewing technical analyses that help ensure safe design and operation of nuclear facilities, and the office had no personnel at DOE sites to provide independent safety observations.

With regard to security:

- In June 2008, we reported that significant security problems at Los Alamos had received insufficient attention.[24] The laboratory had over two dozen initiatives under way that were principally aimed at reducing, consolidating, and better protecting classified resources but had not implemented complete security solutions to address either classified parts storage in unapproved storage containers or weaknesses in its process for ensuring that actions taken to correct security deficiencies were completed. Furthermore, Los Alamos had implemented initiatives that addressed a number of previously identified security concerns but had not developed the long-term strategic framework necessary to ensure that its fixes would be sustained over time. Similarly, in October 2009, we reported that Los Alamos had implemented measures to enhance its information security controls, but significant weaknesses remained in protecting the information stored on and transmitted over its classified computer network.[25] A key reason for this was that the laboratory had not fully implemented an information security program to ensure that controls were effectively established and maintained.

- In March 2009, we reported about numerous and wide-ranging security deficiencies at Livermore, particularly in the ability of

[23] GAO, *Nuclear Safety: Department of Energy Needs to Strengthen Its Independent Oversight of Nuclear Facilities and Operations*, GAO-09-61 (Washington, D.C.: Oct. 23, 2008). GAO first developed its elements of effective independent oversight of nuclear safety in 1987 when Congress was considering legislation to establish the Defense Nuclear Facilities Safety Board. Key elements include, among other things, independence, technical expertise, and enforcement authority.

[24] GAO, *Los Alamos National Laboratory: Long-Term Strategies Needed to Improve Security and Management Oversight*, GAO-08-694 (Washington, D.C.: June 13, 2008).

[25] GAO, *Information Security: Actions Needed to Better Manage, Protect, and Sustain Improvements to Los Alamos National Laboratory's Classified Computer Network*, GAO-10-28 (Washington, D.C.: Oct. 14, 2009).

Livermore's protective force to assure the protection of special nuclear material and the laboratory's protection and control of classified matter.[26] Livermore's physical security systems, such as alarms and sensors, and its security program planning and assurance activities were also identified as areas needing improvement. Weaknesses in Livermore's contractor self-assessment program and the NNSA Livermore Site Office's oversight of the contractor contributed to these security deficiencies at the laboratory. According to one DOE official, both programs were "broken" and missed even the "low-hanging fruit." The laboratory took corrective action to address these deficiencies, but we noted that better oversight was needed to ensure that security improvements were fully implemented and sustained.

- We reported in December 2010 that NNSA needed to improve its contingency planning for its classified supercomputing operations.[27] All three NNSA laboratories had implemented some components of a contingency planning and disaster recovery program, but NNSA had not provided effective oversight to ensure that the laboratories' contingency and disaster recovery planning and testing were comprehensive and effective. In particular, NNSA's component organizations, including the Office of the Chief Information Officer, were unclear about their roles and responsibilities for providing oversight in the laboratories' implementation of contingency and disaster recovery planning.

In March 2010, the Deputy Secretary of Energy announced a new effort—the 2010 Safety and Security Reform effort—to revise DOE's safety and security directives and reform its oversight approach to "provide contractors with the flexibility to tailor and implement safety and security programs without excessive federal oversight or overly prescriptive departmental requirements." We are currently reviewing the reform of DOE's safety directives and the benefits DOE hopes to achieve from this effort for, among others, the House Committee on Energy and Commerce. We expect to issue our report next month. Nevertheless, our

[26] GAO, *Nuclear Security: Better Oversight Needed to Ensure That Security Improvements at Lawrence Livermore National Laboratory Are Fully Implemented and Sustained*, GAO-09-321 (Washington, D.C.: Mar. 16, 2009).

[27] GAO, *Information Security: National Nuclear Security Administration Needs to Improve Contingency Planning for Its Classified Supercomputing Operations*, GAO-11-67 (Washington, D.C.: Dec. 9, 2010).

prior work has shown that ineffective NNSA oversight of its contractors has contributed to many of the safety and security problems across the nuclear security enterprise and that NNSA faces challenges in sustaining improvements to safety and security performance.

Concluding Observations

NNSA faces a complex task in planning, budgeting, and ensuring the execution of interconnected activities across the nuclear security enterprise. Among other things, maintaining government-owned facilities that were constructed more than 50 years ago and ensuring M&O contractors are sustaining critical human capital skills that are highly technical in nature and limited in supply are difficult undertakings. Over the past decade, we have made numerous recommendations to DOE and NNSA to improve their management and oversight practices. DOE and NNSA have acted on many of these recommendations, and we will continue to monitor progress being made in these areas. In the current era of tight budgets, Congress and the American taxpayer have the right to know whether investments made in the nuclear security enterprise are worth the cost. However, NNSA currently lacks the basic financial information on the total costs to operate and maintain its essential facilities and infrastructure, leaving it unable to identify return on investment or opportunities for cost savings. NNSA is now proposing to spend decades and tens of billions of dollars to modernize the nuclear security enterprise, largely by replacing or refurbishing aging and decaying facilities at its sites across the United States. Given NNSA's record of weak management of its major projects, we believe that careful federal oversight will be critical to ensure this time and money are spent in as an effective and efficient manner as possible.

With regard to the concerns that DOE's and NNSA's oversight of the laboratories' activities have been excessive and that safety and security requirements are overly prescriptive and burdensome, we agree that excessive oversight and micromanagement of contractors' activities is not an efficient use of scarce federal resources. Nevertheless, in our view, the problems we continue to identify in the nuclear security enterprise are not caused by excessive oversight, but instead result from ineffective oversight. Given the critical nature of the work the nuclear security enterprise performs and the high-hazard operations it conducts—often involving extremely hazardous materials, such as plutonium and highly enriched uranium, that must be stored under high security to protect them from theft—careful oversight and stringent safety and security requirements will always be required at these sites

It is also important in an era of scarce resources that DOE and NNSA ensure that the work conducted by the nuclear security enterprise is primarily focused on its principal mission—ensuring the safety and reliability of the nuclear weapons stockpile. DOE has other national laboratories capable of conducting valuable scientific research on issues as wide-ranging as climate change or high-energy physics, but there is no substitute for the sophisticated capabilities and highly-skilled human capital present in the nuclear security enterprise for ensuring the credibility of the U.S. nuclear deterrent.

Chairman Turner, Ranking Member Sanchez, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions you may have at this time.

GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this testimony, please contact me at (202) 512-3841 or aloisee@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Allison Bawden, Ryan T. Coles, and Jonathan Gill, Assistant Directors, and Patrick Bernard, Senior Analyst.

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- Gene Aloise is a Director in the Natural Resources and Environment team at GAO. He is GAO's recognized expert in international nuclear nonproliferation and safety/security issues and completed training on these subjects at the University of Virginia and Princeton University. His work for GAO has taken him to some of Russia's closed nuclear cities and the Chernobyl reactor in Ukraine as well as numerous nuclear facilities around the world and in the United States. Mr. Aloise has had years of experience developing, leading, and managing GAO domestic and international engagements. His diverse experience includes assignments with congressional committees as well as various offices within GAO. He has received numerous awards for his leadership and expertise including GAO's Meritorious Service and Distinguished Service Awards. Mr. Aloise received his bachelor's degree in political science/economics from Rowan University and holds a Master of Public Administration from Temple University. Mr. Aloise is also a graduate of the Senior Executive Fellows Program, John F. Kennedy School of Government, Harvard University. He has appeared on numerous TV and radio programs, including CBS's 60 Minutes, CNN, BBC, NPR, and has frequently been quoted in the NYT's, Washington Post and other major news media. Mr.Aloise has testified before Congress on national security and other matters over 50 times and is the Lead Executive responsible for the issuance of hundreds of reports with recommendations that have led to legislative improvements in Agency effectiveness and efficiency and over $5 Billion in financial savings.

Testimony of Dr. Michael R. Anastasio
before the
House Armed Services Committee
Subcommittee on Strategic Forces

February 16, 2012

Chairman Turner, Ranking Member Sanchez, and members of the Subcommittee – thank you for the opportunity to testify today. I am the former director of both Los Alamos (LANL) and Lawrence Livermore National Laboratory (LLNL), however these remarks reflect my personal views alone and do not represent LANL, LLNL, Los Alamos National Security, LLC, or any other organization.

During my career I have witnessed many historic events and dramatic changes in the Nuclear Security Enterprise – yet the laboratories' dedication to mission and quality of science has remained. Recall that the National Nuclear Security Administration (NNSA), the Laboratories, Test Site, and Plants have been able to deliver the capabilities (people and tools) to maintain a safe, secure, effective stockpile since the inception of the Stockpile Stewardship Program in the mid-1990s, despite facing many challenges along the way. This remarkable achievement has directly enabled the nuclear policy articulated in the 2010 Nuclear Posture Review (NPR).

However, the significant budget challenges that we face today – a new "Age of Austerity" – pose significant near-term and long-term challenges to high quality science, engineering, and mission effectiveness in the Nuclear Security Enterprise. After discussing the challenges, I will end with some recommendations.

Context

First, let me raise the context in which the Nuclear Security Enterprise operates and the challenges which that presents.

I was heartened by the bipartisan commitment to the 2010 NPR and accompanying budget outline in the 1251 report. This largely remedied a lack of bipartisan agreement over many years on nuclear policy and provided an accompanying budget aligned with it. Without this consensus there are inevitably differing expectations of the Enterprise and an inability to set and carry out priorities consistently over time. Even with the NPR in place there are already changes in the making, amplified by the financial challenges faced by the country. This drives inefficiencies. Inconsistent priorities will arise and will be exacerbated when there is a gap between expectations and fiscal realities that is manifest already in President's FY2013 budget.

Second, because of the large number of external entities peering into NNSA and its inner workings, with disproportionate attention relative to that seen in other parts of the government, a significant risk aversion has developed within the bureaucracy at NNSA.

This risk aversion has manifested itself in a growing focus on compliance at the expense of delivering the mission.

Oversight and Management

My experience at LANL is instructive for me in considering the Enterprise-wide response to the "Age of Austerity." We were able to increase the effectiveness of the Laboratory in delivering on our missions over the last five years while absorbing new costs of approximately $225M per year and simultaneously confronting a new contract structure, security and safety concerns, and an aging infrastructure. Because of the new contract, LANL's costs rose by approximately $150M per year overnight due to substantial increases in available fee, in gross receipts tax to the state of New Mexico and in a pay-as-you-go defined contribution pension system for about 1/3 of the employees. Subsequently, the financial crisis of 2008 drove the defined benefit pension into an underfunded status requiring approximately $75M per year Laboratory contribution to the pension. In total, new annual costs rose by over 10% of the LANL's budget.

We accomplished this first by right sizing our workforce to the anticipated budget through constrained hiring, aligning the Laboratory to a set of overall goals, and systematically driving down indirect costs in all areas of the Laboratory.

However, it will be difficult for my successor to make further efficiency and effectiveness gains due to the growth in unfunded requirements and from transactional oversight. For example, the NNSA site office has grown from approximately 100 employees to over 130 now. Their focus is oversight of safety, security, and business operations where the inexorable trend is toward ever-deeper involvement and direction of how specific activities are executed rather than evaluating whether the outcomes meet expectations.

At the same time, new requirements and reinterpretations are promulgated continuously from NNSA and/or the DNFSB to drive down operational risks and demand more and more paperwork to demonstrate compliance. Usually those who establish and interpret the requirements do not have direct responsibilities for program. And those that are responsible do not fully understand what goes on in the field.

For a facility like LANL with many high security and high hazard activities, safety and security are paramount. However, a hallmark of an efficient and effective organization is that it achieves a balance across all the competing demands from mission accomplishment to operational excellence. Finding and achieving that balance needs strengthening across the Enterprise.

Efforts at the site level to achieve the optimal balance are also inhibited by restricted flexibility to manage across these competing demands. Priorities can change in the 18 months between budget formulation and the start of the new fiscal year. Our ability to reallocate funding within our overall budget to meet changed priorities is restricted by the

number of congressionally directed control levels and the way they are managed at DOE/NNSA headquarters.

Health of Science / Engineering

Unless dramatic progress can be made on these issues the inevitable response to financial pressures will be to modify the program to accommodate the "Age of Austerity." The expectations established in the NPR will then not be met. If past history is a guide these program impacts will fall disproportionately on the science and engineering base. This is the long-term challenge we face.

An aversion to risk and a deterioration of trust, increases in transactional oversight and in unfunded requirements, combined with an uncertain policy direction and unstable budget outlook hurt the ability of the Nuclear Security Enterprise to attract, develop, and retain the best technical staff available. It is very difficult to convince top quality technical staff to join an organization where they are told how to do their work and left wondering if there is going to be an opportunity to discover and innovate. This has already resulted in the loss of some of the best mid-career scientists from the Laboratories.

The science and engineering base of the Laboratories enables the future ability of the Enterprise to carry out the mission, especially without nuclear testing for integral validation. A deepened and vital science and engineering base that is advancing with the state of the art was a key premise of the Stockpile Stewardship Program and has been responsible for our success over the last two decades. Failure to remedy the oversight / requirements drive and to avoid the squeeze on science can have irreparable harm – once we loose the capabilities we may not be able to recover them.

Recommendations

Let me end with some modest recommendations that will help put us on a better path:

- Reduce indirect costs of the Enterprise through oversight of outcomes rather than oversight of activities. The existing accountability mechanisms available in the current contracts are more than adequate.

- Accompany this with cuts in budget / people engaged in oversight and indirect activities starting with the federal workforce.

- Strengthen the balance across mission delivery and operations. New requirements or interpretations of existing ones (by internal or external organizations) must be coupled with a cost-benefit analysis.

- Reduce the number of Congressional budget control levels to increase flexibility in execution at the NNSA sites.

Again, thank you for the opportunity to testify today and I look forward to your questions.

Michael R. Anastasio, Ph.D.

Laboratory Director

Dr. Anastasio is the former Director of Los Alamos National Laboratory (LANL), retiring in 2011. He also served as President of Los Alamos National Security, LLC, which manages LANL for the Department of Energy. LANL applies science and technology to the certification of the U.S. nuclear deterrent; the reduction of global threats; advancing energy security; and the solution of other emerging national security challenges. Dr. Anastasio is also the former Director of Lawrence Livermore National Laboratory (LLNL), the only person to ever hold both positions.

He began his career at LLNL as a physicist dealing with the science of nuclear weapons. During this tenure Dr. Anastasio was instrumental in the development and execution of the national Stockpile Stewardship Program, which uses a fundamental science-based approach to sustain the safety, security, and reliability of America's nuclear weapons stockpile. He has served in the capacity of scientific adviser at the Department of Energy and has provided scientific advice to senior members of the government on various national security science issues.

Dr. Anastasio has received numerous commendations and is widely recognized for his leadership in national security science and the safe stewardship of nuclear weapons. He is the recipient of the DOE/NNSA Gold Medal, the Distinguished Alumni Award–SUNY Stony Brook, and the DOE Weapons Recognition of Excellence Award for technical leadership in nuclear design.

He is currently serving on the Secretary of State Clinton's International Security Advisory Board, the United States Strategic Command Strategic Advisory Group, and as a Member of the Corporation of the Draper Laboratory. He has also served on other boards and committees including Secretary of State Rice's International Security Advisory Board, the Defense Science Board Task Force on Nuclear Capabilities, the National Academy of Sciences Committee on Science & Technology for Countering Terrorism, the California Council on Science and Technology, and the Blue Ribbon Task Force on Nanotechnology.

Dr. Anastasio has taught at Brooklyn College of City University of New York and performed research in theoretical nuclear physics at the Center for Nuclear Studies in Saclay, France, and at the Nuclear Research Center in Julich, Germany. He received his B.A. in Physics, with Honors, from Johns Hopkins University and earned his M.A. and Ph.D. in Theoretical Nuclear Physics from the State University of New York, Stony Brook and is a member of Sigma Pi Sigma (national physics honor society).

GOVERNANCE, OVERSIGHT, AND MANAGEMENT OF THE NUCLEAR SECURITY ENTERPRISE TO ENSURE HIGH QUALITY SCIENCE, ENGINEERING, AND MISSION EFFECTIVENESS IN AN AGE OF AUSTERITY

Hearing of the Armed Services Committee
Strategic Forces Subcommittee
U.S. House of Representatives

February 16, 2012

George H. Miller, Director Emeritus
Lawrence Livermore National Laboratory

Opening Remarks and Summary

Mr. Chairman and Members of the Committee, thank you for the opportunity to provide a statement on governance, oversight, and management of the national laboratories that are part of the National Nuclear Security Administration (NNSA) within the Department of Energy (DOE). This hearing is timely and important. We must make certain that the outstanding capabilities of these laboratories are being efficiently and effectively applied to the many major problems facing our nation. This is an especially crucial issue to address at time when the nation faces austere federal budgets. It incumbent on all of us to soberly look for ways to eliminate bureaucratic waste and ensure maximum value from the federal dollars invested in the NNSA national security laboratories.

My name is George Miller and I served as director of the Lawrence Livermore National Laboratory (LLNL) from 2006 through December 2011 and as president of Lawrence Livermore National Security (LLNS), LLC, the Management and Operating (M&O) contractor for the Laboratory beginning in October 2007. Prior to becoming Director, I worked at the Laboratory for more than 30 years in a broad spectrum of national security programs. LLNL, Los Alamos National Laboratory (LANL), and Sandia National Laboratories (SNL) carry the awesome responsibility of sustaining the safety, security, and effectiveness of the nation's nuclear stockpile. Our laboratories also apply our outstanding science, technology, and engineering (ST&E) capabilities to address many critical issues that our nation now faces.

Based on the trends I have witnessed over 40 years and my experiences as director of LLNL for the past five years, I would like to make five major points.

- *There are many "top level" positive outcomes from NNSA management of the national security laboratories.* In particular, the laboratories continue to have very strong scientific and technical capabilities and an outstanding workforce. The Stockpile Stewardship Program is working and sensibly balances investments in R&D, production, and facilities; and the talents of the laboratories are being applied to a broad set of critical issues facing the country. In addition, DOE and NNSA have recognized the need for improvements in governance.

- *At a time when federal budgets are austere and the U.S. faces enormous challenges that call for innovative ST&E, we cannot afford to waste precious dollars on bureaucratic inefficiencies.* Bureaucratic inefficiencies prevent the laboratories from accomplishing much more in nuclear security programs with the budget provided to NNSA. In the vernacular of the military, the tooth to tail ratio is significantly out of balance. Also, if we were able to operate at lower cost and there were fewer impediments to arranging interagency work, we could be providing our innovative ST&E more widely to other federal sponsors and U.S. industry.
- *Presently, the NNSA laboratories are under severe stress in their ability to perform their vital missions because they are substantially and increasingly constrained by the manner in which federal management and oversight is implemented.* I believe the impact is well in excess of hundreds of millions of dollars of work per year across the complex. The current governance model is one of "transactional oversight" and control rather than "process oversight" (ensuring that the right processes are in place). Transactional oversight entails setting precise steps to be followed and examining implementation of each step with more than 100 federal employees at each site and hundreds of external audits annually. By its very nature, this process is extremely conservative, risk-averse, and avoids appropriate cost-benefit considerations. In addition to these costs, the resultant detailed stovepiping of what and how work is to be done greatly diminishes the ability of laboratory directors to make day-to-day decisions and trade-offs to optimize efforts, increase productivity, and lower costs.
- *The core issue is the loss of the sense of partnership and mutuality between the governing federal entity and the national security laboratories—the principal reason that Federally Funded Research and Development Centers (FFRDCs) and M&O contracts were created.* In my view, the most appropriate partnership is one strongly focused on national service, with defined roles and responsibilities: the federal government decides "what" needs to be done and the laboratories decide "how" best to accomplish it. Currently such is not the case, and unless this issue is addressed, there is likely no or little benefit to be gained from revisiting choices about the overseeing federal governance structure. To ensure the long-term health of the laboratories, maximize productivity in addressing important national problems, and continue to recruit and retain the highly skilled workforce, the directors need to be able to run their laboratories and make timely, prudent, and integrated management decisions about program execution and operations consistent with federal government objectives and statutes. The new contracts to manage and operate LLNL and LANL were intended to bring best business practices to the management of these institutions. The federal government needs to let that happen.
- *There are a number of positive actions that can be taken to move back toward the partnerships that have served the country so well.* Many discussions of this issue focus on the particular organizational construct—whether NNSA is a semi-autonomous agency, autonomous agency, and to which Cabinet-level department it reports. Each construct has strengths and weaknesses, but I believe it is more important to address the underlying fundamental issue: focus on national service,

reestablishing the partnership with appropriate roles and responsibilities and operating the enterprise in the most efficient and effective manner possible for the benefit of the nation.

Positive Outcomes from NNSA Management

The National Nuclear Security Administration began operations in 2000 as a semi-autonomous agency within the U.S. Department of Energy to manage the nation's nuclear weapons, nuclear nonproliferation, and naval reactor programs. Created by Congress in direct response to concerns about Chinese espionage at the national security laboratories, the agency was expected to take steps to broadly improve overall efficiency and performance as well as improve security.

NNSA came into existence at a time when the laboratories faced a number of major issues including the prospect of significant declines in the near-term and long-term budget for stockpile stewardship. From the perspective of the laboratories, we are in better shape today than we might have been otherwise, and NNSA management can take credit for a number of important "top level" successes. Working within DOE and with the Department of Defense and successive Congresses and Administrations, NNSA has paid attention to the health of its laboratories:

- The laboratories continue to have very strong scientific and technical capabilities. We continue to provide international leadership in areas of critical importance to nuclear weapons science and technology (e.g., high-performance computing and high-energy-density science) and are able to attract and retain an exceptional workforce.
- Funding for the Stockpile Stewardship Program has modestly increased, which is a success in today's constrained budget environment. The 2010 Nuclear Posture Review recognized the need to modernize the nuclear weapons infrastructure, sustain the science, technology, and engineering base, and invest in human capital. Subsequently the Obama Administration updated the Section 1251 Report to increase funding to $85 billion for the nation's nuclear weapons complex and arsenal over the next decade.
- NNSA has strived to balance the need for strong R&D programs at the laboratories—which underpin long-term success in stockpile stewardship—with production (i.e., life-extension programs) and investments in facility construction. The Section 1251 Report reflects this balance.
- Senior DOE and NNSA management understand and value the importance to the nation of the NNSA laboratories functioning as broad national security laboratories. Specifically, in June 2008 DOE Secretary Samuel Bodman issued a future vision, "Transforming the Nuclear Weapon Complex into a National Security Enterprise," that commits to broadening the laboratories' role and acknowledging their importance to meeting 21st century security challenges. To this end, a Mission Executive Council was established to facilitate interagency cooperation in making use of the special capabilities at the laboratories. However, there remain significant impediments to arranging interagency work.

- Senior DOE and NNSA managers recognize the need for governance reform. DOE Secretary Steven Chu and NNSA Administrator Thomas D'Agostino have launched initiatives to improve management and performance, but progress on reform has been slow.

The National Need to Maximize the Value of the NNSA Laboratories

The first and foremost mission of the NNSA laboratories is nuclear security. With the nation committed to sustaining "a safe, secure, and effective nuclear arsenal as long as nuclear weapons exist," LLNL has vital responsibilities to assess the condition of stockpile weapons, develop modifications as needed, and certify weapon performance after changes are made. Nuclear security in the 21st century also requires vigorous programs to prevent the proliferation of nuclear weapons and counter nuclear terrorism. As I have reported to congressional committees over the years, we are achieving many technical successes in this challenging mission, but the nation could be getting much more value out of the exceptional capabilities at the NNSA laboratories, which is particularly important in austere times.

The nuclear security mission of the laboratory has always required the best of science, technology, and engineering. To sustain the nuclear stockpile over the long term, the laboratories strive diligently to attract and retain an outstanding workforce. Scientists must have the skills and experimental and computational tools necessary to understand in detail the effects on aging materials on weapons materials and weapons performance. They must be able to identify and resolve issues as they arise, work with skilled engineers to develop necessary changes to weapon systems, and ensure production quality. Laboratory researchers also devise innovative "game changing" ways to improve scientific understanding of weapons physics, develop methods to improve weapon surveillance and lower production costs, and detect clandestine nuclear activities worldwide.

The exceptional people and research tools at the laboratories have long contributed to solving important national problems broader than nuclear security. Since the 1960s, the laboratories have supported the intelligence community with technical analyses and technology development, and for nearly three decades, work has been ongoing at the laboratories on conventional munitions technologies under a memorandum of understanding with the Department of Defense. Bioscience and biotechnology at Livermore and Los Alamos provide an instructive example. The programs began in the 1960s to understand the effects of ionizing radiation on the health of the DOE workforce. Our researchers brought innovative technology to biology, revolutionized the way cells are sorted, and spearheaded DOE's technical leadership in launching the international human genome project. Our laboratory is now at the forefront of developing DNA-based detector technologies for rapid identification of pathogens for public health and biosecurity applications.

As broad national security laboratories, the NNSA laboratories have very special capabilities that can be brought to bear on the many major challenges now facing the nation: weapons-of-mass destruction proliferation and terrorism; the security of cyber space and space assets in a highly interconnected world; protection of U.S. armed forces

engaged in unconventional conflicts; energy and environmental security; and U.S. economic competiveness. Currently, LLNL applies its exceptional science, technology, and engineering capabilities to projects in each of these areas. The work capitalizes on the special strengths of our Laboratory (e.g., leadership in high-performance computing). Projects are often conducted in collaboration with research partners including the other NNSA and DOE laboratories.

However, we could do much more were it not for existing red tape and bureaucratic inefficiencies in federal management and oversight of the laboratories. As a nation, we cannot afford to waste precious R&D dollars on bureaucratic inefficiencies, particularly at a time when the prospect is for austere budgets in the decade ahead. For the funding provided to NNSA, the laboratories could be accomplishing much more in nuclear security programs—hundreds of millions of dollars of work per year (as discussed later). Work performed for other federal sponsors would similarly benefit from lower work costs at the laboratories, and there would be fewer impediments to arranging interagency work. Both factors are key for the nation to maximize its value from the NNSA laboratories at time when scientific and technological advances are sorely needed to address 21st century challenges to U.S. security.

Constraints on Efficient Management of Laboratory Programs and Operations

The establishment of (what are now) the NNSA laboratories pioneered the concept of government-owned, contractor-operated (GOCO) research facilities, later to be included in policy guidelines established in 1967 (and superseded in 1984) for Federally-Funded Research and Development Centers (FFRDCs). At the time, the Atomic Energy Commission established long-term relationships for the operation of government-owned facilities to conduct research and manufacturing functions. The contracts (with the University of California for Livermore and Los Alamos) placed the day-to-day responsibility for nuclear research in the hands of non-federal employees in order to ensure the highest quality staff were dedicated to these important tasks. In this unique relationship, the government decided "what" needed to be done and provided the funding and the Laboratories decided "how" to best accomplish those tasks within the federally defined constraints.

For long-range basic and applied research, this partnership approach was believed to be essential for creating the special work environment required—responsive to national needs but freed of the ordinary bureaucratic burdens placed on federal agencies and buffered from politics. The FFRDC would benefit from continuity in funding and continual investment to sustain expertise. In return, the FFRDC would work with the best interests of the nation in mind providing the government intellectual quality, objectivity, and independence. The center would be managed and operated following best practices in the private sector. According to Office of Federal Procurement Policy guidelines (OFPP Policy Letter 84-1), the monitoring of FFRDC performance "shall not be such as … to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work."

As FFRDCs, the NNSA laboratories have been able to attract the best and brightest, and they have provided international scientific and technological leadership. However, the

special relationship between the government and the laboratories has continually deteriorated over a long period of time, and it is increasingly difficult for laboratory directors to make the necessary day-to-day management decisions at their institutions in timely manner. In making trade-offs that weigh benefits vs. risks and integrate conflicting objectives, the laboratory directors often have to get federal approval from one or more of the organizational "stovepipes" even if the decision has no ostensible impact on costs. Mission delivery is not as efficient as it could be, and excessive "red tape" can be expected to have long-term ramifications on the health of the laboratories and their ability to attract and retain quality personnel.

This is not news. Independent study after independent study has come to similar conclusions. *America's Strategic Posture*, issued in 2009 as the final report of the Congressional Commission on the Strategic Posture of the United States (chaired by Dr. William Perry and Dr. James Schlesinger), is illustrative. One of the main concerns expressed by the commission is that "the governance structure of NNSA is not delivering the needed results. This governance structure should be changed." The report adds that "... the NNSA has failed to meet the hopes of its founders. Indeed, it may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate. ...Outside assessments have concluded that the heavily bureaucratic approach of DOE/NNSA is inconsistent with the effective operation of a research and development organization."

In the FFRDC–government partnership construct, the federal sponsor specifies "What to do" and the FFRDC determines best "How to do it." The "what" and the "how" have become increasingly intertwined and both specified by DOE and NNSA through overly prescriptive requirements in regulations and directives. A review conducted by the NNSA Sandia Site Office in 2007 found that in 113 directives there were a total of 7,752 separate requirements. The number of directives and standards affecting the contract to manage and operate LLNL rose from 139 in 2007 to a peak of about 160 in 2009; DOE/NNSA efforts at governance reform have since reduced the number to 131—a large number that still imposes way too many non-value-adding requirements.

Non-value-adding requirements are especially pernicious in two ways. First they can impede the adaption of best operational and business practices widely used in industry if they do not exactly conform to an existing requirement. Secondly, they tend to accentuate overly conservative risk-averse behavior. What often gets implemented is the most conservative interpretation of a requirement that does not balance costs and risks. The most conservative interpretation could arise in any one of the stovepipes that have a say in implementation or become a self-imposed constraint to avoid engaging the issue.

The problem of excessive requirements is exacerbated by non-productive efforts that stem from the method of NNSA oversight. The governance model is one of "transactional oversight" rather than "process oversight." Instead of making certain that the laboratories have the right processes in place to manage work safely and securely, transactional oversight entails establishing precise steps and/or requirements to be followed and examining implementation of each. There are more than 130 federal employees on site at LLNL and the Laboratory is subjected to hundreds of audits each year. By comparison, the National Aeronautics and Space Administration's Jet Propulsion Laboratory, which has a budget slightly larger than LLNL's, has about 30 federal employees on site. The

leverage is huge; I estimate that for every federal oversight person it takes one to two Laboratory personnel to respond to their tasking.

NNSA monitors both operational and program performance at the Laboratory using an annual Performance Evaluation Plan (PEP). Assessments of performance as measured against the PEP objectives and goals provide the basis for annual decisions about the award term (extending the contract) and performance fee to LLNS, the M&O contractor for the Laboratory. In FY 2011, the PEP for LLNL had 11 Objectives, 42 Measures, 79 Targets, 5 Award Term Incentives, 12 Multi-site Targets (all but two applicable to LLNL), and a large number of supporting metrics to gauge performance. The DOE/NNSA Site Office at Livermore defines 324 elements in their management assessment plan, which includes 50 separate functional management areas. The data gathering and processes used to track performance indicators add to the bureaucratic workload associated with transactional oversight.

The operational area provides an important example of the increased cost and resulting inefficiency. DOE has been committed to moving from a system of self-regulation to a system of external regulation for years. Secretaries of Energy from Hazel O'Leary onward have supported such change in theory, but progress has been painfully slow. Over the last several years there has been progress at many DOE and NNSA laboratories moving to ISO (International Organization for Standardization) standards in order to get relief from the DOE Orders and potential significant improvements in operational efficiency.

The current DOE/NNSA approach to oversight is both extensive and expensive. In addition to the daily oversight by the NNSA site office personnel, between the NNSA Site Office, NNSA Headquarters, and DOE, there are over 1,000 audits and inspections planned for FY 2012. Internally, LLNL has 280 self-assessments planned for FY 2012, of which about 70 percent are driven by requirements.

At LLNL, ISO 14001 accreditation of our Environmental Management Systems has been in place for over two years, and the program successfully passed two surveillance audits in 2011. LLNL has recently achieved external certification in Safety Management (OHSAS 18001) and is in the process of obtaining Quality Management (ISO 9001) certification. The process oriented approach used to maintain compliance with ISO Standards is much more efficient, typically involving a single integrated evaluation each year. Maintaining certification of these ISO Standards is significantly more efficient than the current DOE process and by its very nature is recognized as an industry best practice.

Even though many of our operational systems are certified based on international standards and overseen by other federal and state institutions, today, our Laboratory is still subject to a broad system of DOE/NNSA site office oversight and detailed checks far beyond the norms for ISO certified operations. These audits and inspections are very expensive, both in terms of federal and Laboratory manpower and are, in my view, unnecessary as long as we maintain ISO certification. LLNL essentially has to operate under two parallel systems.

Just as in the operational area, the activities in the programmatic area are specified, managed, and overseen in a detailed way by federal employees, which significantly reduces effectiveness and efficiency. At the highest-level, a

performance-based management approach seems a very practical, common-sense way for the government to specify "What to do." However, its current implementation is stifling the effectiveness of the laboratories to get the job done and adding significantly to the cost.

Between DOE/NNSA and the M&O contractors, there may be on the order of a few hundred staff at each site dedicated to managing the oversight relationship. With a shift from transactional oversight to process oversight, the number could be reduced significantly, with additional reductions at headquarters. The overall savings across the complex is expected to be hundreds of millions of dollars per year, not counting the added efficiency in work processes that would be realized within the laboratories and production sites.

I have watched the increase in bureaucratic inefficiency and the shift from a focus on national service to a focus on compliance and contract details over the course of my career. All of us—Administrations, Congresses, federal civil servants, and the laboratories—have all had a role in creating the situation in which we find ourselves. We must all work together to ensure that not a single bit of our precious science, technology and engineering talent is wasted on bureaucratic inefficiency and is instead focused on the nation's important challenges.

It is time to eliminate transactional oversight, turn over management of the laboratories to people who have been hired to manage them, and let them implement the best practices of private industry.

Restoring Partnership and Trust

The core issue is the loss of the sense of partnership and a trusted relationship between the federal sponsor and the FFRDCs—specifically DOE/NNSA and the national security laboratories. In a very tangible way, we are all engaged in national service, and the nation is best served, in my view, if our relationship is based on respect and mutuality. Our discussions should first be about national service; the contract is important, but not "THE" issue. In a sports analogy, the "game" (national service) is the issue; referees (contract managers) are important, but referees are not the game.

I use the word "trust" to describe the desired relationship; it is a word that is used variously, and for some, unfortunately it carries emotional overtones. For me, trust is contextual—in this case, trust that the partner will carry out its share of the responsibilities. Both the federal government and the laboratories have distinct and important roles to play. So when I use the word "trust" I mean a relationship of mutually respectful partners, focused on national service, in which the federal government decides "what" needs to be done and the laboratories decide "how" to do it best.

Unless we restore the focus on national service and operate in a relationship of mutual respect, there is likely no or little benefit to be gained from revisiting choices about the federal governance structure overseeing the laboratories. To ensure the long-term health of the laboratories, maximize productivity in addressing important national problems, and continue to recruit and retain the highly skilled workforce, the directors need to be trusted to run their laboratories and make timely, prudent, and integrated management decisions

about program execution and operations consistent with federal government objectives and statutes. A trusted partnership between the laboratories and their governing federal sponsor does not depend on or require transactional oversight.

The change of management of Livermore and Los Alamos national laboratories from University of California to a limited liability consortium of partners is not the source of the underlying issue but it is symptomatic of the problem and in subtle ways reinforces it. In terms of the requirements imposed, the contracts are not hugely different than those with the University of California. However, the larger fees alter the dynamics. For some, the presumption is that the M&O contractor is there to make money instead of providing an important national service; and further, because the fee is viewed as a profit, the laboratories are treated as contractors and contracting officers impose unilateral conditions on a laboratory rather than by mutual agreement. A sense of teamwork is lost, details that are stovepiped and limit flexibility are included as part of the PEP, and the NNSA contracting agent is obligated to scrutinize detailed performance measures to justify the provided annual fee. Instead of national service, the focus is on the contract.

As mentioned, the consequence of this loss of partnership and trust is costly. I believe the most significant—in addition to the dollar costs lost through the governance process—is that the laboratories are greatly hindered from making integrated decisions about programs and operations to best manage their R&D programs and wisely invest in operation improvement in the national service. The hindrance comes from stovepiped review of day-to-day decisions made by the laboratory directors and the excessive scrutiny of transaction oversight that comes from a lost of the sense of partnership and a lack of trust in the laboratories and their managers to act in the national interest.

We all know what the problem is—study after study has highlighted it. Focusing on the particular organizational construct—whether NNSA is a semi-autonomous agency, autonomous agency, and to which Cabinet-level department it reports—diverts attention from what I believe is the core issue. Any of these constructs can be made to work. We know what the right thing to do is. We just need to do it.

It is time to focus on national service, restore the trusted relationship between the federal government and the national laboratories, and do the right thing.

Closing Remarks—on Lost Opportunities

As I learned through the course of my career—and felt so strongly while serving as director of LLNL—the outstanding workforce at our Laboratory has been the key to the success in our vital national security mission. To attract and retain the best and brightest, it is essential to invest in Laboratory staff—particularly in the highly competitive high-technology environment in today's world. These investments take many forms: scholarships, work–life programs, a financially solid benefits program, training and leadership development programs, special salary actions for exceptional people, and the like.

Some of my greatest frustrations as Laboratory director have been related to the approval processes required for and the growing restrictions on investments that I could make in Laboratory personnel—even though, in almost all cases, the actions could be

accommodated within the existing budget. As the manager of an FFRDC, I was expected to act in the best interests of the country and yet I had shrinking latitude to make what I believed to be prudent business decisions to ensure the long-term health of the Laboratory.

If the government continues down the path of treating the NNSA laboratories as contractors rather than trusted partners, engaging in excessive oversight, and treating the workforce as replaceable employees rather than exceptional people dedicated to public service, I wonder how much longer the national security laboratories will be able to sustain their greatness.

Our country is facing multiple major challenges to its national security, to sustainable production of its energy needs, and to its economic competitiveness. Science, technology and engineering capabilities at our national laboratories can contribute significantly to helping address the challenges. We cannot afford to waste the precious talent at these institutions on bureaucratic inefficiency.

Think of three "Ts":

- Restore TRUST
- Eliminate TRANSACTIONAL Oversight
- TURN OVER management to the people you hire to manage.

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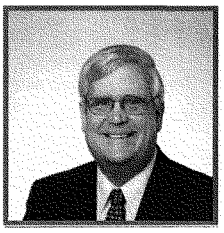

DR. GEORGE H. MILLER
Lawrence Livermore National Laboratory

B.S. physics, College of William and Mary (1967)
M.S. physics, College of William and Mary (1969)
Ph.D. physics, College of William and Mary (1972)

Dr. George H. Miller was the tenth Director of Lawrence Livermore National Laboratory, a position he assumed in March 2006, after a long and distinguished career in national security work at the Laboratory. While serving as Director, Dr. Miller was responsible for the management of the Laboratory and led the institution through its transition in October 2007 to a new management contractor, Lawrence Livermore National Security (LLNS), LLC. Dr. Miller also served as the President of LLNS.

Throughout his tenure, Dr. Miller tackled a variety of management and scientific challenges in the interest of national security. For example, under Dr. Miller's leadership as Associate Director for the National Ignition Facility, a new management team was assembled in 1999 with a new project execution plan that put it on track for completion in 2009. Through Dr. Miller's stewardship, this $3.5 billion laser continues to meet its scientific and operational milestones.

Prior to his position at NIF, Dr. Miller provided the leadership to integrate LLNL's national security programs into a cohesive effort to meet U.S. national security objectives of maintaining the U.S. nuclear deterrent without nuclear testing, advance national nonproliferation and arms control goals through the development and application of effective scientific and technical solutions, and support DOD programs.

From 1985 until 1996, Dr. Miller led the Laboratory's nuclear weapons program as a major participant in the development of the Stockpile Stewardship and Management Plan to ensure the safety, security and performance of the nation's nuclear deterrent in the absence of testing. Dr. Miller applied his expertise as a weapons design physicist to assist in the development of the scientific capabilities necessary to maintain the nuclear deterrent without nuclear testing. He developed his scientific management skills as the project leader for the B77 nuclear weapon development and the W84 ground launched cruise missile.

Dr. Miller has represented the Laboratory's national security programs to a wide variety of decision makers in the federal government, including members of the Executive Branch, Departments of Energy and Defense, and the U.S. Congress. In 1989, Dr. Miller provided scientific counsel to Secretary of Energy Admiral James D. Watkins while on a temporary assignment to the Department of Energy as Special Scientific Advisor on Weapons Activities.

He provides advice to the Commander of the United States Strategic Command through his membership on the USSTRATCOM Strategic Advisory Group and as Chairman of its Science and Technology Panel. He holds memberships in the American Physical Society and Sigma Pi Sigma - National Physics Honor Society. He has received awards and honors from the National Science Foundation Graduate Fellowship, Gulf-General Atomics Fellowship, Sigma Pi Sigma and was recently presented with the Gold Medal from the National Nuclear Security Administration.

Dr. Miller and his wife have two grown children and live in Livermore, California.

Statement of Ambassador C. Paul Robinson
President Emeritus and Laboratories Director of Sandia National Laboratories

Committee on Armed Services
of the U.S. House of Representatives,
the Subcommittee on Strategic Forces

for presentation on February 16, 2012

Introduction

I am C. Paul Robinson from Longmont, Colorado, and I have spent the majority of my career working in various leadership positions within the United States nuclear weapons complex. I was born on Oct. 9, 1941, which as I was to learn only very much later in my life, was coincidentally the same day that President Franklin D. Roosevelt signed the Top Secret memorandum creating the Manhattan Project to build the first nuclear explosive weapons. *Thus, nuclear weapons and I both got our official starts on the same day.* I earned a Bachelors of Science degree and a Ph.D. in Physics and proceeded to the Los Alamos Laboratory, which was the nation's first nuclear weapons laboratory. I spent 18 years there, in a variety of jobs, including the leadership of all of the nuclear weapons programs and national security efforts from 1978 through 1985. After a few years working in the U.S. nuclear industry in New York City, I was appointed to be the Ambassador and Chief Negotiator for the Nuclear Testing Talks between the US and the USSR in Geneva, Switzerland. I was first appointed by President Ronald Reagan and then reappointed by President George H.W. Bush, completing two major treaties and protocols, and several smaller agreements, before leaving the post after the U.S. Senate gave its unanimous approval for ratification of the treaties and protocols in late 1990. I returned to an R&D career, this time at the Sandia National Laboratories, where in 1995 I was appointed to be the President and Laboratories Director. (Sandia itself was originally a part of the Los Alamos Laboratory, but was spun off as a separate entity at the end of World War II.) In 2006, after having served ten years as the leader of Sandia, I retired, but have devoted much of my time since to the same purposes – helping to maintain strong U.S. strategic defense capabilities, and seeking better means to help our nation secure a peaceful and free world. I have attached a one-page vita at the end of this statement, as well as the Disclosure Form for (nongovernmental) Witnesses in order to be responsive to the requirements of House of Representatives Rule XI, clause 2(g)(5), of the Rules of the House of Representatives for the 112th Congress.

Disclaimer: I am appearing today as a private citizen, and my Statement and oral testimony reflect my own thoughts and experiences. In particular: The views and opinions expressed are solely my own, and do not necessarily state or reflect those of Sandia Corporation, Sandia National Laboratories, the United States government, or any agency thereof.

A Brief History of The Weapons Labs and their Federal sponsors

Reasons for creating the Go-Co structure: The first proposal debated within the Manhattan Project (itself placed under the U.S. Army Corps of Engineers) was "Should the country draft all of the scientists we will need into the Army?" This idea was thankfully quite short-lived as a possibility. Also short-lived were any considerations of making the institutions into federal laboratories, largely stemming from the views of many of the scientific leaders of the day, several of who became key advisors to General Leslie R. Groves, who led the Manhattan Project. Their arguments were primarily based on the federal government's poor prior track record in creating and nurturing scientific institutions. It was believed that entrenched bureaucracies, with their practice of hiring only through the Civil Service processes, were unlikely to move the project forward at the rapid pace needed if its products were to support the war effort.

Then, the idea surfaced of tasking the University of California, an institution that was already providing a number of the key scientists, including Dr. Robert Oppenheimer, to provide leadership and management of the lab. The Go-Co idea was then born — the new entity was to be ***government-owned (and financed), but contractor-operated***. The University of California immediately agreed to take over the responsibility for the personnel functions at Los Alamos, and moved to eventually be responsible for all its management and operations. This arrangement also proved a very useful arrangement for keeping secret the names of the eminent group of scientists and engineers being assembled there. Subsequently, in order to get other major nuclear weapons institutions going, the same Go-Co concept was used to bring in a number of other major companies to organize, manage, and operate other key facilities: e.g. Union Carbide, DuPont, etc. at other Manhattan Project sites.

My own nuclear weapons history dates to December of 1967, when I joined the Los Alamos National Laboratory. As a recent graduate with a Ph.D. in Physics, I was assigned to the Test Division (J-Division) of Los Alamos, and my employer was the University of California. I immediately began to work on experiments carried out at the Nevada Test Site. During my first year I also was enrolled in the classified course in Nuclear Weapons Physics taught by Samuel Glasstone, which became a life-changing experience for me —learning the full extent of the exciting discoveries and inventions that had been achieved during the Manhattan Project. It was also a very humbling experience for me, coming directly on the heels of a graduate specialty in Experimental Nuclear Physics.

The government entity then responsible for Los Alamos was the Atomic Energy Commission (AEC). After World War II and the important role the nuclear devices played in ending it, President Truman had signed a bill on August 1, 1946 creating the AEC, and transferring all nuclear-related research and development work —for both military and peaceful uses— from the War Department (which also then got a new name –the Department of Defense) to the new civilian-run AEC.

In 1974, the Congress created the Energy Research and Development Administration (ERDA), abolishing the AEC and also creating the Nuclear Regulatory Commission. In August of 1977, after less than 3 years of ERDA, President Carter signed a bill which transferred all of ERDA and some other activities into a new Cabinet-level department: the Department of Energy. This step was primarily motivated to try and respond to the "energy crisis" which occurred in the prior two years, initially caused by the Arab Oil Embargo. The nuclear weapons work was quietly "tucked into" the new Department, although most of the new enterprise was to be devoted to its new mission —Energy, writ-large, including in all of its forms.

Many fundamental problems were experienced both during and after the long transition from the wartime organization to a functioning Department:

1. When a decision was made to make the Labs permanent after WW II, much discussion centered on the subject of future R&D, and how it was to be used.
2. One stated premise was: "We want the scientists and engineers responsible for U.S. nuclear weapons to always function at "the top of their game". Therefore they provided a generous portion of the budget for "Weapons Supporting R&D," which the Lab leaders themselves would decide how best to use it, in order ***to best meet that "top of their game***" goal.
3. Before long, a counterpoint of views developed, which suggested that the labs owed "a debt to science itself," which they should be "paying back". First at Los Alamos, then later at Lawrence Livermore, large portions of the weapon supporting R&D funds were placed under a separate management than the weapon programs. Soon, other "pure" scientists and specialists in fundamental R&D areas began to be paid for by these funds. ***A major inconsistency of course was the result that weapons R&D funds were being used to keep a separate group of scientists at the top of their game, but with few of those being willing to work within the weapons program, or even willing to make themselves available for consultation with members of the weapons program.*** A contentious debate ensued. From the late 70s (until the end of 1985) I led all the nuclear weapon programs at Los Alamos, and I can tell you firsthand of my battles against this "pure science tax" on the weapons program. But I achieved little success in reversing that situation. The University Faculty Senate at UC entered its opinions on this issue, arguing that the university really had no business being associated with nuclear weapons or labs for development of such weapons, and they voiced the view that, ***unless science was to be generously supported*** within the efforts, the university should sever all ties.
4. In response, and in order to continue to support the mission needs of the weapons program for science and technology, we were able to increase the level of a fledging "laboratory-directed R&D effort" or LDRD, and move it up gradually, from 2% to 8% of the total operating budget. But of course, for the past 20 years that effort has been periodically trimmed downward. A separate problem occurred when some labs began to use their LDRD funds to pay for their postdoctoral research fellows. After I had left Los Alamos in 1985, the weapons

supporting research as well as LDRD began to subsidize ***foreign postdocs*** in growing numbers, rather than requiring a US citizenship, as was usual for most employees. The history of such efforts continues today, but few such postdocs ever gain US citizenship, or more importantly, ever gain security clearances that would allow them to be able to contribute to the US nuclear weapons efforts.

5. After the Nuclear Freeze efforts of the 1970's, and on the heels of the passage of the Non-Proliferation Treaty (NPT), the anti-nuclear lobbying groups began to advocate a policy that became, in retrospect, even more damaging to the exploratory scientific and technical efforts within the laboratories' weapons efforts. These groups suggested their own interpretation of the NPT that would require the US itself to forsake any R&D efforts that might lead to "new nuclear weapons", arguing that if this policy were adopted by the US, more nations might join the NPT regime. Of course, even though such speculations had never been discussed during the treaty preparations, this thesis has continued to be offered to Presidential Administrations and to the Congress over the past three decades. Within the past two years the current US Administration embraced that idea ***and issued instructions*** prohibiting the laboratories from spending any monies in exploring or creating new nuclear weapons, ***unless the work was approved directly, in advance, by the President and the Congress***. This step was taken, even though the formal phased-systems that were adopted for nuclear weapons since the mid-50's [with separate defined phases for concept exploration and development, weapons system development, to actual production and stockpiling of all nuclear bombs or warheads] had always included a specific requirement that to move from weapon system development (phase 3) to actual production (phases 4-6) of any new weapon design **would require explicit approval (in writing) by the President and the Congress**. One can only guess that somehow the current Presidential administration felt that such past prohibitions were also not sufficient in their view, and felt a need to stretch the prohibition further forward in time, in order to try and intercept earlier any ***"thinking"*** about new nuclear weapons. I believe it is safe to say that within the laboratories today there is a need to clarify whether there should be any attempts to regulate or restrain advanced or exploratory thinking. Research and advanced concept stages are fundamental to the scientific process. Any attempts to regulate "thinking about new weapons," or preventing "new designs", either on paper or in computer models are certainly unwise, and completely contradict the approaches recommended in the famous report "***Science, the Endless Frontier***", which was requested by President Truman to explore the essence of the Manhattan Project and address why its success had exceeded all expectations. That study was led by Dr. Vannevar Bush, and strongly advocated that the government must "constantly open new frontiers in science ... to develop and protect our nation's security in peace time or in war." The present approach to limit exploratory thinking in science is contrary to anything in that report. Such proposals seem more motivated by the calls of a "Nuclear Freeze" in the early and mid-1970's. Doubtless, governments do have the right as well as the responsibility to decide what weapons to build, deploy, and use; but such controls have been in place for U.S. nuclear weapons since their

> earliest time. The major debates of the early 1950's in the U.S. on whether to build, test, or deploy thermonuclear weapons (i.e. the so-called "hydrogen bombs") attest to this fact.
>
> Today, there is one other self-imposed constraint, owing to the language within the Comprehensive Test Ban Treaty, which President Clinton signed on September 25, 1996, but for which the U.S. Senate voted to reject its ratification in October of 1999. The U.S. State Department ruling on this matter has had the effect of limiting "new designs that might require additional nuclear underground testing" to be currently prohibited, because such testing would be seen to "act in a manner inconsistent with a (signed but not ratified) agreement". These prohibitions continue to be in place today —16 years after the treaty was signed, but without its entry into force (and with few prospects for its entry into force occurring any time soon). Thus, today, only designs that had been successfully and extensively tested in the past, and which would not require further nuclear testing in the future, are being considered for future U.S. stockpiles.

Let me close this narrow discussion on "new weapons" by mentioning that most other nuclear–armed nations of the world have not adopted any of the prohibitions that the U.S. administration is now requiring of its weapons labs. For others, both in their research and development efforts and in their approach to experimental confirmations in testing, there are no similar constraints. Current restrictions against new nuclear weapons designs reduce the U.S. ability to incorporate results of exploratory science or the application of novel design approaches for developing new weapons. They certainly interfere with the designers' abilities to apply results derived from new scientific and technical breakthroughs or achievements of the times. They further impede progress by restricting the exploration of new ideas and inventions by the US scientists who are charged with the task of attempting to prevent "technological surprises" on the part of other nations — whose scientific research is not subject to such fundamental restraints. By not being able to explore what may be possible, you become "blind" to new possibilities and threats.

More starkly, there is good evidence that some nations are still testing nuclear weapons at low yields. US experts now believe that the levels at which others are conducting underground experiments can allow them to develop completely new primaries for nuclear weapons systems. And, in the case of Russia, their leaders have publically claimed success in fielding of completely new (and revolutionary) nuclear weapons designs via just such a process.

How do we address root causes for the declines in the US nuclear weapons efforts?

Having watched and worked under the various commissions, agencies, departments, and now an "administration within a department", I have seen a continual degradation in capabilities of the federal entities responsible for managing US nuclear weapons development over the past 45 years, along with parallel declines in the GoCo organizations themselves (the nuclear weapon labs and plants.) Let me cite what I

believe are the primary causes for reduced performances that must be addressed if these trends are to be reversed.

James Conant, one of the principal scientific advisors during the Manhattan projects once was once questioned about "How can America best support the scientists who are working to protect our nation's security?" He responded, "***The best thing that can be done is to choose men (and women) of brilliance, back them heavily, then leave them alone to do their work***." Indeed this was, in fact, ***an apt description of how the Manhattan Project itself functioned***. But then after the war, when the GoCo model was put forward as Los Alamos was made a permanent institution, the government agencies for their part could scarcely be accused of "having left them alone to do their work." Quite to the contrary, over a period of many years the ***government oversight*** over the GoCo's began to result in direct interference in the processes and procedures used in the laboratories and plants, with the government progressively imposing more and more bureaucratic processes and procedures on the work of the GoCo's. These have not only steadily increased in the numbers of orders and directives, but in ever more restrictive controls and more strictly defined rules. By the early 1990's, the notebooks containing the DOE-developed rules and directives overflowed bookshelves that were four feet in width and five shelves in height!

It is not at all unfair for me to state that the burgeoning of a multitude of strict controls within the workplaces of the labs and plants, have caused very serious concerns among the scientific and technical staffs. Yet, I know of no instances where protests by laboratory or GoCo leaders against these restrictive interferences by the government were either withdrawn or made less restrictive. Rather the complaints against these ever-more-bureaucratic obstacles —that were clearly slowing the inherent abilities for the labs (and plants) to do their work— were often greeted with the responses like "we are the customers here; do things the way we want them done." Yet such behavior flies in the face of the original GoCo approach —that was ***originally agreed to be a "partnership arrangement"***. The DOE, within its first few years, similarly changed the operating rules by imposing a schedule of "fees", usually multiple millions of dollars and up, that were intended to "get the GoCo's attention", with awards to be made to those who were most compliant to the voluminous rules being constantly generated. All of the original GoCo's had agreed to do their leadership and management tasks on a "No Fee" basis, as a service to the nation. Thus they were only reimbursed for costs incurred. Of course, over time, the quest for fees caused an entirely different motivation than national service to dominate GoCo interactions. Over the course of a decade a great many of the GoCo companies and corporations declined to participate further, and today a new cadre of companies, small as well as large, are the parent companies for GoCo's, with some whose only business today is to operate the labs or plants. For such companies especially, it can be said that the government truly has "captured their attention", though such fees.

It became clear to most of us in the labs and plants that the GoCo model had little meaning or value from that point on.

Yet, in my view, the primary cause for past (as well as recent) failings of the GoCo model resulted from a basic incompatibility between the "bureaucratic structure and functioning" of Federal government entities, and the basic approaches and operating philosophies needed for successful scientific research and development activities. Note that these are the very same worries that had been expressed when the GoCo's were first created —that the government should not be placed directly in charge of these crucial scientific research and development efforts. In half a century, we had come full circle!

We all know too well that bureaucratic ways of approaching work never decrease but only tend to ***grow*** over time, ***unless*** there are very strong external forces that can operate to streamline their work procedures. These forces must also be reapplied at frequent intervals, to prevent "regrowth" of the difficulties. Even so, I believe that all bureaucratic structures still will reach a point where they must be ***drastically reformed, or eliminated and replaced***, before they become completely dysfunctional. The greatest difficulty lies in realizing and taking the necessary actions in time to prevent further catastrophic failures and damages that would otherwise be certain to occur.

I will shorten the discussion here, but will present in **Appendix 1 of this statement** a more fulsome exposition of **the characteristics and the evolution of such bureaucracies, and their history in slowing down the progress of many government agencies and projects over time.**

Bureaucracies have been recognized since ancient times by a set of characteristic behaviors that arose and were exhibited in larger work organizations. Historically, governments in particular have been more susceptible to degenerating into these adverse behaviors, especially when strong leadership was absent. From Ancient Rome, to the Athenian Greeks, and on to the Ottoman Empire, one can observe that such organizations reached a level of "bureaucratic bloat" that the organizations began to lose their power and efficiency. They required longer and longer times to make decisions, finally seemingly incapable of managing further. A number of distinctive factors and behaviors were noted: impersonal work environments, all actions necessarily inhibited by large numbers of rules and obstructive procedures, internally focused power struggles rather than devoting energies to achieving work outputs, and inattention to actions taking place outside the organization. These too often culminated in an inability of the hierarchical leaders to drive behaviors within the organization, to a final condition where the members were no longer attentive to the very mission for which the organization had been created. Some have described bureaucracies as the ultimate "triumph of form over substance"!

These familiar patterns are widespread across the U.S. government today, but have also made their way into many private organizations, especially larger ones. I find very few who remain optimistic about the future success of the GoCo organizations, which were established to manage the nuclear weapons programs. All of their government sponsors, from the Atomic Energy Commission created after WWII, to the present day Department of Energy (with the National Nuclear Security Administration contained inside of it) experienced a burgeoning of such bureaucratic behaviors. These not only occurred within the government organizations chartered with "oversight" of the programs, but within the

Government-owned, Contractor-operated (Go-Co) entities responsible for directly managing and operating the labs and the production plants. The torrent of directives and order that began to be imposed on them, have finally brought the GoCo system to its current sad state. My conclusion is that ***it was the failure by all concerned to control the growth of their bureaucratic behaviors*** that resulted in U.S. nuclear weapons organizations performing at a much-reduced level of achievement than was the case when they excelled at what were seen as "history-making" levels of performance.

Throughout that long period, those scholars who researched and analyzed such organizational behaviors were constantly repeating their conclusion —"***bureaucratic organizations are not an effective structure to be used for organized activities or businesses that are required to be innovative***". This conclusion is especially valid for cutting-edge research and development efforts and for high-tech production. Those of us who have participated in this "60 year experiment" have independently verified that!

The same root causes were cited for the fall of great empires, that ***the growth*** of their own bureaucracies reached a point where ***timely decisions could no longer be made***, even to respond to life-threatening events. And it seems that that this fate can befall any organization over time. While these bureaucratic behaviors do build up within all organizations, large government entities have been found to be especially susceptible. A related contributing factor is cited regarding the structures of modern democratic governments. With a frequent turnover of top personnel through elections, leadership seldom emerges whose knowledge is sufficient to even diagnose, much less to be powerful enough to implement, measures to prevent such destructive growth.

But the question deserves addressing, "Can these difficulties be overcome?" My own readings and experiences over the years on this subject have also convinced me that "**It is not likely, and may be impossible, for bureaucracies to ever reform themselves**." Rather, oftentimes organizations must either be eliminated or go out of business, or be completely rebuilt in order to achieve real changes in bureaucratic behaviors or reductions in their costs. We are also all familiar with the phenomenon in which private companies, who fall victim to their own increasing bureaucracy, soon lose their market to "start-up" companies. These new entities are generally much more aware of, and more responsive to, the conditions in the external world, as well as having an edge as a result of their timeliness and efficiency in accomplishing their tasks. The **new** inevitably outperform the **old**.

Based on the above discussion, let me conclude that "I believe the existing Go-Co concept, which was originally created to run the nuclear weapons laboratories, has finally run its course, and now requires drastic reforms!"

At one point, I had gained enthusiasm when the ***Quality*** and ***Lean*** methodologies came into wider use within U.S. companies and institutions, especially with the quality maxim of ***continuous improvement***. I could immediately see that principle as just a restatement of ***the scientific method*** itself. In both scientific processes and in quality processes —as a result of observations, experiments, and understandings— superior products and

performances can be achieved. We in the Labs started our "quality journeys" and urged the DOE and NNSA to embrace those disciplines. In truth, the leaders of those organizations did embrace these ideas, and for a while, things did appear to be improving. That was until a point was reached in which workers in their organizations began to believe that fewer of them would be needed as a result of the efficiencies and superior operations that were being achieved. Unfortunately the "leaning out" of work processes, along with quality improvements, ***ceased*** when the Federal employees perceived that their jobs might be threatened by their own actions. Yet, the quality approach dictates that only the employees doing the work have the ability to drive the needed improvements, as it is not possible to make these improvements only by "inspecting out the defects". Unfortunately, the present state where quality and lean thinking are now in disuse, might well have been prevented if the very real concerns of these employees had been better handled. Without a vision or plans for the future roles for these government workers having been created, lean-thinking and quality-driven improvements soon ended.

Looking back at the several decades of my career spent in trying to save and restore the Go-Co model, sadly, I am convinced that all of the successive levels of bureaucracy that have grown up after the Manhattan Project have now made it nearly impossible to have optimism for the future for anyone engaged in any part of the programs –within government or within the GoCo's. The multiple steps and difficulties that must be overcome to ***accomplish even simple tasks within technical programs or projects have reached the point that they have become "unworkable"*** for the scientists and engineers still dedicating their lives to the nuclear weapons missions.

With these levels of obstructions to accomplishing work that are in place today, the success of the laboratories themselves (which were never immune to the growth in their own internal bureaucracies) is threatened. The individual performances and the major collective accomplishments needed to fulfill their important national security missions seem destined to fall short of the nation's needs, unless there are major commitments to change paths, and follow-through to achieve the needed reforms.

Therefore, based on the prior discussions, let me summarize the overall conclusions I have reached: The GoCo concept —created in the hope that the nuclear weapons laboratories and plants would continue to be the highest performing of scientific and technical institutions— has now failed. It must be extensively reformed.

Regarding what to do, I kept asking myself, "Why is it, in the those years in which these organizations existed as GoCo's under the U.S. Army Corps of Engineers, their successes were so extraordinary and history making, but they have now degenerated so badly? The answer as to what might be done to fix the current situation almost suggests itself:

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"Why not try going back to the much simpler organizational approach that functioned so well during the Manhattan Project?"

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Therefore, being as succinct as I can be, the essential elements for change that I would recommend to you are:
I believe it is essential to now: (1) eliminate the NNSA and all of its responsibilities within the DOE, (2) remove all remaining nuclear weapons responsibilities from the Department of Energy, and (3) stand up a new, leaner organization within the Department of Defense, using some of the existing parts of the current NNSA.

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This recommendation is surprisingly similar to the recommendations of the Defense Science Board Task Force on Nuclear Capabilities (Report date: December of 2006), which was co-chaired by General Larry Welch and Dr. Johnny Foster. I was a member/advisor within the Task Force. As a result of their experience, in perhaps being seen as too prescriptive in their proposed changes, I have not taken on the issues regarding what the appropriate titles should be for those who would function within the Office of the Secretary of Defense (OSD) hierarchy, believing that it would be best left for the Department of Defense (DoD) itself to address and decide those questions.

Let me point out however, that I recently was one of the five members of the board who carried out the Comprehensive Review of U.S. Nuclear (Weapons) Command and Control Systems (NCCS) for the Secretary of Defense. I came away believing the diagnosis we made of those NCCS problems, and the suggestions we made to correct its difficulties, are remarkably similar to the diagnosis and cures that should now be applied to the nuclear weapons R&D and production communities. There, we saw a dysfunctional separation as the primary root cause for its current problems. These had been growing in between the many largely-independent government agencies who now "must share the responsibilities" for the operation and security of the NWCC systems, with their all important requirements to ensure their continued reliability. But, in truth, we also saw the damages that had resulted from the growth of bureaucracy within in those organizations. For the nuclear weapons communities, the long separation of the Nuclear Weapons RD&D activities from the Department of Defense, and especially the separation of the labs and plants from the uniformed military services, which has gone on far too long, has been detrimental to communications, cooperation, and joint planning. The new structural arrangements being proposed here could rectify these problems, as the U.S. (Strategic) Navy and the U.S. (Strategic) Air Force commands and staffs are drawn into closer partnerships with the R&D and Production efforts. For example, for the first twenty years of the labs, there were large numbers of uniformed military routinely assigned as on-site research associates at all three nuclear weapons labs. Their intensive interactions set the stage for their later successful careers, based on the fundamentals they learned and the shoulder-to-shoulder interactions with personnel who were responsible for all parts of nuclear weapons. These often proved essential for cementing an attitude of close cooperation, which endured as these individuals rose to become commanders and general officers within the uniformed military. Such interactions and benefits hardly exist today, primarily because of the increasing separation of their parent organizations. The organizational reforms proposed here would directly address and correct that.

It is my belief that a trimmer, more responsive core organization can be formed from the ***existing NNSA***. ***It should be moved to the Department of Defense, but only after*** a ***vigorous streamlining*** of the duties, organizations, and communications paths, so essential for ensuring that the Federal roles are better defined, without either the duplications or built-in conflicts which exist today. The GoCo structures should begin anew from that point, operating much as they are today, but with the acknowledgement that the DoD will decide the next step in selection of the GoCo contractors charged with ***leading*** and operating the nuclear weapons laboratories and productions plants and sites in the future.

I believe that the newly recreated and reformed NNSA-like organization within the Department of Defense should have ***a stand-alone, independent existence***, similar to the DARPA structure in that sense. For example, I would expect that its budget would continue to be planned and responsibly managed from within that new organization, rather than flowing from the unformed military controllers. The procedures already extant within the management of the **050 account within the military spending accounts** already incorporates this approach to NNSA funding. The new integrated organizational planning would provide the opportunity to do a better job in harmonizing the development, production, delivery, and dismantlement schedules for nuclear weapons between the services and the new organization. They should all focus on improved co-ordinations of their programs to achieve a closer integration of their missions.

Recent actions taken as a result of the need to provide a clearer path for uniting responsibilities and authorities for the U.S Nuclear (Weapons) Command and Control Systems (NCCS.) These have resulted in the authorities and responsibilities being placed ***within the direct reporting line of the Deputy Secretary of Defense***, acting with a day-to-day responsibility on behalf of the Secretary of Defense —in his designated role as the Executive Agent for NWCC for the President. Thus, it would seem appropriate that the nuclear weapons research, development, and production might take a parallel route to obtain maximum synergy and ease of communications, but that should be left for the Defense Department to decide how best to organize itself.

Let me also cite here the additional responsibilities that in recent years have been given to the nuclear weapons labs, beginning with Sandia Labs, but which are now expanding to Los Alamos and Livermore, to function more fully as "national security laboratories". All the labs anticipate wider programs and responsibilities for advanced technology capabilities within the conventional and special forces defense communities. These also include support for Defense Intelligence technologies and systems, and with wider responsibilities for helping to counter terrorism for both Defense and Homeland Security departments. These expanded national security initiatives would be significantly strengthened by the changes proposed here.

I am intentionally refraining from further speculation about how to create the new government agencies, knowing that it would be easy to go too far in trying to tie down details that need the benefit of wider participants in the creation of these recommendations prior to these being implemented. Let me just say that the major

changes truly can be justified. It is time to "***bring these programs back home***" to the agency that originated the mission and which was so effective in achieving its initial goals during the Manhattan Project.

It should also be noted that after World War II, some began to see the importance of nuclear weapons as being so large (in the aftermaths of Hiroshima and Nagasaki) that they believed these matters should only be managed by a "civilian leadership" and not simply placed in the hands of the uniformed military. Whether those viewpoints were real or only theoretical is a moot point. Today they are no longer an issue, as the Defense Department is, and has been for the past 60 years, a civilian-managed agency. To further insure the purpose of that decision continuing, there are already formal prohibitions in place that prohibit any general officer becoming the Secretary of Defense. Finally, I should note that these proposals for change would also formalize what has arisen and is already in place — the missions and goals that we in the nuclear weapons complex embrace are closely aligned with those of the Department of Defense —to preserve peace and security, by all available means.

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There are three more related subjects I want to briefly mention, although ***these are of lesser importance than the previous discussions***. Their consideration, however can prove useful in giving the best chance for creating a highly effective "new NNSA", including improving the performance of the nuclear weapons complex as a whole, including the weapon production plants. But, because my knowledge of the production plants is not as current as it was in the years when I had frequent first-hand visits and contacts, I will not attempt here to recommend specific reporting paths for the weapons productions plants. Others should be consulted in these questions, although it is my belief that ***the plants would move to the DoD along with the labs***, as their continued close working partnerships are an essential success factor for being able to field U.S. deterrent forces.)

Next, let me point out that there is a fundamental theorem of Systems Analysis which is widely known within technical communities and which is quite apropos if one is to be able to successfully reengineer the government agency responsible for the labs and the plants: namely, ***One can not optimize a system only through efforts to optimize the component subsystems***. Yet, this is just what has been attempted many times over the history of the nuclear weapon complex —from at least the mid 60s all the way through the current times.

One clear example you ought to become familiar with is the decision which was made when the NNSA legislation was first passed (and which I believe was a glaring violation of the specific wording of the legislation), namely, responsibility for the subcomponents of Safety and of Security were not placed under the new NNSA management, but were retained in a stove-piped manner (through "double-hatting") within their pre-existing DOE organizations. These actions are also ***clear examples where key responsibilities and authorities were separated*** (where they should have been unified.) Yet these extremely important functions require a necessary and close inter-relationship to be

successful in accomplishing the overall weapons mission, and to prevent the costs thereof from burgeoning for these tasks. The result was that Safety issues and Security issues ended up functioning completely independently of the planning, management, or execution of the weapons programs.

Any basic management textbook will tell you how wrong that choice was. I have testified to this committee in the past about the effects these specific problems have created, including how they have greatly escalated the costs for nuclear weapons construction work, including the very important, but contested, CMRR at Los Alamos. This facility is so greatly affected because the CMRR work of creating plutonium pits for weapons requires both the highest levels of safety against hazards, as well as a need for the highest levels of security. Yet, today, these DOE highly bureaucratic safety and security organizations still continue to dictate to the weapons complex and to NNSA exactly what they want carried out in order to optimize safety and security, but without any other considerations. Certainly their actions do not give consideration or deference to the importance of the success of the nuclear weapons mission. They have particularly failed to take into account the effect of their directives on the conduct of actual nuclear weapon work, or new bureaucratic constraints created, or the resultant overall costs escalations. The net effects on progress within the plants and labs have never been simply awful. That these inadvisable actions were taken even though the NNSA labs and plants had already achieved, and have maintained safety incident rankings that exceed by far the OSHA nationwide standards for similar work and organizations. ***Efforts to rectify these past errors in decision-making should be fundamental to the re-creation of the GoCo structures of the labs and plants under a new DoD parent organization.***

Let me not fail to mention here an equally egregious but completely parallel action that was taken when ***the Defense Nuclear Facilities Safety Board*** was created, which predates the formation of the NNSA. Not only did the creation of the DNFSB organization separate responsibility and authority, but also made it nearly impossible to resolve any of the differences that inevitably appeared when the Board has acted completely autonomously from the weapons program leaderships at the labs, plants, or the NNSA itself. When strong differences in views have arisen between the Defense Board and any of the program entities, it has required the escalation of the issues all the way to the Secretary of Energy and his personal involvement in order to adjudicate the differences. Thus few issues were actually decisively settled. A "Quality" solution would have placed the two such organizations in a reporting role to the same boss, just as —for example— the highest-ranking inspector of nuclear power plants reports to the same boss as the highest ranking official responsible for operating the plant. That "boss" should likely be the head of the "new NNSA", whatever final title is selected for that individual. That way the intentionally "split" responsibility and authority can merge together at that official, with the independent oversight official and the program leader on equal footings. To date, resolution is more rare than not in the overall DNFSB record. In my view, the effects of their efforts are to inevitably stretch out the time and escalate the costs for maintaining, modifying, or constructing facilities, but without achieving much in the way of appreciable or intended benefits flowing from the efforts that were extended. ***As you in the Congress seek to find answers to help fix the manifold problems of the labs,***

plants, and NNSA, I urge you to put the issue of whether to continue the DNFSB, and its present reporting structure, high on your list of problem areas that need to be addressed.

In closing, let me urge you once more, that all deliberate speed is necessary. The numerous bureaucratic barriers that that were constructed at the Federal level were built up over the full history of the management of U.S. nuclear weapons –i.e. over 60 years or more— without having identified them as the most serious root cause of difficulties, and with insufficient attention ever being devoted to them. Besides urging you today, that only a major reform effort has a chance of succeeding, I also urge you not to fall into the trap of ever retreating to select only small changes or actions to treat these quite serious problems. ***I believe attention to these core problems has been postponed for so long that you must now be bold.*** Besides boldness, you must also be very attentive to thoroughly identify any likely "unintended consequences" that can inevitably occur as specific changes are made, and try and correct them early in the process. As always, and particularly for parts of the bureaucracy that have been in place for such a very long time, resistance to these, or any, changes will likely be severe.

I hope I can add clarity to anything that may now be confusing, as we proceed to the Q and A period. I thank you for your attention.

Appendix 1

A discussion of the Background, History, and Characteristics of Bureaucracies

[The background of how bureaucracies are formed and grow has been extensively analyzed in some detail in the literature within the fields of history, sociology, and economics. In Michel Crozier's 1964 book *The Bureaucratic Phenomenon* was singularly successful in describing the evolution of destructive bureaucracy within organizations that attempted to so systematically design their work processes to a degree that all outcomes would be "well-defined" in advance. The workers in such organizations—in order to gain some measure of "respectable" control over their lives—soon begin to focus on exploiting any "zones of uncertainty" they can identify within those work processes. He characterizes ***the struggles that result*** within these organizations ***quickly degenerating into mere "strategic games"*** to try and exploit such uncertainties for their own ends, or to try and prevent others from gaining an advantage. The work environment then becomes ***focused only on internal (and inward-looking) power struggles***, which he calls "vicious circles". Soon, the ***senior levels*** of the hierarchy ***lose the power to govern***, and the wider ***goals of the organization are also forgotten***.

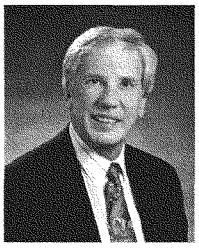
The result of such activity then proceeds to grow, aided especially due to the impersonal nature that exists within the larger bureaucracies. With the decision-making hierarchy having broken down, it reaches a point where any decisions that must be made will take longer and longer to be accomplished. If issues are ever resolved, it is more likely that those individuals who have gained control over the "zones of uncertainty" can wield disproportionate power to their previous role in the hierarchy, and those who end up actually forcing a decision are those who have no direct, or in-depth knowledge of the issues involved. He particularly notes that the most tangible ***final work product*** that appears as a result of these machinations ***become a set of impersonal rules which are said to cover every event***. Crozier also observes that after many years of such situations operating, inevitable parallel power structures emerge, further exacerbating the possibility that decisions can ever be made that are based on factors that are important to the organization as a whole, **or to the mission for which it was created**. One universal conclusion widely expressed in such studies is that "***bureaucratic organizations are certainly not effective for organizations whose purpose is to innovate***."

The growth of bureaucracy within governments has been credited as the principal cause for the failure of many of the major Empires of history. Many historians have attributed the fall of the Athenian Greek Empire as well as its successor, the Roman Empire, to the uncontrolled growth of their bureaucracies, to the point that they could no longer function to cohesively manage or govern. Similarly, the fall of the Ottoman Empire, which thrived from 1300 to 1900, is also thought to have been a direct result of its enormous bureaucracies, and the vast power to which they held sway. The Ottoman government structures initially grew up over that period in order ***to govern the Empire***—in place of weak Sultans, who had quickly proved overwhelmed by the task. But history records that these bureaucracies, who initially were perhaps the greatest examples of bureaucratic

organizations which functioned very well, then grew so unwieldy that they suffered the classic fate that befalls most bureaucracies: (1) they grew ***too large to effectively communicate or cooperate***, and (2) they became so ***internally focused*** that they were unaware of the realities of the worlds outside their own territories and the changes taking place there, and (3) they became so ***slow in their decision-making*** processes that even the crucial decisions that might have saved their Empire could not be either made or acted upon.

I think it is likely that all of us have knowledge through our personal experience of the difficulties inherent in the operation of bureaucracies and in their natural tendencies to grow. My own career included several assignments where I unfortunately got to see what in my experience might even deserve to be nominated as the worst examples of bureaucratic organizations of our modern times. The first was the US "Space Nuclear Propulsion Office". In the 1960's the US government had stood up a large effort whose goal was to develop nuclear-powered rockets to be used for missions to and from the Moon and Mars, and even for space tug duties in orbit around the earth. Although originally created within the Atomic Energy Commission, when it rose to a level that it began to appear feasible that the technology could be key to new space missions, the National Aeronautics and Space Administration (already a large organization well on its way in bureaucratic evolution) argued to the US Congress that they should be given responsibility for the program. A decision was made that a joint organization —the Space Nuclear Propulsion Office— staffed by an initial mixture of NASA and AEC employees— be created, and it began a separate bureaucratic evolution path. By the time that I was assigned in 1969 to be the Chief Test Operator for Los Alamos ground tests of nuclear reactor rockets in Nevada, although the technological performance was becoming quite impressive, it was apparent to most that the program would likely die of its own weight because of the extremes that had been reached in bureaucratic behaviors within the SNPO. And indeed when that soon happened, most involved thought its demise was a blessing in disguise.

Later, in 1987, when I was appointed by President Reagan to be the Ambassador and Chief Negotiator for the Nuclear Testing Talks in Geneva, Switzerland, I and my direct staff were assigned within the U.S. State Department. During the initial preparations, and during other periods such as recesses, Presidential transition, and for the ratification efforts, we actually resided within the State Department headquarters in DC. The State Department had been created in 1789 —the very first Federal Department ever established by the US government. As we got to observe on a close-up basis, it was all too apparent to me and members of my delegation, that just as one might have expected, this oldest standing Department of the U.S. government, had "excelled" in raising the evolution of bureaucratic behaviors to uncontested highs (and of course with corresponding new lows in efficiency and effectiveness). It was nearly impossible to get even routine work needs performed, and the level of energy put into meaningless internal struggles was incredible. My judgment was that, had there not been a separate staff of "Foreign Service Officers" who worked quite long hours to persevere in spite of the bureaucracy all around them, the department would have failed long ago.



Ambassador C. Paul Robinson

President Emeritus and former Laboratories Director,
Sandia National Laboratories
& US Ambassador and former Chief Negotiator,
Nuclear Testing Talks

From October 1990 to January 2006, C. Paul Robinson served in various leadership posts at the Sandia National Laboratories, a Lockheed Martin Company, becoming its Laboratories Director in 1995, and President of Sandia Corporation. During the 10 years he led Sandia, he focused on the laboratories' national security missions, increasing its efforts in nuclear weapons design and development, in non-proliferation and material controls around the world, and led new initiatives in counterterrorism, homeland security, and broadened the lab's support for the Defense Department and the intelligence communities. He also pioneered broad and innovative strategies for partnering with universities and industry and led a major revitalization of research and development efforts, with construction of new laboratory buildings and experimental facilities. In April 2005 Robinson stepped down as President to support Lockheed Martin Corporation for a special project. He retired from LMC and Sandia on January 31, 2006.

Robinson is a member of the Strategic Advisory Group for the Commander, US Strategic Command, where he chaired the Policy Panel from 1992 to 2005. He also serves on the National Nuclear Security Site Advisory Panel. He recently served on the US Nuclear Command and Control System Comprehensive Review for Secretary of Defense Robert Gates. He previously served on the US State Department Advisory Board on International Security and Arms Control for Secretary of State Condoleezza Rice, and on the NASA Advisory Council for Director Michael Griffin. He served as the Chairman of the US Presidential Technical Advisory Group on Verification of Warhead Dismantlement and Special Nuclear Materials Controls, and on the Scientific Advisory Group on Effects for the Defense Nuclear Agency, and on the Defense Threat Reduction Advisory Committee. He now serves on Defense Science Board studies and has served on several other Boards, provides advice to many other government agencies, and frequently testifies before the US Congress.

Appointed by President Ronald Reagan, confirmed by the US Senate, and reappointed by President George H.W. Bush; Ambassador Robinson served as Chief Negotiator and Head of the US Delegation to the US/USSR Nuclear Testing Talks in Geneva from 1988-90. These negotiations produced Protocols to the "Threshold Test Ban Treaty" and the "Peaceful Nuclear Explosions Treaty." Both, along with the treaties, were ratified unanimously by the US Senate in 1990 and are in force between the US and the Commonwealth of Independent States. The Joint Verification Experiment, which he and his delegation negotiated, was carried out in 1988. It laid the foundations for what have become extensive US and Russian Lab-to-Lab efforts.

From 1985-88, Robinson was Senior Vice President, Principal Scientist, and a Board Member of Ebasco Services, Inc., a major New York-based engineering and construction firm. He spent much of his early career (1967-85) at the Los Alamos National Laboratory serving in the Nuclear Test Division, the Advanced Concepts Group, and leading the Laser Spectroscopy and Isotope Separation Division (AP), and the nuclear weapons and other defense and national security programs as Principal Associate Director of the Laboratory.

Dr. Robinson was elected to the National Academy of Engineering in 1998 and serves in various Academy posts. He also has received: the Outstanding Public Service Medal from the Joint Chiefs of Staff for *contributions to strategic forces*, NASA's Exceptional Public Service Medal for *his contributions to Space Operations*, the Smyth Nuclear Statesman Award from the American Nuclear Society for *40 years of contributions to national nuclear efforts*, the American Physical Society's Pake Prize for *outstanding leadership and research accomplishments*, the Secretary's Gold Award from the Department of Energy, and a Distinguished Citizen Award from the New Mexico Governor.

Dr. Robinson earned a B.S. in Physics from Christian Brothers College and a Ph.D. in Physics from Florida State University, and also received an honorary doctorate from Christian Brothers University.

Revised Jan. 2011

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 112th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule. Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number) will be made publicly available in electronic form not later than one day after the witness's appearance before the committee.

Witness name: C Paul Robinson

Capacity in which appearing: (check one)

◉ Individual

○ Representative

If appearing in a representative capacity, name of the company, association or other entity being represented:

FISCAL YEAR 2011

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

FISCAL YEAR 2010

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

FISCAL YEAR 2009

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2011): 1 fee contract, 3 no-fee contracts;
Fiscal year 2010: 1 fee contract, 4 no fee contracts;
Fiscal year 2009: 1 fee contract, 3 no fee contracts.

Federal agencies with which federal contracts are held:

Current fiscal year (2011): DOE(1 fee contract),STRATCOM,DSB, DOE-SNL: all no fee;
Fiscal year 2010: DOE(1 fee contract),DoD, STRATCOM,DSB,DOE-SNL: all no-fee;
Fiscal year 2009: DOE(1 fee contract),DoD, STRATCOM,DOE-SNL: all no-fee.

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2011): NV test site bd,SAG, DSB Task Force, Sandia Emeritus;
Fiscal year 2010: NV test site bd, NWCC FACA,SAG, DSB Task Force, Sandia Emeritus;
Fiscal year 2009: NV test site bd, NWCC FACA, SAG, Sandia Emeritus.

Aggregate dollar value of federal contracts held:

Current fiscal year (2011): 2,930,400 (my aggregate fees $5,250);
Fiscal year 2010: 2,999,300 (my aggregate fees $4,500);
Fiscal year 2009: 2,960,100 (my aggregate fees $6,416).

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2011): none;
Fiscal year 2010: none;
Fiscal year 2009: none.

Federal agencies with which federal grants are held:

Current fiscal year (2011): _____;
Fiscal year 2010: _____;
Fiscal year 2009: _____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2011): _____;
Fiscal year 2010: _____;
Fiscal year 2009: _____.

Aggregate dollar value of federal grants held:

Current fiscal year (2011): _____;
Fiscal year 2010: _____;
Fiscal year 2009: _____.

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ROBERT L. SIMMONS II, STAFF DIRECTOR

February 14, 2012

MEMORANDUM FOR HASC STRATEGIC FORCES SUBCOMMITTEE MEMBERS

RE: Subcommittee hearing on Governance, Oversight, and Management of the Nuclear Security Enterprise to Ensure High Quality Science, Engineering, and Mission Effectiveness in an Age of Austerity

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On Thursday, February 16, 2012 at 11:00 AM in Room 2212 of the Rayburn House Office Building, the Strategic Forces Subcommittee will meet in open session to receive testimony on Governance, Oversight, and Management of the Nuclear Security Enterprise to ensure High Quality Science, Engineering, and Mission Effectiveness in an Age of Austerity.

Should you need additional information, please contact Drew Walter (x6-0531) or Leonor Tomero (x5-2526) on the committee staff.

WITNESSES

Panel 1:

Dr. Charles Shank
Co-Chair, National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories
Senior Fellow, Howard Hughes Medical Institute

The Honorable Charles B. Curtis
Member, National Academies Panel on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories
Senior Advisor, Center for Strategic and International Studies
President Emeritus and Board Member, Nuclear Threat Initiative
Former Deputy Secretary of Energy, 1994 – 1997

Mr. Eugene Aloise
Director, Natural Resources and Environment
Government Accountability Office

Panel 2:

Dr. Michael R. Anastasio
Director Emeritus, Los Alamos National Laboratory
Director Emeritus, Lawrence Livermore National Laboratory

Dr. George H. Miller
Director Emeritus, Lawrence Livermore National Laboratory

Ambassador C. Paul Robinson
Director Emeritus, Sandia National Laboratories

Hearing Purpose

The purpose of this hearing is to conduct oversight of the processes, procedures, and structures used by the federal government to govern, oversee, and manage the nuclear security enterprise that is responsible for carrying out a variety of nuclear security missions for the nation—including sustaining the U.S. nuclear weapons stockpile and preventing nuclear proliferation. In particular, the hearing will focus on how best to structure the management and oversight functions of the federal government to ensure that the laboratories that comprise part of the nuclear security enterprise can conduct their missions efficiently and effectively.

The first panel of witnesses will present and discuss two independent perspectives on management and governance of the nuclear security enterprise. Dr. Charles Shank and Mr. Charles Curtis will share with Members the recently completed National Academies of Science (NAS) study on "Managing for High Quality Science and Engineering at the National Nuclear Security Administration's (NNSA) National Security Laboratories." This study was mandated by section 3131 of the National Defense Authorization Act (NDAA) for Fiscal Year 2010 (Public Law 111-84).The NAS witnesses will be prepared to discuss their study committee's investigation, findings, and recommendations. An embargoed copy of the NAS report has been provided to Members.

Also on the first panel, Mr. Eugene Aloise from the Government Accountability Office (GAO) will discuss GAO's current and prior work examining the effectiveness and efficiency of NNSA and its contractors.

The second panel of witnesses is comprised of former directors of the three NNSA laboratories, who will be prepared to share their direct experiences leading and managing the organizations responsible for carrying out NNSA's mission within the management and oversight processes, procedures, and structures set up by the federal government.

Background

Major Problems at the Department of Energy led to the creation of the NNSA

The National Nuclear Security Administration was created by Congress in the NNSA Act, which was contained in Title 32 of the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106-65). The objective of establishing the NNSA was to address chronic, well-documented management problems within the Department of Energy's (DOE) nuclear weapons complex. The Act created a new "semi-autonomous" NNSA within DOE, and vested in this new agency responsibility for: (1) maintaining the nation's nuclear weapons stockpile, (2) preventing nuclear proliferation, and (3) developing and providing nuclear reactors for U.S. Navy warships. Congress created the NNSA in response to a major espionage scandal (the Dr. Wen Ho Lee affair) and recurring security problems, decades of documented mismanagement at DOE, and dozens of reports and studies that described weak management, confused lines of authority, and lack of mission focus within DOE's nuclear weapons program.

A 1999 report by the President's Foreign Intelligence Advisory Board (PFIAB) was one study in particular that spurred Congress to take action, and was specifically cited by the House Armed Services Committee as part of the rationale for the NNSA Act. The PFIAB report described DOE as a "dysfunctional bureaucracy that has proven it is incapable of reforming itself" and highlighted recurring security problems that DOE had failed to correct.[1] To address these concerns, the PFIAB recommended creation of either a new, completely independent agency with sole responsibility for the nuclear weapons program or what it termed a "semi-autonomous" agency within DOE in which the bureaucratic interactions between the new agency and DOE would minimized.

The PFIAB report was part of a long series of reports documenting management shortcomings at DOE that provided momentum for the effort to create NNSA. Like many of these reports, the PFIAB cited "brilliant scientific breakthroughs at the nuclear weapons laboratories" while strenuously indicting DOE for its continual management and security problems. Other reports that documented DOE management problems prior to the creation of NNSA include (but are not limited to):

- The 1995 "Galvin Commission" report[2] "revealed a counterproductive federal system of operation" for DOE's national labs, saying "the current system of governance of these laboratories is broken and should be replaced with a bold alternative." The Galvin Commission noted that problems included "increased overhead cost, poor morale, and gross inefficiencies as a result of overly prescriptive Congressional management and excessive oversight by the Department," and "inordinate internal focus at every level of these laboratories on compliance issues and questions of management processes, which takes a major toll on research performance."

[1] "Science at its Best, Security at its Worst," A Report on Security Problems at the U.S. Department of Energy. A Special Investigative Panel, President's Foreign Intelligence Advisory Board. June 1999, http://www.fas.org/sgp/library/pfiab/index.html

[2] "Alternative Futures for the Department of Energy National Laboratories," Task Force on Alternative Futures for the DOE National Laboratories, U.S. Secretary of Energy Advisory Board, February 1995.

- A 1997 study[3] by the Institute for Defense Analyses (IDA) on the management of the nuclear weapons program concluded that DOE suffered from confusing and redundant lines of authority, as well as a bureaucratic structure that was obstructing performance of what the study called "a critical job—maintenance of the U.S. nuclear deterrent." The report found that DOE's processes for managing environment, safety, and health oversight were impeding effective management, and that DOE's onerous review processes undermined accountability and prevented timely decisions from being made and implemented throughout the entire nuclear weapons complex. IDA concluded that DOE needed to strengthen its line accountability and reorganize its structure in several areas.
- In March 1997, the White House Office of Science and Technology Policy (OSTP) reported[4] on the status of implementation of President Clinton's Presidential Decision Directive NSTC-5, which required DOE, DOD, and NASA to "improve agency management and reduce unnecessary redundancy" in management of their respective national laboratories. OSTP "cited efforts by the three agencies to improve their laboratory management but found that DOE was still micro-managing its laboratories and had made little progress toward reducing the administrative burdens it imposed on its laboratories. [OSTP] recommended a variety of improvements in performance measures, incentives, and productivity and urged more streamlined management."[5]
- The 1999 report[6] of the "Chiles Commission" noted weak DOE management of the nuclear security mission and a perception among scientists, engineers, and other workers in the nuclear weapons complex that the nation lacked commitment to the program to sustain the U.S. nuclear arsenal. The Chiles Commission recommended streamlining DOE management and oversight functions, clarifying roles between various DOE organizations, and demonstrating commitment to the nuclear enterprise through enhanced training opportunities and construction of modern facilities.
- Throughout the 1990s, the General Accounting Office (GAO, now called the "Government Accountability Office") published a series of reports detailing chronic management problems at DOE, including those that contributed to security scandals. For instance, in 1993 GAO said "DOE has significant management problems, as reported by many oversight groups and acknowledged by agency leadership," and "management of the nuclear weapons complex and the national laboratory system…[is] in disarray."[7] In 1998, one year before the NNSA Act was signed into law, GAO analyzed DOE's progress in addressing the dozens of recommendations made by various advisory groups to improve and streamline management of DOE's national laboratories (including those

[3] "The Organization and Management of the Nuclear Weapons Program," Institute for Defense Analyses, IDA Paper P-330, March 1997, http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA323402
[4] "Status of Federal Laboratory Reforms: The Report of the Executive Office of the President Working Group on the Implementation of Presidential Decision Directive PDD/NSTC-5," Office of Science and Technology Policy, Executive Office of the President, March 1997. http://www.fas.org/irp/offdocs/pdd5status.html
[5] Quote from: "Uncertain Progress in Implementing National Laboratory Reform," U.S. General Accounting Office, GAO/RCED-98-19, September 1998, p.6, http://www.gao.gov/assets/230/226363.pdf
[6] "Report of the Commission on Maintaining U.S. Nuclear Weapons Expertise," Commission on Maintaining U.S. Nuclear Weapons Expertise, March 1, 1999, http://www.fas.org/nuke/guide/usa/doctrine/doe/chilesrpt.pdf
[7] "Management Problems Require a Long-Term Commitment to Change," U.S. General Accounting Office, GAO/RCED-93-72, http://www.gao.gov/assets/220/218381.pdf

contained in the reports described above). After analyzing the actions DOE told GAO it was pursuing to implement these recommendations, GAO said that, "Most of the actions DOE reported to us are process oriented, incomplete, or only marginally related to past recommendations for change. For example, creating new task forces and strengthening old ones may be good for defining problems, but these measures cannot force decisions or affect change."[8] In March 2000, GAO explained in congressional testimony[9] that "Security concerns and problems have existed at many of these facilities since they were created, and recent years have been no different." GAO noted that several options had been proposed "to resolve organizational and managerial weaknesses that have been identified by ourselves and others as the causes of these security problems," including "numerous long-standing safeguards and security problems, including ineffective controls over foreign visitors, weaknesses in efforts to control and protect classified and sensitive information, lax physical security controls, ineffective management of personnel security clearance programs, and weaknesses in tracking and controlling nuclear materials."

Combined, all of these reports articulated the rationale that spurred Congress to adopt the NNSA Act in 1999: that confusing lines of authority, insufficient attention to security issues, and poor management and budget processes were fundamentally undermining DOE's ability to provide effective management and oversight of the nuclear weapons complex. In creating NNSA, Congress considered making the new agency fully independent or semi-independent from the Department of Energy. In the end, Congress chose the "semi-autonomous" model recommended by the PFIAB. As described by a HASC special report, the objective of the reorganization was "to correct the confused lines of authority and responsibility within the DOE nuclear weapons complex that contributed to the mismanagement and security problems at the Department, and to provide a clear mission focus and accountability for DOE personnel involved in the nuclear weapons program."[10]

To ensure that the new agency had the ability to achieve its mission, the NNSA Act contained several provisions designed to ensure a large degree of autonomy for the new agency while still preserving the Secretary of Energy's ultimate responsibility for overseeing the agency. As was later noted in a HASC special report, the intended effect of the Act "is to provide a substantial degree of independence—but not total independence—from the Department of Energy."[11]

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[8] "Uncertain Progress in Implementing National Laboratory Reform," GAO, GAO/RCED-98-19, September 1998, http://www.gao.gov/assets/230/226363.pdf

[9] "Nuclear Security: Security Issues at DOE and Its Newly Created National Nuclear Security Administration," GAO testimony before the before the Subcommittee on Energy and Power and the Subcommittee on Oversight and Investigations, Committee on Commerce, U.S. House of Representatives, March 14, 2000, http://www.gao.gov/assets/110/108298.pdf

[10] "Department of Energy National Nuclear Security Administration Implementation Plan: An Assessment." House Armed Services Committee, Special Oversight Panel on DOE Reorganization. February 2000. p. 2.

[11] Ibid, p.2.

Implementation of the NNSA Act and the HASC Special Oversight Panel

Almost immediately after the NNSA Act was signed into law in October 1999, House Armed Services Committee Chairman Floyd Spence created the HASC Special Oversight Panel on Department of Energy Reorganization to oversee implementation of the Act and the standing-up of NNSA. Led by Chairman Mac Thornberry and Ranking Member Ellen Tauscher, the Panel conducted a series of hearings and other oversight activities during the remainder of the 106th Congress.

In February 2000, the Special Oversight Panel published a report[12] assessing DOE's initial efforts to stand up NNSA, noting: "The central purpose of the new organization [NNSA] is to correct the confused lines of authority and responsibility within the DOE nuclear weapons complex that contributed to the mismanagement and security problems at the Department, and to provide a clear mission focus and accountability for DOE personnel involved in the nuclear weapons program." The report assessed DOE's plan for implementing the NNSA Act, and while expressing that the Panel was "encouraged by some preliminary and necessary implementation activities," the report said the Panel was concerned that the implementation plan "undermines the semi-autonomy of the NNSA," and "retain[s] DOE management and budget processes, organizational structures, and lines of authority that the Panel believes to be flawed and that [the NNSA Act] was intended to reform." The Panel's February 2000 report noted serious concerns about the efforts of the President and DOE to restrict NNSA's independence, saying:

> "The President and DOE initially opposed passage of [the NNSA Act], and attempted to persuade Congress to amend the legislation prior to passage and to alter the law after it passed. DOE opposition was reflected in the President's statement that was released when the bill was signed into law. In that statement, the President instructed the Secretary to perform the roles and functions of the Administrator until further notice, and to assure DOE control over the NNSA by assigning DOE personnel to serve concurrently in NNSA positions. The Panel assesses both actions as contrary to the spirit and letter of the law."[13]

The panel specifically highlighted concerns with the practice known as "dual-hatting" as the most significant flaw in the DOE implementation plan, noting: "The clearest example of this [effort to minimize NNSA's semi-autonomy] is the intention expressed in the implementation plan to assign DOE officers to serve contemporaneously in the NNSA." Essentially, key positions in NNSA, such as the budget director, security chief, and General Counsel, were filled with personnel that fulfilled the same role for DOE.

The HASC Special Oversight Panel issued a second assessment in October 2000. That report reiterated criticisms of the initial DOE implementation plan, but also noted signs of progress over the course of calendar year 2000:

> "In June 2000, news of another security failure within the complex led DOE to respond to congressional objections regarding dual-hatting and prompted the Senate to confirm General John Gordon as the NNSA's first Administrator. In August, the Secretary of Energy appointed an NNSA official to replace DOE's dual-hatted security "czar" as the

[12] Ibid.
[13] Ibid, p.3.

NNSA chief of defense nuclear security. By the end of September, DOE's leadership had approved several additional steps that – if fully implemented – should virtually eliminate the threat posed by dual-hatting to the NNSA's semi-autonomy. In light of these events, the Panel is cautiously optimistic that the NNSA will now have the opportunity to significantly improve the management, organizational, and programmatic structures it has inherited from DOE."

Reports since 2000 on improving NNSA/DOE nuclear security enterprise effectiveness and efficiency

Since its establishment in 2000, a considerable number of reports, studies, and assessments have analyzed various aspects of NNSA's and DOE's effectiveness and efficiency in managing the nuclear security complex and offered recommendations for improvement. Several of these reports (not an exhaustive list) are described below.

Report to Congress on the Organization and Operations of the NNSA

In February 2002, NNSA provided a report to Congress that outlined NNSA's plan for organizing and progressing towards becoming the "semi-autonomous" agency required by the NNSA Act. The report articulated an initial strategic plan for NNSA and detailed plans to streamline operations and improve efficiency while maintaining mission effectiveness and high-quality science. In essence, this February 2002 report was NNSA's attempt to respond to both Congress and all of the findings and recommendations contained in prior reports (as described above). Plans outlined in the February 2002 report included:

- Implementation of a new headquarters and field office structure to streamline, simplify, and clarify roles and reporting relationships.
- Establishment of a Management Council empowered to find efficiencies and resolve issues.
- Creation of an integrated planning, programming, budgeting, and evaluation system to link policy with budget resources.
- Reinforcement of NNSA's "semi-autonomous" nature by DOE's creation of a consolidated DOE Office of Independent Oversight and Performance Assurance (OA) to provide oversight of NNSA activities—reducing multiple, redundant DOE oversight interactions with NNSA to a single office.
- A series of actions to "lift administrative burdens through streamlining policies, procedures, and staffing," including an "objective of reducing by half the administrative workload imposed by policies, procedures, and guidance," and plans to "reengineer core business practices" and "right-size and reinvigorate federal staff."

DOE Best Practices Pilot Study

In 2001, the Department of Energy conducted a study[14] of best practices for running large, government-directed scientific research labs, benchmarking the Lawrence Berkley National Laboratory (LBNL)—a DOE Office of Science lab—against NASA's Jet Propulsion

[14] "DOE Best Practices Pilot Study," Lawrence Berkeley National Laboratory, DOE Office of Science, LBNL/PUB-865, February 2002, http://www.lbl.gov/Ops/assets/docs/best_practices.pdf

Lab and the National Science Foundation's (NSF) National Center for Atmospheric Research (NCAR). The study's findings included:

> "Where the federal mission program manager has the authority and responsibility for setting Administrative and Operational (A&O) requirements, alignment is achieved because the cost-effectiveness and efficiency gains are in the program manager's best interest. Where additional A&O requirements are directed from other parts of the agency that are not responsible for mission success, misalignment can occur, leading to increased costs and other inefficiencies."

The study identified several best practices that it recommended implementing across all DOE labs[15]:

- Identifying a single federal official to be responsible for mission success and administrative and operational oversight;
- Adopting federal and national standards in preference to DOE contract-prescribed requirements that dictate what and how administrative and operational actions are undertaken;
- Using nationally recognized accounting firms to perform administrative and operational systems reviews in a single annual audit;
- Allowing the laboratory to exercise discretion in the implementation of Departmental directives;
- Adopting nationally standardized system requirements and practices that would allow the laboratory to benchmark its administrative and operational results against other systems; and,
- Introducing a contractor incentive system that would provide contract extensions for performance excellence.

Recommendations to improve the effectiveness and efficiency of the labs included:

- **"National Standards.**
  Encourage efficient and innovative support work by establishing performance criteria that are based on applicable national standards instead of agency-specific requirements.
- **Performance Oversight and Incentives Based on Certified Systems Metrics.**
  Replace transactional oversight of A&O performance with validation of certified systems, and base performance incentives on certified A&O system metrics.
- **Contract-Based Best Management Practices.**
  Embody these best management practices in the FFRDC contract, defining the roles and responsibilities of agency and contractor personnel, behaviors, and performance expectations."

The DOE study concluded:

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[15] Summary taken from: "Management Best Practices for the National Laboratories," Report of the External Members, Best Practices Working Group, The Laboratory Operations Board, U.S. Department of Energy, September 9, 2003, http://www.doeal.gov/MOContracts/docs/ReadingRoom/ManagementBestPracticesForNationalLaboratories.pdf

> "Implementing the best management practices and adopting the recommendations described above would result in significant benefits to the DOE operations at LBNL. These mission-realignment and systems-improvement actions would allow labor reductions and cost avoidances—between 10% and 30% in net resource savings would be realized. The resources saved in A&O support areas could be immediately applied to critical mission and institutional needs. A sizable portion of the A&O cost savings would also be realized in the form of reduced indirect service budgets and corresponding lower overhead rates. The DOE missions and programmatic research facilities would be the direct beneficiaries of these redirected resources."

NAS study on Maintaining High Scientific Quality and LANL and LLNL

In 2004, Congress directed DOE and NNSA to hold open competitions for the management and operations (M&O) contracts for both Los Alamos National Lab (LANL) and Lawrence Livermore National Lab (LLNL) to help address management and security problems. As part of this effort, NNSA requested the help of the National Academies of Science to provide guidance on how best to ensure that the contract competitions preserve the high-quality science and engineering at the labs.

The resulting NAS report[16] gave high marks to the quality of the science being conducted at the labs, and noted that "The execution and accomplishments of the scientific programs did not appear to be a factor in the decision to hold a competition for the M&O contracts at LANL and LLNL." The report made several findings and recommendations, including:

- NNSA should run the contract competitions for LANL and LLNL simultaneously to ensure both competition and coordination on the futures of the two sister-labs.
- NNSA should take active steps in the contract competition to preserve the high-quality science and technology research occurring at the labs while remedying the project management and security problems.
- NNSA should seek contractors with experience in running a large science and technology organization and the ability to create and follow a long-term research and development agenda.
- The contract competition should be tailored to find contractors with demonstrated skills in process, financial, human and physical resource management, and project execution.

Comparative Study of Alternative Systems for National Laboratory Oversight

In response to a request from Secretary of Energy Bodman, in 2007 the DOE National Laboratories Improvement Council (NLIC) investigated "the practicality of, and expected value from, a fundamental revision of DOE's directive and oversight approaches for its national

[16] "Maintaining High Scientific Quality at Los Alamos and Lawrence Livermore National Laboratories," Committee on Criteria for the Management of Los Alamos and Lawrence Livermore National Laboratories, National Research Council, 2004, http://www.nap.edu/catalog/11009.html

laboratory contracts." In its report[17], NLIC suggested an alternative governance approach where DOE and its M&O contractors:

1. "Adopt existing statutes, federal and state regulations, and consensus standards as the primary framework for the management and operation of national laboratories.
2. Eliminate, to the extent possible, the use of DOE orders and associated contractor requirements documents (CRDs) to direct contractors. The first recourse when DOE direction is required is for the responsible contracting officer to develop a contract clause or establish a performance outcome to guide the necessary actions.
3. Establish and use contractor assurance systems as the means for assuring strong performance and laboratory management accountability, and for providing complete transparency to the operation of key laboratory processes to enable more effective and efficient Federal oversight.
4. Realign DOE site office roles and responsibilities to control the flow of contract requirements through the contracting officer, evaluate contract deliverables, maintain awareness of critical performance information, validate the contractor's assurance system, and support DOE's program offices.
5. Realign DOE Headquarters (HQ) structurally and functionally to rely on site-office oversight and to focus resources on providing performance-based programmatic direction and management to the laboratories. DOE HQ directs and assures the effectiveness of the site offices and responds to program performance and contractor evaluations."

Based on evidence gathered by NLIC from previous pilot efforts to streamline oversight of NNSA facilities, the report cited the following potential benefits of implementing the recommendations:

- "More effective and efficient Federal oversight, enabled primarily through transparency of mature contractor assurance systems.
- Improved mission and operational performance, as indicated by increased productivity and fewer adverse incidents.
- Lower cost of doing business for the government and contractors.
- Greater clarity of requirements, with fewer duplications.
- Ability to have graded responses to only applicable requirements.
- More efficient and predictable regulatory activities."

Report on Increasing Productivity and Mission Impact at the DOE National Laboratories

In April 2009, Secretary of Energy Chu asked the leaders of DOE's national laboratory M&O contractors to recommend actions he could take to: "(1) strengthen the laboratories' contributions to DOE's missions and the nation, and (2) to revitalize the relationship between DOE and its contractors." In an August 2009 report[18] responding to the Secretary's request, the lab directors made the following recommendations:

[17] "Comparative Study of Alternative Systems for National Laboratory Oversight," DOE National Laboratories Improvement Council, October 15, 2007.
[18] "Increasing productivity and mission impact at the DOE National Laboratories," U.S. DOE National Laboratory Management and Operations Contractors, August 2009.

1. "Focus DOE management and oversight of the laboratories on achieving mission outcomes, rather than on process and procedures;
2. Restore the principles of the Government-Owned, Contractor-Operated (GOCO) model for managing the laboratories to the relationship between DOE and its contractors;
3. Establish a management culture and practices that appropriately balance performance and operational risks with mission accomplishment, as opposed to seeking to avoid all risks, regardless of the cost or adverse mission impact; and
4. Provide the laboratories with increased flexibility in forming research partnerships, in technology transfer, in personnel practices, and in other areas that will enable cost reduction and increase mission impact."

The report noted that "numerous DOE and independent reviews have, over the past two decades, made recommendations similar to those presented here and have described ways to achieve their objectives." The report highlighted a need to:

- Fix confused and conflicting lines of authority and oversight.
- Assign responsibility for both mission success and operational performance to the same federal program offices.
- Eliminate orders and contract requirements that instruct the contractors on "how" work is.
- Respond to unfavorable events by holding contractors accountable for performance, rather than by issuing new requirements.
- Eliminate DOE regulation and oversight of functions that are already regulated and overseen by other entities (such as OSHA or state environmental regulators).
- Reduce or eliminate requirements for transactional oversight where not required by statute or Federal Acquisition Regulations.

Leveraging Science for Security: A Strategy for the Nuclear Weapons Labs in the 21st Century

In 2008, the Stimson Center conducted a study[19], funded by NNSA and led by former Assistant to the President for Homeland Security Frances Fragos Townsend and former Deputy National Security Advisor Lt. Gen. (Ret.) Donald Kerrick, to provide the incoming Obama Administration "a roadmap to more effectively leverage the existing capabilities at the nation's nuclear weapons laboratories and Nevada Test Site (NTS) to meet an array of emerging vital national security challenges." The Stimson Center report noted that:

> "In past decades, the size of the nuclear weapons budget allowed for a healthy amount of high-risk, long-term research at the weapons Laboratories, much of it growing out of, but diverging from, the core weapons-related capabilities. Importantly, the diverse capabilities resident at the Laboratories have permitted other national security agencies to periodically tap into that scientific expertise on an "as needed" basis, without requiring them to make the long-term investments necessary to build and sustain the enterprise. In

[19] "Leveraging Science for Security: A Strategy for the Nuclear Weapons Labs in the 21st Century," The Henry L. Stimson Center, 2009, http://www.stimson.org/images/uploads/research-pdfs/Leveraging_Science_for_Security_FINAL.pdf

short, a generous nuclear weapons budget created these multidisciplinary scientific reservoirs brimming with critical capabilities that could be leveraged on the cheap."

The report noted that declines in the nuclear weapon budget meant that a new lab governance model was needed to support the core scientific and engineering expertise that was critical for solving a variety of national security problems—in addition to direct work on nuclear weapons. The report made a series of key findings, including:

- "*Governance is the key issue.* The Laboratories and NTS need an effective coordinating entity, one that provides strategic guidance and management direction. A new governance structure would allow the US government—including the Department of Homeland Security, Department of Defense, and the Intelligence Community in particular—to better leverage the assets available at the Labs, thus elicit their longer-term investments...
- *Sustainable support of other national security agency S&T needs can be guaranteed only if the other agencies commit to long-term strategic relationships at a "sponsor" level.* These strategic relationships should entail capital investment, annual funding commitments, and participation in the long-term strategic focus of the Laboratories. This requires creating a structure for multi-agency decision-making and investment and eliminating "primary" versus "secondary" access to the Labs' capabilities...
- *The implementation of the NNSA Act failed to achieve the intended autonomy for NNSA within the Department of Energy.* The Labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well.
- *NNSA and the Laboratories do not always work in partnership with one another.* Rather than the NNSA telling the Laboratories "what" and the Labs responding with "how," the Labs are defining "what" and the NNSA (in particular, the site offices) is micromanaging "how"...
- *The Labs require greater strategic guidance from NNSA (or their primary government sponsor) without unnecessarily curtailing their management autonomy and operational flexibility.* The Laboratories need top-down coordination and political consensus in order to push their mission. Currently, imposed constraints and bureaucracy are unmanageable for Laboratory leadership. Simultaneously, the federal government has failed to define the Laboratories' mission.
- *Allocation of investments across all the Laboratories is suboptimal, which impedes strengthening of capabilities or focusing of research efforts.* This approach does not maximize a return on investment and creates expensive redundancies in programs/capabilities across the complex, hurts the quality of response, and causes unnecessary meetings/travel/coordination and other inefficiencies with no demonstrable improvement in response time or ingenuity.
- *If the decline in nuclear weapons budgets continues and other agencies' investments cannot be secured, core competencies applicable to a range of critical national security needs will be severely eroded or lost.* Long-term investments are required from users beyond DOE/NNSA to shore up critical national security competencies."

The Stimson report made one major recommendation, saying:

"The Task Force concludes that the basic choice is pretty clear:

- Initiate an extensive overhaul of DOE/NNSA to achieve intended agency autonomy and immediate action on numerous recommendations outlined [in the Stimson report];

OR

- Create a new independent agency with the institutional mechanisms and oversight in place to achieve the envisioned transformation and fully leverage the taxpayer's investments in the Laboratories science and technology infrastructure for government-wide national security.

> After a careful weighing of the options, the Task Force strongly recommends creating a fully independent agency for national security science and technology—the Agency for National Security Applications (ANSA)...the proposed organizational change would catalyze the multi-agency investment schemes and synergies necessary to fully achieve the science and technology transformation vision....the Task Force proposes fully severing NNSA and its Federally Funded Research and Development Centers (FFRDCs) including the NTS, from DOE to establish the proposed Agency for National Security Applications."

Report of the Congressional Commission on the Strategic Posture of the United States

Section 1062 of the FY2008 NDAA (P.L. 110-181) established the Congressional Commission on the Strategic Posture of the United States to "to examine and make recommendations with respect to the long-term strategic posture of the United States." Chapter 6 of the final report[20] of the Commission focused specifically on the nuclear weapons complex, and described several findings and recommendations related to governance and management. In the end, the Commission concluded:

> "The Commission's third main concern about the weapons complex is that the governance structure of the NNSA is not delivering the needed results. This governance structure should be changed."

The Commission elaborated:

> "Despite the efforts of thousands of dedicated and competent civil servants, Federal oversight of the weapons enterprise needs significant improvement. Key to that improvement is reconsidering the role and performance of the NNSA. The NNSA was formed to improve management of the weapons program and to shelter that program from what was perceived as a welter of confusing and contradictory DOE directives, policies, and procedures. Despite some success, the NNSA has failed to meet the hopes of its founders. Indeed, it may have become part of the problem, adopting the same micromanagement and unnecessary and obtrusive oversight that it was created to eliminate....
>
> The leadership of all three weapons laboratories believes that the regulatory burden is excessive, a view endorsed by the Commission. That burden imposes a significant cost and less heavy-handed oversight would bring real benefits. This conclusion is backed up by some real data. One recent external assessment of NNSA laboratories (performed by the Hackett Group in 2006) found a very high cost of compliance with federal safety and security requirements—approximately 15 times as much as for companies of similar complexity (recognizing also some important differences in some of the functions of those companies). Some other data is available from a pilot program conducted by the NNSA at the Kansas City plant in 2006 and 2007. Under this program, the plant was exempted from essentially all DOE regulations and additional oversight management changes were made. An external audit documented significant cost savings. Extending this approach throughout the complex is feasible. Two broad attitudes are often cited as contributing to excessive regulation. The first is the failure of the NNSA and DOE to distinguish between what to do (a government function) and how to do it (a contractor responsibility). This attitude leads to overly prescriptive requirements in DOE regulations and plant and laboratory management and in operations contracts. The second unhelpful attitude is the

[20] "America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States," U. S. Institute of Peace, 2009, http://www.usip.org/files/America's_Strategic_Posture_Auth_Ed.pdf

> tendency of the government to respond to problems by imposing new rules that will 'guarantee' that the problem does not recur.
>
> It should also be noted that the regulatory burden on NNSA facilities is increased significantly by the on-going audits and reviews by the DOE Inspector General and the Defense Nuclear Facilities Safety Board—and also the Government Accountability Office. These burdens are not under the control of either the Secretary of Energy or the NNSA Administrator. Despite excellent working relationships in some areas, efforts to implement the NNSA Act and to maintain even limited NNSA autonomy have resulted in a large and continuing measure of bureaucratic conflict. This has been a major distraction at a time when the NNSA might have been consolidating gains and realizing efficiencies. Some observers have concluded that the NNSA approach has failed and that some entirely new approach must be found. The Commission has come to a different conclusion. In its view, the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being. It is time to consider fundamental changes. Organizational changes may not be sufficient for reducing the regulatory burden, but they are clearly necessary."

Ultimately, the Commission recommended that Congress re-constitute NNSA as a wholly independent agency reporting to the President through the Secretary of Energy. The Commission recommended that this independent NNSA "should have a budget separate from any other entity," and "that this budget be reviewed by the Defense Appropriations Subcommittees of the House and Senate" rather than the current structure of appropriations through the Energy and Water Subcommittees. The Commission noted that:

> "NNSA's problems will not vanish simply by implementing a new reporting structure. A major driver of micromanagement and excessive regulation is the attitude of the Federal workforce reflected in both unreasonable regulations and excessive oversight in implementing them. Moving NNSA can only be effective if the NNSA leadership and the Administrator are committed to reducing micromanagement."

The Commission summarized their recommendations for reforming governance of the nuclear security enterprise as follows:

> "In summary, the Commission recommends that the President should designate the nuclear weapons laboratories as national security laboratories. He should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the laboratories. In crafting the needed legislation, the Congress should include the following additional provisions:
>
> - *That DOE regulations will not apply to the NNSA and that the Administrator should issue appropriate regulations without external approval.*
> - *That the Administrator should issue no regulations concerning occupational safety and health but should depend on the Occupational Safety and Health Administration (OSHA) for both regulations and oversight.*
> - *That NNSA will be responsible for all environmental management, including legacy remediation, at NNSA sites.*
> - *That the NNSA budget will be administered completely separately from the budget for any other agency. To implement this separation, the NNSA budget should be considered by the defense appropriations subcommittees...*

- *That the NNSA Administrator and the Nuclear Regulatory Commission will jointly prepare and implement a plan for a three year transition to NRC regulation throughout the NNSA weapons complex.*
- *That once the Administrator and Commission certify to the Congress that this transition is complete, Defense Nuclear Facilities Safety Board jurisdiction over the NNSA shall cease.*
- *That the DOE Inspector General have jurisdiction over the NNSA. Except for this IG support, that the NNSA not depend for services or support on the rest of DOE.*
- *That the NNSA should have direct access to the Intelligence Community.*
- *That the Secretary of Energy retain his responsibility in stockpile certification.*
- *That after three years, GAO evaluate whether the appropriate independence from DOE has been achieved.*
- *These changes should not apply to Naval Reactors, which should retain the current procedures set forth in the existing NNSA Act."*

NLDC Prioritization of Burdensome Policies and Practices

In response to a request from the Secretary of Energy, the National Laboratory Directors Council (consisting of DOE and NNSA national lab directors) created a white paper[21] in May 2011 identifying 18 policies/practices they deemed "most burdensome" and could be fixed "without legislative action or coordination with other agencies." Broken into several categories, the white paper's findings included:

1. "Unneeded Approvals
   Problem: Business processes which require DOE approval of M&O activities should be reserved for extremely high value, high risk transactions. A proliferation of approvals have arisen, often in response to minor and isolated problems, at the site office, service center, program, or headquarters support level, approvals inappropriately distribute risk-acceptance responsibilities and lead to costly delays and risk-aversion...
2. Excessive Oversight
   Problem: DOE's structure encourages a "piling on" of audits and assessments without clear risk-prioritization, coordination, or value. Audit findings must always follow audits, and these take on the force of policy, resulting in variable, audit-drive policy responses and ever higher costs. The Laboratories must staff up to deal with these audits and assessments, moving more and more dollars away from science. Recommend reducing the scope of audit activities and limit them to real "for cause" actions...
3. Unnecessary Reporting
   Problem: The Laboratories are required to submit a variety of reports to DOE. Many of these reports are duplicative or provide information that does not contribute to better management or oversight of the M&O. ON the contrary, much of this reporting is time consuming and ultimately not used in any meaningful way towards the missions of the Labs...
4. Striving Towards Best Practices

[21] "NLDC Prioritization of Burdensome Policies and Practices," White Paper provided to the Secretary of Energy, National Laboratory Directors Council, May 31, 2011.

Problem: In many areas of DOE, best practices or even conventional operating practices used in industry and academia are not followed. While best practices may not be suitable for some unique processes within DOE, many of the practices in place do not deliver more effectively with fewer problems and unforeseen complications.

5. Over-Regulation
Problem: DOE has developed regulations in the form of Orders, guidance, or memos that are duplicative of and often go beyond existing national standards. These regulations are often requirements that are imposed with little flexibility and may contradict existing national standards."

GAO Assessments of Management of the Nuclear Security Enterprise

In addition to the assessments and reports described above, in the decade since NNSA was created GAO has conducted an extensive series of assessments of NNSA's management of the nuclear security enterprise. Based on this long history of oversight, GAO has repeatedly highlighted that NNSA needs to have better information on its programs and operations—at all eight of its facilities—to run its nuclear security enterprise effectively and efficiently. GAO believes that to achieve the vision of the nuclear security enterprise that NNSA has articulated—eight sites conducting critical nuclear security work and solving the most difficult national security problems—NNSA must manage and govern its facilities and M&O contractors such that the entire enterprise works together in an intelligent and informed manner. GAO has said that better, more consistent information is critical to improvement. Furthermore, GAO has said that in areas such as project management, safety, and security, NNSA must lead its M&O contractors to improve. Several of the major GAO reports are summarized below.

NNSA: Additional Actions Needed to Improve Management of the Nation's Nuclear Program

In 2007, GAO reviewed actions taken by NNSA to improve security and management practices within its nuclear security enterprise. GAO concluded[22]:

"NNSA has taken several actions to improve its management practices, including developing a planning, programming, budgeting and evaluation process. However, management problems continue, in part, because NNSA and DOE have not fully agreed on how NNSA should function within the department as a separately organized agency. This lack of agreement has resulted in organizational conflicts that have inhibited effective operations.

GAO also identified the following areas where additional management improvements are needed:

- *Project management.*
NNSA has not developed a project management policy, implemented a plan for improving its project management efforts, and fully shared project management lessons learned between its sites.
- *Program management.*
NNSA has not identified all of its program managers and trained them to a certified level of competency.

[22] "NNSA: Additional Actions Needed to Improve Management of the Nation's Nuclear Programs," Government Accountability Office, GAO-07-36, January 31, 2007, http://www.gao.gov/products/GAO-07-36

- *Financial management.*
  NNSA has not established an independent analysis unit to review program budget proposals, confirm cost estimates, and analyze budget alternatives."

Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities

In 2010, GAO assessed NNSA's budget justifications for the funds it requests for: (1) operation and recapitalization of nuclear security enterprise infrastructure through the Readiness in Technical Base and Facilities (RTBF) funding line, and (2) research and production capabilities supported through the Stockpile Services funding line. GAO concluded[23]:

> "NNSA cannot accurately identify the total costs to operate and maintain weapons facilities and infrastructure because of differences in sites' cost accounting practices. These differences are allowable under current NNSA guidance as long as sites comply with cost accounting standards and disclose their practices to NNSA...NNSA has an effort under way that, if fully implemented, would provide more detail on the total costs to operate and maintain weapons facilities and infrastructure...
>
> NNSA does not fully identify or estimate the total costs of the products and capabilities supported through Stockpile Services R&D and production activities. Instead, NNSA primarily identifies the functional activities—such as engineering operations, quality control, and program management—and their costs supported through Stockpile Services and bases its future-year budget requests on the extent to which prior-year budgets were sufficient to execute these functions...NNSA has an effort under way that, if fully implemented, would provide more detail on the total costs of the products and capabilities supported through Stockpile Services."

Nuclear Weapons: NNSA Needs More Comprehensive Infrastructure and Workforce Data to Improve Enterprise Decision-making

At the direction of the FY2010 NDAA, in February 2011 GAO published an assessment[24] of NNSA's FY2011 Stockpile Stewardship and Management Plan. GAO found:

> "In its *FY 2011 Stockpile Stewardship and Management Plan*, NNSA outlines plans for substantial investments in important nuclear weapons capabilities and physical infrastructure. However, the agency lacks important enterprise-wide infrastructure and workforce data needed for informed decision-making. In response to this shortcoming, which NNSA recognizes, the agency is considering the use of computer models that integrate data from across the enterprise, which, if fully realized, may give decision-makers a tool to take a broad and accurate assessment of the situation. Specifically:
>
> - *NNSA does not have accurate, reliable, or complete data on the condition and replacement value of its almost 3,000 weapons activities facilities. This is, in part,*

[23] "Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities," Government Accountability Office, GAO-10-582, June 21, 2010, http://www.gao.gov/products/GAO-10-582

[24] "Nuclear Weapons: NNSA Needs More Comprehensive Infrastructure and Workforce Data to Improve Enterprise Decision-making," Government Accountability Office, GAO-11-188, February 14, 2011, http://www.gao.gov/products/GAO-11-188

because NNSA has not ensured contractor compliance with a DOE directive that requires facility inspections at least once every 5 years…

- *NNSA has identified 15 ongoing capital improvement projects as necessary to ensure future viability of the program, but the agency does not have estimated total costs or completion dates for all projects… DOE regulations do not require a total cost estimate until the initial design phase is complete, but without reliable cost and schedule data NNSA does not have a sound basis to justify decisions and planned budget increases…*
- *NNSA lacks comprehensive data on the critical skills and levels needed to maintain the SSP's capabilities. NNSA primarily relies on its contractors to maintain the workforce and, while these efforts may be effective for a specific site, NNSA lacks assurance that the overall program is maintained. Without such data, NNSA cannot forecast the impact of programmatic actions or identify consequences of those actions. NNSA officials told GAO that the agency recently established an Office of Corporate Talent and Critical Skills to bring attention to these issues."*

DOE: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Site

On January 31, 2012, GAO published an assessment[25] of support functions at DOE, with a particular focus on how streamlining of support functions among the 17 NNSA and DOE Office of Science sites have been streamlined or could be further streamlined to realize cost savings. GAO found that:

> "Support function costs at NNSA and Science sites for fiscal years 2007 through 2011 are not fully known because DOE changed its data collection approach beginning in 2010 to improve its data and, as a result, does not have complete and comparable cost data for all years. In fiscal years 2007 through 2009, total support costs for NNSA and Science sites grew from $5 billion to about $5.5 billion (nominal dollars)... DOE and contractors have undertaken various efforts since 2007 to streamline and improve the efficiency of sites' support functions. Streamlining efforts reported by officials from DOE and the eight NNSA and Science sites GAO reviewed focused mainly on procurement; human resources, including employee benefits; and facilities and infrastructure... DOE and its contractors have estimated savings for some streamlining efforts, particularly in procurement, but it is difficult to compare or quantify total savings across sites because DOE's guidance for estimating savings is unclear and the methods used to estimate savings vary."

GAO recommended that DOE and NNSA fully implement a quality control system for cost data on sites' support functions and clarify guidance to contractors on estimating cost savings from streamlining efforts to ensure consistency.

National Academies of Science study on Managing for High Quality Science and Engineering at the NNSA National Security Laboratories

On February 15, 2012, the National Academies of Science (NAS) will release Phase I of its study on the quality and management of science and engineering (S&E) at the NNSA labs.

[25] "DOE: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Site," Government Accountability Office, GAO-12-255, January 31, 2012, http://www.gao.gov/products/GAO-12-255

The Phase I report[26] focuses on how management practices affect the quality of science and engineering at the three labs.

This NAS study was mandated by section 3131 of the FY2010 NDAA, which was prompted by concerns about the effects of privatization of lab management at Los Alamos National Lab and Lawrence Livermore National Lab (LANL and LLNL). Section 3131 reflected a compromise during conference, from the initial House provision requiring a GAO study to assess the costs of the transition and the impacts on lab management and lab functions (including safety, security, and environmental management) due to concern that the increased cost of management fees, taxes, and other associated costs might result in decreased resources for programmatic work and negative impacts to morale.

In the conference report accompanying the final bill, the conferees noted that "there is a growing concern about the ability of the DOE to maintain the overall quality of the scientific research and engineering capability at the three laboratories," and that the conferees desired "an even-handed, unbiased assessment of the quality of the scientific research and engineering" at the labs and an assessment of the "factors that influence" such quality.[27] Phase 1 of the study focuses on the latter: management-related factors that influence the quality of science and engineering at the labs.

One aspect of lab management that the NAS study examined was recent contracting changes at the labs. In 2004, Congress mandated that the long-standing contracts with the University of California to manage LLNL and LANL be re-competed. As a result, these two M&O contracts were awarded to two independent limited liability corporations (LLCs) that include Bechtel Corporation and the University of California, and the award fee for managing each lab increased substantially (to around $80 million per year). Employees and outsiders have criticized the new contracts as moving the labs away from a public service motivation and toward a profit motivation. The NAS found:

> "While the new contracts at LANL and LLNL clearly produced a noticeable level of staff frustration, staff members with whom the study committee interacted continued to show a strong commitment to their work. Those who testified to the study committee about morale problems spoke primarily of the situation as it existed at the time of the contract transitions, or of the subsequent layoffs at LLNL. When the study committee examined the M&O contracts, it found very little that prescribes the management of S&E. Many of the bureaucratic frustrations raised at all levels appear to be either within the power of the Laboratories to address or driven by governance strategies above the Laboratory level: they are not traceable to the M&O contractor or the contracts themselves...Some employees and stakeholders have been concerned that M&O contractors pursuing a fee might not act in the public interest, and this is an important issue. Therefore, the study committee discussed incentives with the three Laboratory directors and was convinced that their primary objective remains to manage the Laboratories in the public interest."

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[26] "Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories," Committee to Review the Quality of the Management and of the Science and Engineering Research at the Department of Energy's National Security Laboratories – Phase I, National Research Council of the National Academies, February 15, 2012.

[27] Quotes from section 3131 of: "National Defense Authorization Act for Fiscal Year 2010: Conference Report to Accompany H.R. 2647," U.S. House of Representatives Report 111-288, October 7, 2009.

The NAS also examined the move within the labs towards a broader customer base than just working on the nuclear weapons program. This has resulted in something of a rebranding of the labs from "nuclear weapons labs" to "national security labs." The NAS found:

> "An evolution of the Laboratory missions to "National Security Laboratories" is well underway. The absence of nuclear testing means that experimental validation of much of the S&E performed by the Laboratories is not possible, and thereby lessening the intellectual attractiveness of the work for at least some prospective employees. The expansion of the Laboratories' mission into new non-nuclear areas offers the prospect of increasing the Laboratories' appeal to top-quality scientists and engineers while also serving important national security missions. Thus, the quality of S&E, being preconditioned on attracting high-quality people, depends in the long run on successfully making this transition to National Security Laboratories...In a time of constrained budgets, broadening the mandate to a national security mission helps preserve S&E expertise by providing opportunities to work on problems posed by partner agencies. However, while such Work for Others (WFO) is very important for the future of S&E at the Laboratories, all three of the Laboratory directors were very clear that maintenance of the nuclear weapons stockpile remains the core mission of the Labs."

Examining NNSA's governance structure and oversight processes of the labs, NAS made similar criticisms as those found in other studies (as described above):

> "In the view of this committee, the relationship between NNSA and its National Security Laboratories is broken to an extent that very seriously affects the Labs' capability to manage for quality S&E. There has been a breakdown of trust and an erosion of the partnering between the Laboratories and NNSA to solve complex S&E problems; there is conflict and confusion over management roles and responsibilities of organizations and individuals...Erosion of trust on both sides of the relationship shapes the oversight and operation of the Laboratories, resulting in excessive bureaucracy governing Laboratory activities at a deep level of detail, including the conduct of S&E...The loss of trust in the ability of the Laboratories to maintain operational goals such as safety, security, environmental responsibility and fiscal integrity has produced detailed scrutiny by NNSA HQ and site offices and increased aversion to risk. A major byproduct of this has been to create a bias against experimental work, because of the onerous processes sometimes required before running an experiment. The bias is problematic because experimental science is at the very heart of the scientific method."

NAS found that that the level of detailed, transactional-level management and oversight that NNSA applies to the labs was causing significant inefficiencies and risking the quality of science and engineering at the labs:

> "The FFRDC [federally funded research and development corporation] relationship is based on a partnership between the Federal government and a Laboratory in which the government decides what problems need to be addressed and the contractor determines how best to address those problems. There is a perception among S&E staff and managers at the three Laboratories that NNSA has moved from partnering with the Laboratories to solve scientific and engineering problems, to assigning tasks and specific S&E solutions with detailed implementation instructions. This approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased. The study committee found similar issues in transactional oversight of safety, business, security and operations. Science and engineering quality is at risk when Laboratory scientists and engineers are not encouraged to bring forth their creative ideas in partnership with NNSA to solve problems vital to our national security."

The NAS report made a series of recommendations to improve the management, oversight, and inefficiency problems it identified:

- *"Recommendation 4-1:*
  The study committee recommends that NNSA and each of the Laboratories commit to the goal of rebalancing the managerial and governance relationship to build in a higher level of trust in program execution and Laboratory operations in general.

- *Recommendation 4-2:*
  The study committee recommends that NNSA and the Laboratories agree on a set of principles that clearly lay out the boundaries and roles of each management structure, and also that program managers at headquarters, the Site Offices, and in the Laboratories be directed to abide by these principles.
  For example, the Site Manager and the Director and/or Deputy Director of each Laboratory could establish, in consultation with other Lab staff, a process to identify and agree on eliminating certain oversight procedures that are not necessary or related to the overall goals of the Laboratory. Similarly, some mechanism could be established to filter program taskings at both the headquarters level and at the Laboratory senior management level to assure that each tasking is necessary and consistent with the agreed management principles.

- *Recommendation 4-3:*
  The study committee recommends that the goal of rebalancing the relationship and the set of principles laying out the boundaries and roles of each management structure be memorialized in memoranda of understanding between NNSA and its Laboratories. NNSA should assess performance against these understandings on an annual basis over a five-year period and report these assessments to.

- *Recommendation 5-1:*
  The study committee recommends that the NNSA, Congress, and top management of the Laboratories recognize that safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced, so that they not impose an excessive burden on essential S&E activities.

- *Recommendation 5-2:*
  The study committee recommends that NNSA reduce reporting and administrative burdens on the Lab directors, and purposely free directors to establish strategic science and engineering direction at the Laboratories."

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94704

phone (510) 704-8783
fax (510) 704-8065
info@upte-cwa.org

www.upte.org

February 13, 2012

Chairman Michael Turner
House Armed Services Subcommittee on Strategic Forces
2216 Rayburn House Office Building
U.S. House of Representatives
Washington, DC 20515

Ranking Member Loretta Sanchez
House Armed Services Subcommittee on Strategic Forces
2216 Rayburn House Office Building
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Turner and Ranking Member Sanchez:

As your Subcommittee prepares to hold a hearing on the governance, oversight and management of the nuclear security enterprise and to hear from the National Academy of Sciences (NAS) in regards to their report on the issue, we felt it necessary to share with you some of our views and concerns. As individuals with a long history working in this environment and leaders of the organization representing employees at the DOE/NNSA laboratories, the Los Alamos National Laboratory and the Lawrence Livermore National Laboratory we believe that we can provide critical insight on this vital subject matter. We applaud you for holding the hearing and hope that a number of important issues will be addressed at the hearing.

Background

The National Academy of Sciences (NAS) recently completed their year-long study of the effects on their scientific and national security missions of the transition to private, for-profit monopoly management of the DOE/NNSA laboratories, the Los Alamos National Laboratory and the Lawrence Livermore National Laboratory. The final NAS report was just released. In our testimony today we would like to summarize and amplify what we told the NAS about the many ways the work environment has changed at the Labs since the management transition, and how these changes have had a detrimental effect on accomplishment of the Labs' missions. The changed environment has affected careers through program misdirection and loss of trained personnel, and has escalated a decline in science and engineering productivity. Both Labs have suffered from a decline in recruitment and a continued loss of senior people.

We believe that the root cause of all these problems is the for-profit monopoly management structure itself. We would like to summarize here the two main reasons why we believe this, and suggest to you what can and should be done to correct these problems.

Corruption of the Scientific Method by For-Profit Monopoly Management

In order to understand better what is fundamentally wrong with the way the science enterprise is now conducted at the Labs, we first would like to describe for you the right way to do science. The right way to do science is to follow strictly the scientific method. The scientific method was first developed over 400 years ago, and its implementation has led to fundamental advances in our understanding of natural phenomena, a seemingly endless sequence of technological developments based on new understandings of nature, and a consequent vast increase in human prosperity that has become the foundation of modern civilization. In other words, hypothesis-driven science, based on the scientific method, has a long history of success.

In hypothesis-driven science, we first inductively construct a mathematical model of the observed properties and behavior of the physical system of interest, then we use the model to develop a hypothesis of how the physical system will behave or respond to new or different conditions, then we test the hypothesis by carefully designed experiment, then we use the experiment results to refine the model. Iterating these steps advances our knowledge and understanding. In hypothesis-driven science, modeling and experiment work synergistically. No incentive is necessary, since the advancement of knowledge is simultaneously its own incentive and its own reward.

At the Labs now, there is not much hypothesis-driven science being done. Instead, it is mostly milestone-driven science, and much more so since the transition to private for-profit management. In milestone-driven science, we develop a milestone, or a set of milestones, for model prediction, and a separate set of milestones for experiment. Modeling and experiment results are ends in themselves, detached from any need to advance understanding. Unlike hypothesis-driven science, milestone-driven science does not have an already built-in incentive. At the Labs, milestone-driven science is incentivized by monetary reward, particularly the performance-based incentive management bonuses built into the management contract.

Thus, with the for-profit management structure, the focus has shifted dramatically to meeting contract performance goals and earning the maximum performance fee. This single-minded focus on milestone-driven science has resulted in less tolerance for the open debate and discussion that is necessary both for good science and engineering and for regulatory compliance. In other words, any critiques --- vitally necessary to the success of hypothesis-driven science --- that are viewed by management as potentially putting the management fee at risk are strongly discouraged, even suppressed. Scientists and engineers cannot function properly in such an environment.

At the start of the NAS Study, we presented to the Study panel one example of how, at Lawrence Livermore, milestone-driven science has impeded the progress of scientific understanding vital to the nation's goal of achieving fusion ignition. The example we gave at that time concerned the determination of the high-pressure compressibility of deuterium. Measurements made at different Labs using different experiment facilities and

different measurement techniques came up with widely different values for deuterium compressibility at a pressure of about a million atmospheres. Despite several proposals that were advanced by Livermore scientists and others on how we might resolve the issue of which measurement is correct, management's attitude was that the matter was closed --- after all, the Lab did meet the milestone to get the measurement --- and resources would instead be directed at moving on to the next milestone. Management's focus on meeting milestones rather than advancing understanding is a principal factor in why the issue of the correct compressibility of deuterium remains unresolved to this day.

Now, a more recent happening, also in the National Ignition Campaign, provides an even more dramatic example of the failures of milestone-driven science and how it has put the Lab's future in jeopardy.

The first strategic error was to promise fusion ignition by a date certain, and then devise arbitrary experiment milestones to get to the goal by the promised date. Unexpected results were obtained last September in National Ignition Campaign experiments on the National Ignition Facility (NIF) laser at Livermore. These experiment results were a serious setback to meeting the performance milestones in the National Ignition Campaign. Management's response to this setback was to postpone all other experiments on the NIF laser --- experiments by the weapons program, DOD experiments, and other science experiments --- and to re-allocate resources from other programs so as to conduct an accelerated National Ignition Campaign. In other words, they doubled-down on the original bet, still banking on meeting the milestones and getting to the promised land by the promised date. If the original bet was risky, the doubled-down bet is riskier still.

Meanwhile, there has been a major disruption for almost all employees at the Lab. Some have seen a complete cessation of the work they were doing. Others have been re-assigned to other tasks in direct support to the National Ignition Campaign, sometimes without a good fit to their expertise. How this is all going to play out over the coming months is yet to be seen.

The recognition that milestone-driven science is a problem is not original with us, or with the NAS Study panel. More than two years ago, on January 28, 2010, Dr. Richard Garwin of IBM prepared information for Congress. At that time this is what he said:

"Scientists and weapons experts were seriously demoralized --- however unintentionally --- by the transfer of Los Alamos and Livermore to corporate management, with no prior recognition that for each Laboratory there would be a $100 million management fee and a similar further program budget reduction because Laboratory activities would no longer be exempt from tax. This lack of foresight and the apparent valuation of bureaucratic milestones over technical performance has been a substantial problem in recent years."

If Congress allows the current arrangement of for-profit milestone-driven science to stay in place at the Labs, there will just be an endless series of such disruptions and failures, and the damage to the Labs and their scientific missions will be irreparable. The time is

now to make the fix. The fix to us is obvious: re-compete the management contracts, and de-privatize.

Before we get to that, however, we discuss briefly another serious flaw in the current for-profit monopoly management structure of the Labs.

Wasting Public Money by For-Profit Monopoly Management

The original objective of Congress in putting the Labs up for bid was to improve efficiency, accountability, and transparency[i]. NNSA's awkward bid process, however, all but precluded the transparency of a public C-Corporation and instead compelled the opaque private LLC structure we have now.

Furthermore, a private *monopoly* is anything but efficient; hence the existence of anti-trust laws. A for-profit monopoly funded by the government is worse still, and when we add a lack of tangible, customer-testable products (nuclear warheads), this is the worst situation of all.

"Free Market" capitalism involves a willing buyer, with a choice of which supplier to choose (e.g., Coke or Pepsi) and which price to pay (e.g. $1.89 as an emergency walk-in or $0.99 on sale). The availability of competing choices is what makes the system work – and lacking these ingredients, for-profit privatization becomes a very Un-American idea indeed.

"Free Market" capitalism for the employees (or as LLNS and LANS calls them, "the most valuable resource") means not just an option to leave a defective or corrupt firm, but an option to leave, join the *competition* instead, and help to sink the defective or corrupt firm. This helps keep greed, incompetence, and corruption in balance. This model has of course failed in the case of LLNS & LANS since, as a taxpayer subsidized private monopoly, they have no competition.

The result has been apparent from day 1: LLNS and LANS cost the taxpayers an extra $400 million per year. But in another way, the $400M/yr (now approximately $2B after 5 years) is a small amount of money.

Guided by the nuclear weapon design desires of LLNS and LANS, the NNSA has spent well over $30B since their takeover of the Labs and associated production complex. Since that time we have seen an endless (and failed) stream of LLNS and LANS proposals for new, untested combinations of plug-n-play nuclear weapons, designed to provide for easily met performance bonuses and easy management at LLNS and LANS. All of this has had the effect of diverting valuable resources, at great cost, from other missions – whether in science, energy, environment, or even in the curatorship and certification of the existing nuclear weapons stockpile to modern, professional standards. It is easier for LLNS and LANS to take the easy route, and NNSA rewards this bad behavior. The transparency of a public, non-profit structure would have a huge effect on discouraging such bad behavior.

Nuclear weapons certification is another expensive failure of the LLNS and LANS monopoly. In this core mission, the National Academies reviewed the LLNS and LANS stillborn certification methodology[ii] after 7 years of promises, and the NAS recommended that a different process be used[iii]. An unaccountable monopoly resulted in a stagnant and inferior weapons certification process. The real world, both open public and corporate, has developed and implemented product certification based on national standards while the LLNS and LANS monopoly has only languished and spent massive tax dollars on "Key Personnel" salaries that are 10 to 20 times the American national average salary.

NNSA was advised by several competent sources[iv] not to award both Labs to the same "Firm". Yet, they did so anyway. The resulting monopoly led to a string of inevitable failures. In the real world, whether the open, non-profit, public world or an open, for-profit corporate world with competition, these failures would lead to the liquidation of LLNS and LANS, with the mission going to its competitors instead.

Action Requested

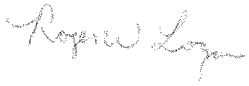
We believe that nuclear weapons science and certification, the major role of these NNSA labs, is inherently a public, non-profit mission. For this reason, and for the reasons outlined above, we strongly urge the Committee to include language in the National Defense Authorization Act for 2013 to re-compete the management contracts for the Los Alamos and Lawrence Livermore National Laboratories in such a way that these Labs are managed as public or private non-profit entities operating in the public interest, and to return their focus to their original science and national security missions. We also strongly believe that further Congressional delay in taking such action will be harmful to the national interest. We cannot continue to wait year after year since in the meantime, massive amounts of tax dollars are being wasted – not just the extra $400 million per year cost of the LLNS and LANS monopoly structure, but the misdirection of the entire $7 billion per year NNSA weapons budget. The future certification pedigree of the B61, W78, and W88 are now under direct threat.

We also recognize that, in the current political climate, only smaller incremental steps may be possible in the near term. One step that we could take immediately would be to introduce low-cost competitors to the LLNS and LANS monopoly on site at each of the taxpayer-owned facilities of Los Alamos and Livermore. Several management-level people have expressed interest in such "small business enterprises". Will we continue to stifle their entrepreneurship and its potential benefits for the nation and its taxpayers? This small inexpensive step would introduce real free-market competition and help guide us toward the ultimate solution to the LLNS and LANS problem. The cost of these small independent non-profit enterprises could easily be covered by imposing a cap on the current LLNS and LANS management fees.

We would again like to thank you for your attention to this critical issue and are available to answer any questions that you may have for us. Again, we believe that the input of the employees that work in the labs are critical in reviewing the developments of this change. Thank you for your attention and time.

Respectfully,

Dr. Jeff Colvin
LLNL Physicist
SPSE Legislative Director



Dr. Roger Logan
1st Directed Stockpile Work Leader at LLNL
Retired from Los Alamos and Livermore

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[i] House Energy & Commerce, "Review of the University of California's Management Contract for Los Alamos National Laboratory" Subcommittee on Oversight and Investigations, 1 May 2003.

[ii] National Academies, "Evaluation of Quantification of Margins and Uncertainties Methodology for Assessing and Certifying the Reliability of the Nuclear Stockpile", Mar 2009, http://www.nap.edu/catalog.php?record_id=12531

[iii] Logan, R.W., "U.S. Nuclear Weapons Design and Certification Infogram: Comments on the NAS Draft Report on QMU", Dec 2008.

[iv] Brian, Danielle, Project On Government Oversight, "POGO's comments to the Draft Request for Proposals for the contract to manage Los Alamos National Laboratory", Project On Government Oversight, 6 Jan 2005. http://www.pogo.org/pogo-files/letters/nuclear-security-safety/nss-lanl-20050106.html

Statement by Ambassador Linton Brooks

on

Governance, Oversight and Management

of the Nuclear Security Enterprise

Submitted for the record to the

Strategic Forces Subcommittee of the

House Armed Services Committee

February 14, 2012

I want to thank Chairman Turner and Ranking Member Sanchez for the opportunity to provide this Committee with my views on issues associated with the structure and operation of the National Nuclear Security Administration (NNSA). My views reflect my four and one-half years as NNSA Administrator and my service as Chair of the Infrastructure Experts Working Group supporting the 2009 Strategic Posture Commission (sometimes referred to as the Perry-Schlesinger Commission). They do not, however, reflect detailed knowledge of current internal NNSA practices. I should emphasize that I am appearing as a private citizen and my views do not necessarily represent the views of any organization with which I am affiliated.

Concern over Federal management of the nuclear weapons enterprise has a long history. Workshops, panels and commissions raise awareness of various problems and serve as therapy for those struggling with them, but usually make little sustained difference. Sometimes, however, large scale changes do occur. Concern over government management of safety in the early1990s gave us the Defense Nuclear Facilities Safety Board. Concern over security management in the late 1990s led to the establishment of the National Nuclear Security Administration. Both of these major changes originated in the Congress. The question facing the Congress today is not whether problems in governance and management exist. They do, and they always will. The question is what to do about it. Specifically, is it time for another major legislatively-driven reform?

A useful starting point for considering the issue is *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*. The 2009 Strategic Posture Commission was remarkable. A bi-partisan, Congressionally-appointed panel composed of members from across the ideological spectrum, all with vast experience and strong views, reached unanimous agreement on a lengthy set of recommendations. The Commission was supported by a number of expert working groups, many of whose members went on to fill very senior positions in government. The Commission report was enormously influential in the drafting of the 2010 Nuclear Posture Review. On NNSA, however, the Commission's recommendations have been ignored, even by those who agree with its assessment that "the [NNSA] governance structure…is not delivering the needed result," and that "oversight of the weapons enterprise needs significant improvement…[including] reconsidering the role and performance of the NNSA."

The most fundamental issue facing the Commission still faces those who would reform NNSA today. It is whether the problem is primarily external (too much second

guessing by other portions of the Department of Energy or by the Defense Nuclear Facilities Safety Board) or is primarily internal (that is, is NNSA adopting the same micromanagement and obtrusive oversight that it was created to eliminate). The Commission concluded that both problems existed.

To deal with the external problem, the Commission recommended that NNSA (less Naval Reactors) become a stand-alone agency, reporting to the President through the Secretary of Energy. This independent agency should not be covered by DOE regulations, nor should regulations issued by the NNSA Administrator require external approval. NNSA should be responsible for all environmental management, including legacy remediation, at NNSA sites. The NNSA budget should be completely separate from the budget for any other agency and should be considered by the defense appropriations subcommittees in the House and Senate. There should be a plan for a three year transition to NRC regulation throughout the NNSA complex, after which Defense Nuclear Facilities Safety Board jurisdiction over NNSA should cease.

The Commission also concluded that external reform was not enough and that problems will not vanish simply by implementing a new reporting structure. They asserted that "A major driver of micromanagement and excessive regulation is the attitude of the Federal workforce reflected in both unreasonable regulations and excessive oversight in implementing them." Organizational change, in their view, can only be effective if the NNSA leadership is committed to reducing micromanagement. To help in this regard, they recommended that the newly-independent NNSA issue no regulations concerning occupational health and safety but instead depend on the Occupational Safety and Health Administration (OSHA) for both regulations and oversight of non-nuclear safety.

To ensure a proper approach within the new independent NNSA, the Commission also proposed that which current NNSA employees transfer to the revised organization (which they assumed would be smaller than today's NNSA) should be determined, in part, based on individual employees' understanding and acceptance of the need to reduce Federal micromanagement and on their commitment to the distinction between the government's duty to determine what is to be done and contractor responsibility to decide how to do it.

Given the influence of the Commission in other areas, it is striking that—prior to this hearing—neither the Administration nor the Congress has given their recommendations any serious consideration. It may now be time to change that and to end the semi-autonomous status of NNSA as a separately-organized entity within the Department of Energy in favor of full autonomy. In deciding whether and how to proceed, I believe the Congress generally—and this Committee specifically—faces four major issues.

Issue 1. Is the situation sufficiently severe that Congressional intervention is required? I believe that the clear answer is yes, whatever the Committee's assessment of NNSA's current performance may be. The Strategic Posture Commission examined an option of using legislation to strengthen the NNSA within the Department of Energy.

They concluded that such an approach "cannot be effective in the long term. The record of recent years points to no other conclusion." I agree. The current "semi-autonomous" structure has proven to be too dependent on the personalities of DOE and NNSA leadership to be consistently reliable and effective.

Issue 2. Will the consequences of a major reorganization be enough of an improvement to justify the disruption and cost involved? While I support the Perry-Schlesinger recommendations, they need to be scrubbed for unanticipated consequences. In the nuclear weapons program we subject weapons design to extensive "red teaming" as a form of peer review. New designs for the NNSA should be subject to the same process. Therefore, before making any final decisions on legislation, the Committee should subject the ideas put forward by the Strategic Posture Commission to a detailed skeptical review by its staff. It should also seek the rationale for the Administration's apparent conclusion that the Commission's ideas should not be pursued.

Issue 3. Can the internal and external problems, to the extent they exist, be solved together? Given the enormous disruption involved in organizational change, it would be unconscionable to make such change without assurances that greater autonomy for NNSA will lead to more effective and less intrusive oversight. The Commission correctly noted that changing governance can empower leadership and vision by removing distractions. But organization is not a substitute for vision. The Committee should be under no illusion of the difficulty of culture change. In my experience, virtually all civil servants want to do a good job and are convinced that their actions add value and are in the national interest. Virtually all laboratory scientists and managers want to do a good job and are convinced that Federal actions hamper them in doing so. Striking the correct balance between these two legitimate viewpoints will always be hard; organizational change is only justified if it is likely to make finding that balance easier.

Issue 4. Is there a suitable champion or champions to ensure the effort receives sustained support? Major change cannot be sustained without institutional champions. For organizational change those champions must be on the Hill and have influence in both chambers. For internal change they must be part of the senior leadership in NNSA. It is clear that this Committee must play a leading role. Champions must not just support change, however, but also defend the resulting organization. Sooner or later, there will be a problem which it can be plausibly claimed more federal oversight would have prevented. Champions must be prepared to resist the pressure to impose new procedures in such circumstances.

Is it now time to revisit the more extreme recommendations of the Strategic Posture Commission? My answer is yes. The present system has been tried for a decade by dedicated, hard-working and competent civil servants. It has not lived up to the nation's hopes. We can do better.

Siegfried S. Hecker
Center for International Security and Cooperation, Stanford University

Hearing of the Subcommittee on Strategic Forces
Arms Services Committee of the House of Representatives on the
"Governance, oversight and management of the Nuclear Security Enterprise to ensure High Quality Science, Engineering and Mission Effectiveness in an Age of Austerity."
February 16, 2012

Mr. Chairman, I am pleased to be invited to share my views on a subject that is of great concern to me. I apologize for not being able to appear in person due to my obligations back at Stanford University. Thank you for the opportunity to provide a written statement to be entered into the record to address how the governance, oversight and management of the nuclear security enterprise can be improved to enable the National Nuclear Security Administration's (NNSA) laboratories and plants to be more effective and efficient. In June 2003, while still employed at the Los Alamos National Laboratory, I testified before the U.S. Senate Committee on Energy and Natural Resources hearing on "Governance of the Department of Energy Laboratories." Here I will update that assessment to address your concerns. The June 2003 Senate statement is attached in the appendix. I want to make three main points in my remarks today:

First, in 2003 I concluded that the system of governance was broken; the innovative and successful GOCO (government-owned, contractor-operated) partnership between the government and the laboratories had been effectively dissolved resulting in a crisis in management. The changes made in the intervening nine years have made governance less effective, have significantly increased the cost of doing business, and have produced even more stifling oversight to the point that effective conduct of the laboratories' mission is seriously compromised.

Second, the stifling oversight is a result of the loss of balance between mission requirements and regulatory/oversight requirements. Congress, apparently in an attempt to enhance the accountability of the labs and their contractors, has driven the entire system of laboratory operations -- from the Department of Energy/National Nuclear Security Administration (DOE/NNSA), to the Defense Nuclear Facility Safety Board (DNFSB), to the DOE site offices, to the laboratory management -- toward risk aversion without sufficient consideration for the impact on mission and cost.

Third, although in the age of austerity, effectiveness and efficiency is measured primarily in terms of cost, the primary price the United States is paying for risk aversion is not in U.S. dollars, but rather in the loss of intellectual capital and know-how at the laboratories and plants. Instead of being focused on the intellectual challenges of today's mission requirements, the labs are in a state of morale crisis brought on not so much by insufficient funds, but instead by a suffocating regulatory and operational climate of risk aversion that doesn't allow them to get work done.

There is no quick fix for these problems. I will offer a series of recommendations for your consideration.

My tenure at the Los Alamos National Laboratory.
I first arrived at Los Alamos nearly 47 years ago as a 21-year old summer student in search of adventure and a scientific challenge. I had my sights set on a university faculty career. The University of California's ties to the lab were critical in my decision to come to Los Alamos. That summer was bliss, as was my two-year postdoctoral position three years later. Upon completing postdoctoral work I left Los Alamos for a job in industrial R&D, but returned to join the scientific staff in 1973 because the research environment was the best in the nation.

Los Alamos gave me the opportunity to do world-class research and it allowed me to serve my country at the same time. I learned how scientifically fascinating the nuclear weapons problems were. The environment created by the University of California allowed me to learn from Nobel laureates and Manhattan Project pioneers. It was an atmosphere that was not only scientifically rewarding, but also instilled in me a sense of patriotism and public service, and it shaped my career.

I had the privilege of leading this illustrious laboratory from 1986 though 1997 – through the rapidly changing times of the Cold War's end and the post-Cold War period. The positive changes in the global geopolitical environment were accompanied by enormous management challenges. With the end of the Cold War, public scrutiny of the Department of Energy's nuclear complex increased; the sense of urgency in Congress for the nuclear weapons mission decreased; the regulatory environment shifted dramatically toward risk aversion; and the DOE weapons laboratories, Lawrence Livermore, Los Alamos and Sandia national laboratories, lost the political immunity they had during the Cold War, making them more prone to partisan political attacks.

After my directorship I remained at the laboratory and returned to my first professional love: exploring the technical challenges associated with understanding the metal plutonium, the heart of the bomb. I also adopted a new personal mission: to attract and mentor the next-generation of scientists to better understand the complex and fascinating behavior of this rare element. In addition, I sought to attract more of the lab's technical staff to help solve the new, emerging nuclear challenges around the world – challenges that had become more daunting with the end of the Cold War. However, I was concerned that the GOCO partnership was being effectively dissolved, and it became increasingly difficult to attract and retain the best and the brightest for the country's nuclear missions. When the DOE/NNSA took what I considered to be the ill-advised step to contract a for-profit consortium instead of the University of California to run the laboratory in 2005, I retired from the laboratory and joined the faculty of Stanford University.

I continue to work part time, without pay, with technical colleagues at the Los Alamos National Laboratory on plutonium science and international nuclear challenges. My association with the lab reminds me of the enormous talent still resident at Los Alamos, but also of the untenable working conditions that have been created for the scientific and

engineering staff by the risk-averse nature of the DOE/NNSA nuclear enterprise. The comments that I offer in response to your request, Mr. Chairman, are from observations made up close and personal, not from a distance.

The demise of the GOCO partnership.
In my 2003 Senate testimony, I made the case that the GOCO partnership, established during the Manhattan Project, was deliberate, innovative and successful. The GOCO management and operating (M&O) contract was a partnership to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation. That partnership allowed contractors, such as the University of California, to provide the stewardship for nuclear weapons, what I consider to be an *inherently governmental function,* while bringing the best technical talent to the job. It allowed the weapons laboratories to provide the cradle-to-grave care of nuclear weapons during the Cold War.

However, by the late 1980s we witnessed the disintegration of the Soviet Union and a concomitant loss of a sense of urgency for the nuclear weapons mission. A public call for greater transparency of DOE's nuclear weapons complex and congressional pressure changed the relationship between the DOE and its laboratories from a partnership to more of an arms-length procurement process. Consequently, it became increasingly difficult for contractors to take the public-service approach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These problems were brought to the attention of our government by several high-level task forces and commissions.[1]

In 2000, Congress created the semi-autonomous National Nuclear Security Administration (NNSA) in an attempt to improve the government's ability to conduct its nuclear security mission. Unfortunately, the NNSA never achieved the semi-autonomous status Congress intended it to have nor did it provide the necessary isolation from politics for it to be more effective than previous arrangements. Consequently, creation of the NNSA did not reverse the negative trend in governance and management at the weapons laboratories. Additional damage was done in 2005 when the NNSA, under pressure from Congress to provide greater accountability, terminated the public-service contractual relationship with the University of California for the management of the Los Alamos National Laboratory (followed in 2007 for the Lawrence Livermore National Laboratory) with a for-profit consortium.

I objected on the grounds that this change was incompatible with the inherently governmental function the weapons laboratories are asked to perform. The exorbitant award fees, changes in the tax status of the lab resulting from the for-profit status of the

[1] R.W. Galvin, *Alternative Futures for the Department of Energy Laboratories,* 1995 (http://www.lbl.gov/LBL-PID/Galvin-Report/Galvin-Report.html) and J. Hamre, Chairman of the Commission on Science and Security established by the Secretary of Energy in October 2000, summarized his concerns based on the Commission's report in *Issues in Science and Technology, Summer 2002* http://www.issues.org/18.4/hamre.htm).

contractor and the new pension system increased the cost of doing business greatly without apparent benefit in accomplishing the missions of the laboratories. Instead of restoring the government-contractor partnership, the contracting changes resulted in continued excessive oversight and prescriptive operational practices that have stifled the productivity of the laboratories without concomitant improvements in health, safety or security. Moreover, the award fee, rather than mission or science, is seen by many laboratory employees as driving management's priorities.[2] I believe Hugh Gusterson accurately captures the morale crisis of the Los Alamos staff in his article. Jeff Garberson[3] states that the situation is similar at the Lawrence Livermore National Laboratory.

I believe that the current system of management, having moved far afield from the GOCO partnership, is no longer deliberate, innovative and successful, while being more expensive than it has been at any other time in the history of the nuclear weapons program. This deterioration is not the result of the creation of the NNSA nor the change to a for-profit contractor per se, but rather the accumulated changes driven primarily by Congress for greater accountability.

Increased imbalance between mission and regulatory requirements.
With the end of the Cold War the balance between getting work done in the nuclear complex to keep the Soviet Union at bay and the level of risk tolerated in the operation of the nuclear complex shifted steadily toward lower acceptability of risk. Concurrently the doors to the DOE nuclear complex were opened to public scrutiny, which raised the public's concern about the environmental, safety and health impacts of the nuclear enterprise.

As I described in my 2003 testimony, the DOE responded to increased environmental, safety and health regulations with increased oversight and prescriptive remedies that focused on compliance and paperwork, rather than improved safety and environmental practices. These problems were noted by the Galvin Task Force, which reviewed the governance of the DOE laboratories and issued its report on *Alternative Futures for the Department of Energy Laboratories* in February 1995. The report pointed out that both DOE and Congress must shoulder the responsibility for the erosion in governance. The Task Force observed:

> "[T]he Department is driven both to honor the prescriptions from Congress and to over-prescribe in order not to be at risk of failing to be super attentive to the Congress's intentions. The net effect is that thousands of people are engaged on the government payroll to oversee and prescribe tens of thousands of how-to functions. The laboratories must staff up or reallocate the resources of its people to be responsive to such a myriad of directives; more and more of the science

[2] This issue was described by Hugh Gusterson in "The assault on Los Alamos National Laboratory: A drama in three acts," Bulletin of the Atomic Scientists, 67(6) pp. 9-18.
[3] Jeff Garberson, "Analyst Sees Lasting Damage to Los Alamos, Livermore," *The Livermore Independent*, Dec. 1, 2011.

> intended resources are having to be redirected to the phenomenon of accountability versus producing science and technology benefits."

The Task Force indicated that productivity at the DOE laboratories could be enhanced by 20 to 50 percent. It concluded that the system of governance was broken, having veered significantly from its GOCO practices.

The concerns expressed by the Galvin Task Force were amplified dramatically by the government's reaction to the security crisis triggered by the Cox Report and its accusation of Chinese espionage at Los Alamos in 1999. John Hamre, chair of the Commission on Science and Security established by the Secretary of Energy in October 2000, summarized his concerns based on the Commission's report: "The commission concluded that DOE's current policies and practices risk undermining its security and compromising its science and technology programs. The central cause of this worrisome conclusion is that the spirit of shared responsibility between the scientists and the security professionals has broken down." Hamre continued: "The damaging consequences of this collapse of mutual trust cannot be overstated. It is not possible either to pursue creative science or to secure national secrets if scientists and security professionals do not trust each other." These concerns were expressed before the security crisis described by Gusterson in his article in the Bulletin of the Atomic Scientists.

In the intervening years, in spite of the creation of the NNSA, the work of the congressionally mandated Defense Nuclear Facility Safety Board (DNFSB) and the for-profit contracts for the operation of the Lawrence Livermore and Los Alamos national laboratories, these problems have continued to worsen. Congress has continued to demand greater accountability from the DOE/NNSA and its contractors. The investigative arm of Congress, the Government Accountability Office (GAO), cites "insufficient DOE/NNSA oversight" as a major contributing factor to most of the problems it has investigated in the complex. Consequently, it is no surprise that the DOE, the NNSA, the local NNSA site office, the contractor, and the various levels of laboratory management all continue to "over-prescribe in order not to be at risk of failing to be super attentive to the Congress's intentions," as noted by the Galvin Task Force. The result is risk aversion at every level of responsibility, resulting in a stifling work environment for laboratory staff. The most common complaint that I hear in walking the halls of Los Alamos and in my interactions with the Lawrence Livermore technical staff is that it has become unduly difficult to get work done, especially in nuclear facilities.

I believe the balance between mission requirements and regulatory requirements has swung so heavily in the direction of the latter that it now seriously endangers the conduct of the nuclear weapons mission in the country's nuclear weapons complex. This, in my opinion, is the major factor contributing to the lack of effectiveness and efficiency in the complex.

The budget is important, but money alone cannot fix the problem.
It is understandable that the cost of the nuclear weapons complex is a great concern in this age of austerity. However, the greatest price we are paying for the imbalance in

mission and regulatory requirements cannot be measured in US dollars, but instead in the loss of intellectual capital at these labs and weapons know-how at the nuclear weapons plants.

To fix this problem it is imperative to reiterate the important mission of the nuclear complex and create a sense of urgency to accomplish that mission. Clearly the mission has changed during the past 20 years, but the nuclear enterprise remains a cornerstone of America's national security. President Obama reinforced this in his April 2009 speech in Prague and in his 2010 Nuclear Posture Review. The Congressional Commission on the Strategic Posture of the United States (in the Perry-Schlesinger report) did the same. Mr. Chairman, you and the Subcommittee on Strategic Forces of the Committee on Armed Services, have repeatedly stressed the importance of the nuclear weapons enterprise for American security. You have supported modernization of the aging infrastructure. You have emphasized the importance of the intellectual vitality of the workforce at the laboratories.

Yet, the broken system of governance, the loss of trust between the government and its contractors and the stifling operating environment resulting from the imbalance of mission and regulatory requirements has seriously eroded the morale at the laboratories and threatened the very intellectual vitality that is imperative for effective nuclear stewardship. It has become so cumbersome and expensive to get work done at the laboratories that it is very difficult to attract the talent required for the demanding missions. I am concerned that the laboratory no longer provides the attractive environment for young scientists and engineers that I found when I joined Los Alamos early in my career, especially since it is no longer operated by the University of California, but rather by a for-profit consortium with the University as one of its members. Work in the nuclear facilities is now dramatically more expensive than just a decade ago, but even more troubling is the fact that some of it is simply not being attempted because the regulatory environment makes it too difficult.

Mr. Chairman, you and the Subcommittee have expressed concern about potential asymmetries between U.S. capabilities and future trajectories of our nuclear forces compared to Russia and China. In my opinion, the greatest asymmetry in capabilities rests not with the nuclear arsenals, but in the ability to effectively work in the nuclear facilities required to field an effective deterrent.

For example, I have visited the plutonium laboratories of the Russian, Chinese, French, UK and Indian nuclear complexes. None of these countries tie the hands of their scientists and engineers as dramatically as we do with our risk-averse regulatory system. None of them have incapacitated their nuclear weapon production complex to the point that we have, both with regulatory barriers and spiraling costs of replacement facilities. In other words, we have become our own worst enemy. The Los Alamos Chemistry Metallurgy Research Replacement (CMRR) construction project is a case in point. I first did plutonium research in the CMR building in 1965, when it was only 13 years old. It is now 60 years old and it must be replaced with a modern plutonium research laboratory to keep our plutonium expertise for stockpile stewardship. Yet, we have allowed an

unbalanced regulatory approach to drive the price tag to $5 - $6 billion, far beyond what such a facility should cost and would cost in other countries. Moreover, instead of working to create a smaller, agile nuclear weapon production complex that retains the critical skills needed for our deterrent, we have an outdated, cumbersome complex that cannot easily respond to either the modernization or the effective downsizing of our arsenal.

In addition to what I found at nuclear facilities in other countries, I also find that some of DOE's nuclear facilities, overseen by DOE's Office of Science rather than the NNSA, have not suffered as precipitous a decline in their working environment as have the weapons labs. I recently visited the Oak Ridge National Laboratory (ORNL) and the Pacific Northwest National Laboratory (PNNL). Their nuclear facilities appear to be more sensibly operated than those at the Los Alamos or Lawrence Livermore national laboratories. Not surprisingly, I found the morale of the staff at the nuclear facilities at ORNL and PNNL much better than that at Los Alamos or Livermore. I was struck by the partnership approach that the DOE site offices appear to have developed with these labs, a stark contrast from the adversarial relationship that has existed at Los Alamos for years. In addition, these labs are not overseen by the Defense Nuclear Facility Safety Board.

In my 2003 testimony I stated:

> "[I]t has become increasingly difficult for contractors to take the public-service approach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These changes were made not by design with the best governance in mind, but rather resulted from the accumulated reactions of the DOE to government audits and congressional pressure. The net result has been to significantly diminish the ability of the laboratories to accomplish their missions and to dramatically reduce their productivity. The laboratories are on the cusp of being irreparably damaged as scientific institutions in service to the nation."

I echo these sentiments today. The deliberate change to for-profit contractors at the Lawrence Livermore and Los Alamos national laboratories have exacerbated the problems rather than fixed them.

Mr. Chairman, you asked me for concrete, actionable recommendations to achieve increased effectiveness and efficiencies at the laboratories. There is no simple fix to these problems. The system of governance is broken and it will require more than a change of contractor to fix. These problems also cannot be fixed with money alone; they must be addressed by a fundamental rebalancing of mission and regulatory requirements. I offer the following recommendations:
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- The most immediate need is to improve the working environment at the weapon labs. To do so, Congress should help to rebalance regulatory/operational requirements with mission requirements. Nuclear operations must, of course, be

safe, secure and environmentally acceptable, but they must also be cost effective. The nature of the nuclear enterprise involves risks – these risks must be managed in a cost effective manner, not avoided by an overly prescriptive and stifling system of multiple layers of oversight. It is time to re-examine if the Defense Nuclear Facility Safety Board is the best mechanism to evaluate the risks at NNSA's nuclear facilities. Comparisons should be made to managing nuclear facilities in the rest of the DOE complex and to how the Nuclear Regulatory Commission manages the risk of commercial nuclear facilities.

- The inherently governmental nature of the nuclear weapons enterprise requires rebuilding a partnership between the government and the weapons labs based on trust and a long-term contracting commitment. Congress drove the system away from this partnership in an attempt to get greater accountability from the contractors, but the loss of partnership has negatively impacted nuclear weapons stewardship. It should now steer governance back toward a partnership and away from emulating federal operations or a procurement-oriented contract model. It should give the NNSA the semi-autonomous status that was envisioned when it was established and isolate it better from partisan politics. The for-profit contracting arrangements for the Lawrence Livermore and Los Alamos national laboratories should be re-evaluated. I am not convinced that the consortia's private-sector companies bring management benefits commensurate with the large award fees provided by the contract.
- I strongly encourage both Congress and the NNSA to evaluate how other countries operate their nuclear facilities and how they create an environment conducive to getting work done. The French nuclear facilities, particularly the plutonium facility at Valduc, deserve close evaluation as how to balance risk and mission. Closer to home, I also advise that the NNSA look at other nuclear facilities for best practices in how to manage risks.

APPENDIX

Senate Committee on Energy and Natural Resources Hearing on
"Governance of the Department of Energy Laboratories"
Siegfried S. Hecker
Senior Fellow, Los Alamos National Laboratory
June 24, 2003

Mr. Chairman, I am pleased to be invited to share my views on a subject that is of great concern to me. I have prepared this written statement. With your permission, I would like to enter it into the record along with a comprehensive article I wrote on this subject in 1997. I will briefly summarize my statement this morning. Specifically, I want to make three points.

First, the GOCO (government owned, contractor operated) system of governance for the Department of Energy nuclear weapons laboratories was based on a partnership between the government and a contractor to deal with the inherently governmental nature of the development, construction, and life-cycle support of nuclear weapons. The partnership was designed to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation. The GOCO partnership was deliberate, innovative and successful. Not only did the weapons laboratories provide the cradle-to-grave care of the nuclear weapons that helped end World War II and deter the Soviet Union during the Cold War, but they also contributed to other critical national security and civilian missions. The need for a successful system of governance for these laboratories is as great as ever in light of the challenges of stockpile stewardship in a no-test environment and of the increased threats of proliferation of weapons of mass destruction and terrorism.

Second, over the years, as missions evolved and as public expectations of these institutions changed, the laboratories were often slow to make the necessary changes. However, rather than working with the laboratories to institute the necessary changes in the spirit of the GOCO partnership, the DOE typically responded to public criticism and congressional pressure with new orders, rules, and contract terms that fundamentally shifted governance away from the GOCO partnership toward a hybrid federal operation and procurement contract operation. The lines of responsibility and authority between the DOE and the contractors have become blurred, with more and more of the operational decisions made by federal employees, but more accountability and liability shifted to the contractors. Consequently, it has become increasingly difficult for contractors to take the public-service approach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These changes were made not by design with the best governance in mind, but rather resulted from the accumulated reactions of the DOE to government audits and congressional pressure. The

net result has been to significantly diminish the ability of the laboratories to accomplish their missions and to dramatically reduce productivity.

Third, these problems must be repaired before the damage to the entire system becomes irreparable. Although contractors must be held to the highest standards in managing all of their operations, the solution to the current crisis is not as simple as changing contractors. If the system of governance is broken, as I contend it is, then no contractor will be able to accomplish its mission successfully and productively. To achieve world-class performance we must have not only a world-class contractor, but also a world-class customer and a revitalized system of governance. Such a system must re-establish the partnership between the government and the contractor, it must rebuild trust, flexibility, and a public-service orientation, and it must opt for contract terms that encourage implementation of best practices from the private sector rather than adopting prescriptive federal practices. These changes will be difficult to implement now that the system has swung so far from these features. I believe that a congressionally mandated Blue Ribbon Task Force chartered to design an improved system of governance is the best way to address this important and urgent problem.

The GOCO (government-owned, contractor-operated) partnership for the nuclear weapons program.

I will first discuss the salient features of the GOCO partnership that formed the basis of governance of the DOE laboratories. Although many of these features applied to both weapons and civilian laboratories, I will focus my remarks on the nuclear weapons laboratories.

The development, construction, and life-cycle support of the nuclear weapons required during the Cold War were *inherently governmental functions.*[4] However, the government realized that it could not enlist the necessary talent to do the job with its own civil-service employees. Instead, it enlisted contractors to perform the government's work on government land, in government facilities, using the specialized procurement vehicle of an M&O (management and operations) contract.

The government does not normally contract out inherently governmental functions such as managing the armed services, conducting international relations, or the

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[4] "Inherently governmental function" means, as a matter of policy, a function that is so intimately related to the public interest as to mandate performance by government employees. This definition is a policy determination, not a legal determination. An inherently governmental function includes activities that require either the exercise of discretion in applying government authority, or the making of value judgments in making decisions for the government. (Quoted from the Federal Acquisition Regulations [FAR], Part 7.5).

printing of money. But when it does, there is sufficient authority (notably the Atomic Energy Act in the case of nuclear weapons) to tailor the resulting contracts in a way that addresses the special concerns of both the government and the contractor. The government used the M&O contracting vehicle to develop the GOCO partnership for atomic energy activities.

The GOCO partnership was deliberate, innovative and successful. Not only did the weapons laboratories provide the cradle-to-grave care of the nuclear weapons that helped end World War II and deter the Soviet Union during the Cold War, but they also became world-class research institutions that positively impacted the broader interests of the United States. The GOCO concept was designed as a partnership to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation.

Specifically, for the nuclear weapons laboratories the contractor was chosen to bring to the job scientific and management talents that typically do not exist in the federal government. Furthermore, the contractor was not to be saddled with all federal rules and regulations governing procurement, personnel policies, etc., in order to be quicker, more flexible, and more effective than the government itself.

Under the GOCO partnership, the government defines general policy and programmatic goals. The contractor is responsible for performing the research programs in a technically sound, cost-effective and safe manner. In simple terms, the government decides what's to be done, and the contractor decides how and by whom. The government, as owner and customer, had the responsibility of holding the contractor accountable for its performance, for safe and secure operations, and environmental stewardship of the government's facilities.

The nuclear weapons program required the following characteristics:
- Long-term commitment, but limited access (the government did not want dozens of institutions involved in the design and development of nuclear weapons).
- Technical excellence and innovation in a highly classified environment.
- Ability to cope with potentially enormous risks and hazards.
- Unwavering technical integrity.
- Unique, expensive facilities.
- Cost-effective, safe, and environmentally responsible operations.

These requirements were met by appealing to organizations such as the University of California and AT&T Bell Labs (two of the most respected and innovative research institutions in the world) to join the government in a public-service partnership.

The *sine qua non* of the University of California's agreement to serve the nation was "no gain, no loss," while providing outstanding public service. The government's interest in accomplishing high-risk research at minimum cost was served by the University's commitment to public service with no profit or fee. The University's concern with financial risks and liabilities was alleviated by the government's

commitment to broad indemnification. The laboratories performed large-scale, complex research and development activities that were essential to the mission, but by their very nature carried great inherent risks. The only reasonable condition under which the University could serve was with federal indemnification. The University's service was rendered solely for the advancement of the national interest, without personal or institutional gain.

Under this arrangement, the University did the work, and the government covered the cost and took the major financial risks. While the government's indemnification of the University was never absolute, the basic approach was that the government would bear the risks to essentially the same extent as if the government were performing the work itself, while appropriately holding the contractor accountable for stewardship of government resources.

Changes of the GOCO relationship over time – a personal view

Mr. Chairman, in your letter of invitation you asked me to address how changes in federal governance of the laboratories over the years have impacted the ability of laboratory scientists to respond to national missions. I had a front-row seat for 38 of the 60 years of the existence of the laboratory system – first as a student, then a scientist, than a manager and laboratory director, and now, again, as a scientist. So, I will take the liberty of providing a brief journey through my career at the Los Alamos National Laboratory as a way to answer your question and touch upon some of the broader issues you raised.

Nirvana:

I first came to Los Alamos in the summer of 1965 as a 21-year old student in search of adventure and scientific challenge. Within a week, I was working productively in a plutonium lab under the guidance of a hands-on mentor in the most modern plutonium facility in the world, the Chemistry Metallurgy Research (CMR) Building. I had a productive and fascinating summer that greatly influenced the rest of my life.

Looking back now, what happened that summer was astonishing. First, I received a security clearance to work "inside the fence" within three months – in spite of the fact that I was born in Poland, grew up in Austria, had been in the United States less than 10 years, and a citizen less than five years. The necessary background checks were done expeditiously to allow me to start at the laboratory that summer. The clear message was that my new country trusted me and for me that trust became the most demanding gift of all. During the past 10 years, the clearance process for American-born applicants has typically taken one to two years (because of a variety of bureaucratic impediments, not because the background checks are more thorough) – a period that seems like an eternity,

especially for young people eager to get to work. Moreover, as I will demonstrate below, the sense of trust, so essential to the conduct of our national security mission, has been seriously eroded over the years.

Also, having a 21-year old with no nuclear materials experience working in a plutonium lab within one week is not only unheard of today, but the federal authorities would most likely consider it irresponsible management practice. Yet, I believe that I received an excellent, professional, and safe indoctrination because I was mentored by experienced scientists and engineers, not guided by a thousand-page rulebook. I was taught that safety is an integral part of the fabric of work, not something that is added on because of compliance with rules and regulations. Safety was our responsibility and every employee knew that. However, as I will explain below, environmental, safety, and health issues became major issues in the DOE complex and the laboratories around 1990. The DOE response was very compliance driven and the increased presence of DOE overseers and auditors blurred lines of responsibility instead of improving safety. The laboratories, on the other hand, were slow to adapt to changing requirements and public expectations. Over a period of a few years, they began to adopt best practices from the private sector through an integrated safety management approach. However, this was very difficult under an overly prescriptive federal environment.

After returning to school to complete my graduate work, I returned to Los Alamos three years later as a postdoctoral research fellow and what I considered a stop on the way to a university professorship. Los Alamos offered one of the most attractive research environments in the country and it belonged to the prestigious University of California family of campuses and labs. Los Alamos had excellent research facilities, a broad spectrum of great scientists and engineers, and great financial support. Moreover, the laboratory had the flexibility to permit me to follow my research interests. These were times when the spirit of partnership permeated every aspect of the laboratory's operations. It was a time when the Congress (through the Joint Committee on Atomic Energy), the executive branch (through the Atomic Energy Commission), and the contractor (the University of California, for our laboratory) were true partners in the nation's nuclear enterprise. Subsequent to my two-year appointment, I decided to make a stop in an industrial research laboratory at General Motors before moving on to a university. However, I never reached my destination because my Los Alamos colleagues were sufficiently persuasive to convince me to return instead to Los Alamos as a technical staff member in 1973.

My goal was to do materials research, not weapons research and development. I did not go to school to design or build bombs. I never imagined that I would get deeply involved in nuclear materials and nuclear weapons. Yet, the environment created by the University of California at Los Alamos hooked me to this very day. It gave me the opportunity to do world-class research and it allowed me to serve my country at the same time. I learned how scientifically fascinating the nuclear weapons problems were. It allowed me to learn from Nobel laureates and Manhattan Project pioneers. It was an

atmosphere that awakened a sense of patriotism and public service. I was proud to be contributing to the compelling missions of the laboratory – fundamentally, that of national security, but also contributing to energy, environment, and public health. Partnership, flexibility, and trust were still central. The bureaucracy at that time was much less and seemed bearable; although the old timers complained that things were not the way they used to be.

Winds of change:

During the late 1970s and early 1980s, things began to change. The broadened missions of the laboratories that followed the transformation in 1977 of the Atomic Energy Commission to the Department of Energy (via the short-lived Energy Research and Development Administration) brought with them significantly more government bureaucracy. The new department was clearly a political entity, not the focused, professionally staffed AEC. Moreover, the elimination of the Joint Committee on Atomic Energy in Congress decreased the support for nuclear activities in Congress and added much bureaucracy because of complicated jurisdictional issues.

During the 1980s, things also changed for me. I took on increasingly greater management responsibility along with my research. I was fortunate to be asked to lead the laboratory, beginning in January 1986 and to serve as its director, which I did until November 1997. In spite of the changes noted above, the spirit of the GOCO partnership between the Department of Energy and the laboratories still existed. The laboratories were still part of the DOE family. The DOE leadership set overall policies and directions, provided oversight, and held us accountable. We, the laboratories, had cradle-to-grave technical responsibility for the nation's nuclear weapons. We provided continuity from one government administration to the next. For example, my tenure as director overlapped that of four Secretaries of Energy. This relationship was enabled by the special nature of the GOCO partnership contract. The laboratory directors had the responsibility for the safety, security, and reliability of nuclear weapons. The President's confidence in the nuclear arsenal was based to a large extent on the judgment of the directors. Clearly, the directors had to act in the best interest of the nation. I was able to do so because the University of California had a long history of public service and it was protected by a special contract with the government that covered major liabilities.

The partnership between the DOE and the laboratories also manifested itself in a number of exciting initiatives to respond to changing missions during the late 1980s. As the Soviet Union began to disintegrate, we jointly launched initiatives that addressed other critical national problems that could benefit from the capabilities of the laboratories. These projects included addressing non-proliferation concerns, improved conventional munitions, ballistic missile defense, enhanced energy supply, the development of high-temperature superconductors, the Human Genome Project, and industrial partnerships with industries such as the oil and gas industry. These projects

were partnerships between DOE and the laboratories and had strong backing from Congress, especially from Senators Domenici and Bingaman.

The DOE complex under stress and a retreat from the GOCO partnership:

But the late 1980s witnessed not only the disintegration of the Soviet Union, but also the slow but steady disintegration of the DOE nuclear complex. In Washington, there was a loss of a sense of urgency for the nuclear weapons mission. In addition, the growing national environmental awareness brought into question many past practices in the nuclear weapons complex. The public expected greater scrutiny of the nuclear complex and better stewardship of the nuclear enterprises, especially following the Three Mile Island accident in 1979 and the Chernobyl reactor disaster in 1986. The DOE complex experienced particularly intense public and congressional scrutiny following a 1984 federal court decision on an environmental lawsuit regarding the Oak Ridge site that ordered all DOE facilities to be placed under federal, state, and local environmental regulations instead of being self-regulated. The resulting changes in operations in the DOE complex greatly impacted the productivity of the complex and changed the relationship between the DOE and its contractors. Many of the production facilities in the nuclear weapons and materials complex were shut down, some in keeping with changing mission requirements (such as the plutonium production reactors and uranium enrichment facilities) and others principally because of regulatory concerns (pit production at Rocky Flats, for example).

It was not the stricter governmental safety and environmental regulations per se, but the way DOE responded to these regulations that led to these problems. Driven by intense public and congressional pressures, the DOE responded with increased oversight and prescriptive remedies that focused on compliance and paperwork, rather than improved safety and better environmental practices. The increased scrutiny began in the weapons production complex, but moved to the laboratories around 1990 with the implementation of the DOE Tiger Team inspections. The DOE increasingly prescribed how the work by the contractors in the complex should be performed, rather than specifying what was to be done and then holding contractors accountable for doing it safely and effectively. The Department and other agencies increased the number of audits dramatically (for example, at the Los Alamos National Laboratory we had roughly 160 audits in 1992) and put more and more of its federal employees on site to oversee operations. The roles, responsibilities, and authorities of federal overseers and contractor personnel became confused, often leading to an adversarial relationship.

The DOE Tiger Team inspections were symptomatic of the change – attention focused on regulatory compliance that was mostly process and paperwork oriented instead of outcome driven. These changes led to a great proliferation of DOE employees in the audit chain at the laboratories. The laboratories responded by staffing up their own auditing staffs and functions, even creating new internal organizations to respond to the requirements imposed by the DOE. In addition, the laboratories were trying to balance programmatic requirements with newly imposed environmental, safety, and health requirements without adequate financial support from the government. Moreover, they were trying to make all these changes in facilities and infrastructures that were old and

often beyond repair. For example, the CMR Building in which I began my career was nearing the end of its useful life, yet we were not able to get DOE approval for a replacement facility at this time.

Consequently, much of the trust that formed the basis of the GOCO relationship between the DOE and the contractor was lost. The Department's relationship with the laboratories, driven to a large extent by pressure from Congress, changed from one of owner/operator to policeman/operator. The relationship changed from one of partnership to an arms-length government procurement. Congress insisted on greater "accountability" from the Department and its contractors, but it too often measured success by how well the Department or the contractors fared during government audits, rather than by how well they accomplished their missions. Virtually every audit by the Government Accounting Office (GAO) of the DOE complex concluded that the "insufficient DOE oversight" was a major contributing factor to whatever problems were cited.

It was no surprise then that with each contract renewal, the DOE further dismantled the GOCO partnership to make the contracts more like standard government procurements. The Department began to take away many of the special procurement practices built into the GOCO contracts that allowed flexibility and speed. Yet, it was these special contractual provisions that allowed the laboratories to emulate private sector practice, rather than cumbersome federal procurement regulations. It began to impose federal personnel policies and business practices on the contractors. It began to chip away at the indemnification provisions offered to GOCO contractors since the inception of the concept. It began to shift the risks of operations of its nuclear facilities increasingly to the contractors, offering financial incentives to those who were willing to compete in this new contractual environment. Consequently, the DOE either lost or fired many of the stellar American companies that agreed to step in after the Manhattan Project to help create and manage the nuclear complex. In the early 1990s, AT&T, which had operated Sandia National Laboratories since its inception, declined to consider continuation of its management role when the DOE decided not to renew its presidential indemnification (first approved by President Truman) for operation of the Sandia laboratories. Lost to the DOE complex for a variety of reasons were such stellar companies as DuPont, General Electric, Dow, Union Carbide, and Rockwell. These changes may have made it easier to audit the laboratories, but they did not make them more effective. In fact, these changes very negatively affected the operational environment. It also made it more difficult to recruit the best scientists and engineers, and it discouraged qualified individuals from taking on scientific leadership/management positions. Over time, it diminished the laboratories' ability to accomplish their technical missions effectively.

These problems were noted by the Galvin Task Force, which reviewed the governance of the DOE laboratories and issued its report on *Alternative Futures for the Department of Energy Laboratories* in February 1995. The Task Force lamented the fact that the GOCO relationship between the DOE and the contractors had deteriorated to the point where the laboratories look essentially like GOGO (government-owned, government-operated) institutions. The report states: "...wherever we turn we see evidence of nothing but a government owned and more government operated system."

The report pointed out that both DOE and Congress must shoulder the responsibility for this erosion. The Task Force further observed: "...the Department is driven both to honor the prescriptions from Congress and to over-prescribe in order not to be at risk of failing to be super attentive to the Congress's intentions. The net effect is that thousands of people are engaged on the government payroll to oversee and prescribe tens of thousands of how-to functions. The laboratories must staff up or reallocate the resources of its people to be responsive to such a myriad of directives; more and more of the science intended resources are having to be redirected to the phenomenon of accountability versus producing science and technology benefits." The Task Force indicated that productivity at the DOE laboratories could be enhanced by 20 to 50 percent. It concluded that the system of governance was broken, having veered significantly from its GOCO practices.

At this point, most of the contractors and their laboratories looked to the private sector to attempt to re-engineer the laboratories. We at Los Alamos began a "productivity initiative" in the early 1990s to apply the lessons learned by the private sector in the 1980s to make our operations more productive while ensuring safety and environmental responsibility. We brought in private-sector consultants, we went to school at the private industrial universities (such as Motorola University) to learn quality principles, we began the Baldrige Quality Award assessment process, and we co-opted the DOE leadership to join us in these endeavors. We began to re-engineer our business systems and our work processes, to implement an integrated safety management system, and we restructured the laboratory. These changes began to improve our productivity. The University of California also negotiated a performance-based contract with the DOE. Unfortunately, the DOE did not change its management system or oversight practices; nor did it adequately support the changes at the laboratories and the University. For example, at Los Alamos we did not get the necessary backing and cooperation of the DOE when we had to make difficult manpower decisions that were necessary to enable our productivity initiative. Unfortunately, the bottom line was that neither DOE nor the Congress was prepared to make the type of changes we were implementing, cutting short our ambitious re-engineering efforts. A great opportunity to fundamentally improve the laboratory's operations and its overall productivity was lost.

Strong mission support from the government and the role of the University of California:

I would like to add a success story that ran counter to our disappointing experience in trying to change the operating environment for the better at the laboratories. In the 1990s, the DOE and the laboratories together successfully dealt with the changing mission requirements that accompanied the end of the Cold War. The collapse of the Soviet Union was as remarkable as it was unexpected. With the backing of Charles Curtis, then DOE Under Secretary, the laboratory directors established successful threat reduction efforts with their counterparts in Russia. Most of the early cooperative nuclear programs with Russia were initiated by laboratory personnel with the explicit support of DOE. Under the leadership of then DOE Assistant Secretary for Defense Programs, Dr. Victor Reis, the laboratories helped to forge the nuclear weapons stewardship program. The laboratories also began an effort in the mid-1990s to help the country develop technologies necessary to deal with terrorism and weapons of mass destruction. These

changes were profound and essential to our national security. The programs and changing missions were strongly encouraged and supported by Congress. Unfortunately, the same was not true of helping us deal with the deteriorating operational environment at the laboratories.

I had the fortune of leading the Los Alamos National Laboratory during these historic times. I began to increasingly appreciate the role of the University of California in dealing with these complex issues. The University not only provided a technical peer review system for all of our laboratory's technical activities to make sure they remained world class, but it also had the convening power to engage high-level advisors that helped me and our laboratory management to think through the necessary mission and operational changes. With the strong backing of the University and its advisory council, then director of the Lawrence Livermore National Laboratory, John Nuckolls, and I visited the Russian nuclear weapons laboratories in February 1992, less than two months after the dissolution of the Soviet Union. We initiated many cooperative activities that helped to lessen the dangers inherent in the Russian nuclear enterprise faced with a sudden and dramatic breakdown of its government and its economy. We received the University's backing in spite of the fact that these initiatives were very risky and that liability issues had not been directly addressed. The University's own public service orientation and the special nature of the GOCO contract that still prevailed at that time made this possible.

During the 1990s, the DOE and the laboratories also faced some difficult decisions with respect to arms control agreements, nuclear weapons safety, nuclear testing, and the evolution of stockpile stewardship. It was essential that the laboratory directors provided the best technical advice to the government, regardless of its political correctness. The directors, in spite of the fact that they did not work for the federal government, had to act as public servants because these issues were of an inherently governmental nature. Beginning in 1996, the directors of the three DOE weapons laboratories were asked to certify the nuclear stockpile with letters to the secretaries of Defense and Energy (who then advised the President). To sign the letter that states: *"I certify the nuclear weapons in the stockpile that our laboratory has designed to be safe and reliable, without nuclear testing at this time,"* the directors should not be motivated by personal salaries, corporate fees or corporate profits. The directors can do this job responsibly only by acting as an extension of the Department - as "public servants." It is the very nature of the GOCO partnership that allowed the directors to do so. Furthermore, the regents and the president of the University of California made it clear that they expected me to place the national interest above all. They provided the backing and the confidence for me to make the tough decisions we faced during this time. Over the years, the presence of the University of California in the nuclear weapons complex also enriched the debate about the role of nuclear weapons and their stewardship.

Political turmoil and serious setbacks for the laboratories:

I left the directorship at Los Alamos in November 1997 to return to my research interests and to spend more time on the threat reduction activities with the Russian nuclear complex. I remained at Los Alamos because I believed this was the best way to

serve my country. My principal research interest is plutonium metallurgy. Potential problems with the re-manufacture of plutonium pits for weapons or problems with the aging of existing pits are at the heart of the challenge of stockpile stewardship – that is, keeping our nuclear weapons safe, secure, and reliable. I helped to craft the concept of science-based stockpile stewardship – now I wanted to help it succeed. I wanted to attract the best young talent to this task and I hoped to help restore a productive work environment for plutonium research. I knew that the working environment at the laboratory was no longer the nirvana that I experienced when I first arrived, but I found that it had deteriorated even more than I had realized as director.

Unfortunately, two unfortunate events caused even more severe damage to the work environment at Los Alamos – the Wen Ho Lee security affair that came to light in 1999 and the missing hard drive incident in 2000. Both incidents raised serious questions about security practices at Los Alamos and at DOE. However, instead of careful analysis of how to correct the cyber and counter-intelligence weaknesses that the case exposed, the politically charged environment resulted in reactions in Congress and by the DOE leadership that proved devastating for the laboratory and the entire system of laboratories. Additional security measures were enacted at the laboratories that were not well thought out and that could have disastrous long-term consequences for the laboratories and the ability to fulfill their missions. For example, polygraph testing was implemented in spite of substantial scientific evidence that it is unreliable (a view recently confirmed by a study by the prestigious National Academies). Insufficient consideration was giving to the down side of polygraph testing; that is, not only what to do about false positives and false negatives, but also how to deal with the overall damaging effect such testing has on recruitment and retention). In the case of the hard-drive incident, the security frenzy led to an FBI investigation that utilized strong-armed tactics in one of the most sensitive divisions of the laboratory, resulting in the creation of a hostile work environment.

The concerns about the government's reaction to the security incidents at Los Alamos are shared by others, who perhaps can view these incidents more dispassionately than I. John Hamre, chair of the Commission on Science and Security established by the Secretary of Energy in October 2000, recently summarized his concerns based on the Commission's report in *Issues in Science and Technology, Summer 2002*. Hamre stated: "The commission concluded that DOE's current policies and practices risk undermining its security and compromising its science and technology programs. The central cause of this worrisome conclusion is that the spirit of shared responsibility between the scientists and the security professionals has broken down." Hamre continued: "The damaging consequences of this collapse of mutual trust cannot be overstated. It is not possible either to pursue creative science or to secure national secrets if scientists and security professionals do not trust each other." He also pointed out that to fix these problems the DOE must confront the long-standing management problems in the Department. Donald Kennedy echoed many of the same concerns about the Department's approach to security in his editorial in the 23 May 2003 issue of *Science*.

Unlike the security environment, the operational environment in the laboratory's experimental facilities (especially the plutonium facilities) suffered no catastrophic event,

but instead faced continuing erosion in our ability to do experimental work. The safety and environmental regulations continued to become increasingly prescriptive. In spite of our progress in implementing integrated safety management systems and improving our nuclear operations, more DOE oversight was prescribed and approval through the DOE maze became increasingly cumbersome. More and more, the key safety decisions were moved from knowledgeable engineers and scientists to overseers with little hands-on nuclear experience. I realize that DOE must provide oversight of our operations; after all it is the owner and has a responsibility to the public. However, for the reasons discussed before, DOE oversight has evolved over the years to become so intrusive and counterproductive that it has diminished our scientific quality and productivity.

Let me provide you with one of the most egregious examples of an approval system gone awry. It is the tale of a colleague who had an experience far removed from that I experienced when I started at Los Alamos as a student. In early 1992, he began to design and build a full-scale hydriding test facility for plutonium pits at our TA-55 plutonium facility. In spite of the fact that his project was of great importance and significant urgency for stockpile stewardship, he was not able to run his first experiment until December 1999, almost eight years later. The Tiger-Team atmosphere slowed down initial approvals and the paperwork became excruciatingly cumbersome. In spite of excellent design and engineering work, the project suffered repeated delays due to additional reviews and approvals required by DOE. The flammable gas issue associated with hydrogen alone required three and a half years approval through DOE Los Alamos Office, DOE Albuquerque, and DOE Headquarters. In spite of some 18 to 20 reviews of the system and eight years in preparation, only two minor physical changes were made to the system. How can we meet our mission requirements and how can we prevent our scientists and engineers from giving up in frustration in this type of an environment? In addition, changes in indemnification now threaten laboratory employees working directly with nuclear materials with Price Anderson violations, which presents an additional impediment to getting people to do experimental nuclear work.

During this time we also experienced increasing micro-management and a loss of flexibility in the laboratories' technical and programmatic activities. Over the years, DOE provided the programmatic requirements and broad budgetary flexibility, whereas technical decisions were made at the laboratories. Now, both congressional committees and DOE insisted on budgeting and managing programmatic activities at an increasingly finer scale to achieve greater accountability. Unfortunately, this shifted more of the technical decision making to DOE Headquarters and limited the flexibility at the laboratories to do the best possible job. So, although today the overall budgets are sufficient to get the job done, the compartmentalization of the budget diminishes our ability to do so effectively.

These problems and the conclusions of the Hamre Commission and the Galvin Task Force paint a very different picture from that of numerous governmental audits and investigations by offices such as the GAO or the Inspector General. These audits consistently fault the DOE for lack of sufficient oversight. None of these reports laments the lack of trust and flexibility, or the fact that an environment has been created in which

we cannot get our work done productively. Instead, trusting a contractor is treated more like an offense than a necessity. Moreover, the GAO and IG reports become ammunition for congressional hearings, which often lead to further admonition of DOE practices. DOE officials, in turn, become more prescriptive in their management and oversight. This cycle has repeated itself many times during the past dozen years, resulting in the loss of trust and the loss of the partnership concept that made the laboratories successful over the years. Moreover we lost many good people who gave up in frustration.

In an effort to improve the ability of the government to conduct its nuclear national security mission, Congress created the semi-autonomous National Nuclear Security Administration to carry out the national security responsibilities of the Department of Energy, including maintenance of a safe, secure and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program. The NNSA officially began operations on March 1, 2000. In my view, the previous DOE administration resisted the autonomy of the new administration and hampered its effective implementation. In General John Gordon and Ambassador Linton Brooks, the NNSA has had the type of competent, nonpolitical leadership that Congress envisioned. Ambassador Brooks has made some positive changes such as the organizational changes he announced on Dec. 18, 2002. However, the difficulties in the structure and operational environment run deep in the organization. I believe that he will need encouragement and help from the Congress to make additional operational improvements in the NNSA.

The current contracting crisis and a path forward

The latest crisis in governance and contracting was triggered by concerns over poor procurement and property management practices at Los Alamos. Although many of the initial accusations and headlines have proven incorrect or misleading, much needs to be and is being done to improve business practices at the laboratory. These concerns brought into question the University of California's ability to manage the laboratory, and they triggered several congressional hearings. At the end of April, Secretary Abraham decided to compete the Los Alamos contract for the first time in its 60-year history. Quite naturally this decision is causing serious concern and unrest within the Los Alamos workforce.

The regents of the University of California have not yet decided whether or not to compete for this contract. In my opinion, the University has served the nation with distinction by operating the nuclear weapons laboratories at Los Alamos and at Livermore since their inception. However, that success was made possible by the very nature of governance and the partnership inherent in the GOCO contracting model. As pointed out, this model has been effectively dissolved over the past dozen years, and the University has come under increasing criticism for its management of the laboratories. Unless the next contract begins to restore the partnership between the government and the contractor, it may not be in the University's or the nation's best interest to continue with

UC management. Moreover, I believe that no contractor will succeed unless the governance model is fixed.

Mr. Chairman, your hearings are designed to examine governance and contracting. As I have pointed out, the GOCO M&O contract was designed as a partnership to steer between the alternatives of a completely federal operation and a procurement-oriented, contract operation. As missions evolved and as public expectations of these institutions changed, the laboratories were often slow to make the necessary changes. However, rather than working with the laboratories to institute the necessary changes in the spirit of the GOCO partnership, the DOE typically responded to public criticism and congressional pressure with new orders, rules, and contract terms that fundamentally shifted governance away from the GOCO partnership toward a hybrid federal operation and procurement contract operation. The lines of responsibility and authority between the DOE and the contractors have become blurred, with more and more of the operational decisions made by federal employees, but more accountability and liability shifted to the contractors. Consequently, it has become increasingly difficult for contractors to take the public-service approach required for nuclear weapons stewardship, to nurture world-class science, to deal with the risk of nuclear operations, to provide a buffer from political pressures, and to provide the continuity necessary for stewardship. These changes were made not by design with the best governance in mind, but rather resulted from the accumulated reactions of the DOE to government audits and congressional pressure. The net result has been to significantly diminish the ability of the laboratories to accomplish their missions and to dramatically reduce their productivity. The laboratories are on the cusp of being irreparably damaged as scientific institutions in service to the nation.

Now one must make a clear choice. On one hand, one can follow that path – that is, respond to every problem by increasing federal oversight, increasing the presence of federal on-site employees, writing more rules, stepping up audits, and increasing penalties and fees for noncompliance. This approach has led us in the direction of making the laboratories look and act increasingly like federal institutions with a major toll on scientific productivity. On the other hand, one can try to revitalize the GOCO partnership to ensure that we are able to continue to attract the best scientific and management talent to the nation's nuclear weapons enterprise and to bring the best practices from the private sector to bear on their operations.

I mentioned that the GOCO concept as originally conceived was *deliberate, innovative, and successful.* I believe that the current situation is none of the above. The current system of governance is not deliberate. The GOCO partnership has been effectively dissolved by a series of piece meal actions mostly in response to the crisis de jour, not by design. The current system is bureaucratic not innovative. The organizational lines of authority have become blurred and ineffective. It leans heavily toward a GOGO mode of operation, which has not distinguished itself in practice in the rest of the government. And the current system is not successful. The prescriptive mode of operations and the enormous burdens of federal oversight and micromanagement have taken an unacceptable toll on the scientific quality and productivity of the laboratories.

Moreover, it is becoming so difficult to get work done at the laboratories that it will be very difficult to attract the talent required for the demanding missions. I believe that the best way to redesign the system of governance and to reestablish a productive work environment is to charter a high-level Blue Ribbon Task Force, one that would follow up on the previous Galvin Task Force and Hamre Commission and help to design a vastly improved system of governance and contracting for the future.

Based on my experience at Los Alamos, I view the following as necessary ingredients of a successfully redesigned system of governance:

- *Partnership based on trust between government and contractors.* The inherently governmental nature of the nuclear weapons enterprise requires rebuilding a partnership based on trust and a long-term contracting commitment. Congress should steer governance back toward a partnership and away from emulating federal operations or a procurement-oriented contract model. Although the government must verify trust, it must concurrently nurture it to ensure safe, secure, environmentally, and cost-effective operations of the nuclear weapons enterprise.
- *Scientific excellence and integrity.* Fostering creativity, innovation, and freedom of expression, in a highly classified environment, is essential to providing and certifying a reliable, safe, and secure nuclear deterrent. Hence, the contractor of a nuclear weapons design laboratory should have a strong tradition of scientific excellence in research management and unwavering technical integrity. It should also have the reputation and convening power to attract the best talent and the best advisors to the laboratory. The two design physics laboratories at Los Alamos and Livermore should be managed by the same contractor to foster competition for ideas rather than for corporate profits or market share.
- *Public service in the nation's interest.* The directors of the laboratories must discharge their duties, especially the certification of the nuclear stockpile, to be in the best interest of the nation, and not be motivated by personal benefits, corporate fees, or corporate profits. This requires institutions steeped in public service and a special contract with indemnification provisions to deal with the high risk of nuclear operations. Recent changes in contracting have made it increasingly unattractive for not-for-profit organizations such as universities to operate the laboratories in spite of the fact that it is precisely these institutions that have a distinguished history of public service.
- *Safe, secure, and effective nuclear operations.* To deal with the inherent risks of nuclear operations requires a contractual relationship with special indemnification provisions, a risk-based approach to both safety and security, and clearer lines of authority within the government. Those functions that require regulatory oversight and compliance should be made independent of the Department.
- *Best business practices.* Encouraging business reforms based on quality approaches as used by U.S. industry rather than forcing compliance with federal procurement, personnel, and business practices are necessary to make the laboratories more productive and to attract best business and management talent. Such reforms will require substantial changes to current contracting language,

which has increasingly forced practices into the federal mold. Contracts should be performance based, focused on outcomes. The DOE should return to specifying what the contractors are required to do, then hold them accountable for delivering results, and not prescribe how it should be done.

- *Government reform.* Providing for an organizational structure in the DOE that provides clearer lines of authority, and garners bipartisan political support, is essential for the future of the nuclear weapons enterprise. The establishment of the new National Nuclear Security Administration was a step in that direction, but more needs to be done. This will require strong backing of Congress.

Concluding remarks

Mr. Chairman, the fact that you are holding a series of hearings to examine the system of governance and contracting practices at the laboratories gives us hope that these issues will receive the attention they deserve. At stake is nothing less than restoring the scientific productivity of the laboratories and the successful execution of the nation's stockpile stewardship mission. In addition, congressional actions over the past several years and your tireless efforts on behalf of our nation's defense preparedness have also sent a clear signal that these laboratories are needed more than ever. Thanks to you and your colleagues, we have an important mission, we have financial support, we are upgrading our facilities (that includes replacing the CMR Building, which last year turned 50 years old), but the system of governance is broken and our operational environment is not productive and not conducive to attracting and keeping the best talent to do this important job for the nation. Sixty years ago our country devised an innovative concept, the GOCO partnership model, to bring science to bear to the nation's defense. This concept helped to end the most devastating war in history. It helped end the Cold War in our favor and to the benefit of all of mankind. Now we area not threatened by a similar external enemy, but instead we have ourselves brought on a crisis in the effectiveness of our laboratories and, consequently, in the nation's nuclear weapons stewardship. These internal problems are often more difficult for the United States to overcome than defeating an external adversary. However, this time the stakes are too high not to act. I know that all of my colleagues at the laboratories and the University of California are prepared to do our part.

Biography of Siegfried S. Hecker (2012)

Dr. Hecker is co-director of the Stanford University Center for International Security and Cooperation, Senior Fellow of the Freeman Spogli Institute for International Studies, and Professor (Research) in the Department of Management Science and Engineering. Joining the Los Alamos National Laboratory as a technical staff member in the Physical Metallurgy Group in 1973, he has served as Chairman of the Center for Materials Science and Division Leader of the Materials Science and Technology Division prior to becoming Director of the laboratory. Dr. Hecker began his professional career as a senior research metallurgist with the General Motors Research Laboratories in 1970 after two years as a postdoctoral appointee at Los Alamos. Dr. Hecker received his B.S. in metallurgy in 1965 and M.S. in metallurgy in 1967 from Case Institute of Technology and his Ph.D. in metallurgy in 1968 from Case Western Reserve University.

Dr. Hecker's research interests include plutonium science, nuclear weapon policy and international security, nuclear security (including nonproliferation and counter terrorism), and cooperative nuclear threat reduction. Over the past 20 years, he has fostered cooperation with the Russian nuclear laboratories to secure and safeguard the vast stockpile of ex-Soviet fissile materials. His current interests include the challenges of nuclear India, Pakistan, North Korea, the nuclear aspirations of Iran and the peaceful spread of nuclear energy in Central Asia and South Korea. Dr. Hecker has visited North Korea seven times since 2004, reporting back to U.S. government officials on North Korea's nuclear progress and testifying in front of the U.S. Congress. Dr. Hecker works closely with the Russian Academy of Sciences and is actively involved with the U.S. National Academies. He served on the National Academy of Engineering Council and International Affairs Committee.

Dr. Hecker is a member of the National Academy of Engineering, Foreign Member of the Russian Academy of Sciences, Fellow of the American Physical Society, Fellow of TMS (Minerals, Metallurgy and Materials Society), Fellow of the American Society for Metals, Honorary Member of the American Ceramics Society, Fellow of the American Academy of Arts and Sciences and Fellow of the American Association for the Advancement of Science. Among other awards, Dr. Hecker received the American Physical Society Leo Szilard Award (2011), the Eugene L. Grant Award for Excellence in Teaching (2010), the Presidential Enrico Fermi Award (2009), the American Nuclear Society Seaborg Medal (2004), the Department of Energy's E. O. Lawrence Award (1984), the Los Alamos National Laboratory Medal (2008), the Acta Materialia J. Herbert Hollomon Award (2004), the Case Western Reserve University Alumni Association Gold Medal (2004), and the New Mexico Distinguished Public Service Award (1998). He previously served on the Board of Regents of the University of New Mexico and the Board of the Carrie Tingley Hospital.

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QUESTIONS SUBMITTED BY MEMBERS POST HEARING

FEBRUARY 16, 2012

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. 1) The NAS study committee said it had examined many previous reports and efforts to fix the management relationship. We've seen dozens of reports in the past two decades talking about the broken management structure, first between DOE and the labs, then between NNSA and the labs. What needs to happen to see real, concrete changes that address these recurring problems? Fundamentally, can this problem be fixed? What steps should Congress take?

Dr. SHANK. 1) If we look back at the time when the Laboratories worked best we can see the elements for that success. First, we must acknowledge that we need the best minds that we can find to assure the Nation's nuclear deterrent. The GOCO model has brought the skills and talents of Industry and Universities to partner with the Government to address the challenges that define the mission of the Laboratories. This partnership is fundamentally different than a Government contract to provide a service for a fee. Clearly defining roles and responsibilities is the key to making this partnership work. The Government defines what needs to be done, provides the funding and the oversight. The contractor provides the skills and capabilities that address how the work is to be done. When NNSA moves to highly prescriptive work assignments, it violates the partnering arrangement. Disputes between the NNSA and the Laboratories often go unresolved due to the sensitive nature of the work. In our report we proposed the formation of a committee of knowledgeable individuals to help resolve issues of roles, responsibilities and scientific conflict.

I believe the problem can be fixed. First, Congress and the NNSA could take a major step in fixing this situation by clearly defining roles and responsibilities and maintaining an interest in how this is working in the Laboratories. Second, by moving to national standards, as described in the answer to Question 7 [Now Question 99], much of the problem of trust and cost effect oversight of operations could be accomplished.

Mr. TURNER. 2) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" with a broader mission set is well under way. The report says that expansion of the labs' missions to new arenas "offers the prospect of increasing the Laboratories' appeal to top-quality scientists and engineers while also serving important national security missions. Thus, the quality of science and engineering, being preconditioned on attracting high-quality people, depends in the long run on successfully making this transition to National Security Laboratories."

- Does the NAS believe the governance and management structure for the labs is set up to facilitate this expansion into new, non-nuclear work? How should it be changed to better enable this broader mission?
- Does NAS believe expansion into these new work areas will cause the labs to "take their eyes off the ball"—distract them from their core mission of sustaining the nuclear weapons stockpile?
- How does this "Work for Others" (the labs working on programs not directly related to the nuclear weapons mission) support or detract from the mission of nuclear stockpile stewardship?

Dr. SHANK. 2) Our report clearly states that the core mission of these Laboratories is maintaining the nuclear deterrent. The complexity of this task has increased over the years. The Laboratories can no longer afford to maintain the full range of capabilities to execute this mission. At the same time the Laboratories have created a number of unique capabilities that can be quite useful in solving a broad range of national problems while maintaining the skill necessary to support the core mission. Each of the laboratory directors made a very clear statement that sustaining the nuclear weapons stockpile is the core mission and will remain so, even with the opportunity to work on other problems. Some of the Laboratories already have a significant portfolio of work for others that support the core mission. In a world of constrained resources, the broader national security work will be an essential part of supporting the core mission.

Mr. TURNER. 3) Your National Academies of Science report says that the relationship between the labs and NNSA has strayed from the original intent of the labs

as federally funded research and development centers (FFRDC) that are operated through a "Government-owned, contractor-operated" model. Basically, while the letter of the model is still in place, the spirit and the intent of the model have been abandoned. Today, Federal employees are being very prescriptive on "how" the labs should carry out their work.

- The National Academies implies that there are inefficiencies in this management approach, saying "this approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased." How should we address these inefficiencies? What should Congress do?
- The FFRDC construct was created to allow the Federal Government to broadly determine "what" work needs to be done while the FFRDC (i.e., the lab) determines "how" to accomplish the work. Does NNSA's current management and governance model for the labs operate in this fashion?
- Federal Procurement Policy guidelines (OFPP Policy Letter 84–1) say that the Federal Government's monitoring of FFRDC performance "shall not be as . . . to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work." Does the NAS study group believe NNSA's current management and governance model for the labs operates in the spirit and intent of the FFRDC model? Why or why not?

Dr. SHANK. 3) I have addressed much of the answer to this question in Question 14 [Now Question 1]. In our report, we point out that roles and responsibilities have deteriorated to the point that oversight and operations are blurred. In some cases detailed prescriptions on how to do the work are given to the Laboratories by the same people doing oversight. In our report, we made recommendations of how Congress could track and maintain a concern about this issue.

Mr. TURNER. 4) The National Academies study group found "issues in transactional oversight of safety, business, security, and operations. Science and engineering quality is at risk when Laboratory scientists and engineers are not encouraged to bring forth their creative ideas in partnership with NNSA to solve problems vital to our national security." Is the "transactional oversight of safety, business, security, and operations," noted by the National Academies report needed? Is it adding value? Should it be reduced, or modified in some fashion? How? What should NNSA's role be in governing the labs? What should the contractor's role be?

Dr. SHANK. 4) Oversight is an important responsibility of the NNSA. When public money is being spent, it is important that an oversight process be in place to give the public confidence that work is being done in an economical, safe and environmentally sound manner. In the paragraph below I have reproduced part of the answer to Question 7 [Now Question 99].

There is a small fraction of the work at the Laboratories where a failure would have a high consequence and therefore require a high degree of operational formality. The rest of the work looks like work done in a typical industrial environment. I believe that necessary oversight could be done in manner accomplished by other similar institutions. There are widely accepted systems and standards for overseeing safety, finance, human resources and facility operations. A straightforward approach would be for the Laboratories to qualify systems in each of the operational areas. Then, a vastly reduced number of people could audit the systems. A major barrier to accomplishing something like this is to realize that maintaining the current oversight apparatus in tact, which has been sized for transactional oversight, will prevent any of the advantages to ensue. Another concern is that a new approach needs to be created with the idea there will be failures in the future and that whatever system in place must be resilient to single point failures.

In the above model, the role of the contractor is to assure the maintenance of auditable systems for laboratory operations and to partner with the NNSA to execute mission work where roles and responsibilities of the lab and NNSA oversight and program direction are clearly delineated.

Mr. TURNER. 5) The NAS study committee recommends that "NNSA, Congress, and top management of the Laboratories recognize that safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced, so that they not impose an excessive burden on essential science and engineering activities." What specific, concrete actions should Congress take to address this recommendation by the NAS?

Dr. SHANK. 5) The improvement in operational performance is apparent for all the Laboratories although most dramatically at the Los Alamos Laboratory. The time has arrived where oversight can now move to a systems approach described in the answer to Question 7 [Now Question 99]. The benefits could be significant in terms of cost effectiveness and performance in accomplishing the mission.

Mr. TURNER. 6) Some current and former employees of the national labs have expressed concern to this committee that, since required by Congress in 2004, the labs are now managed to incentivize their managing and operating contractors with fee or profit motive—and that this is harming their ability to do world-class research and that the labs have shifted away from their original public service culture and motivation. But the National Academies report finds that the bureaucratic frustrations that are affecting all levels within the labs, "are not traceable to the M&O contractor or the contracts themselves," and found that the lab directors' "primary objective remains to manage the Laboratories in the public interest."

- Does the National Academies study committee believe that the labs can do public service-oriented, world-class research under their current governance-, contract-, and fee-structure? Does the study committee recommend any changes in the contracting approach?
- Do the lab directors need to communicate their public service motivations more clearly and consistently to lab employees? Is this a communications and leadership problem, or something deeper?
- Are such sentiments—that the for-profit motive is harming the labs—pervasive throughout the workforce at the labs, or do strong public service sentiments still exist?

Dr. SHANK. 6) Our committee took the issue of private versus public contractors and the influence of increased fee following the Congressional action in 2004 very seriously. We sought out and listened to current and former employees of the Laboratories. One lab, Sandia has been managed by a private entity since its inception. The other two labs are now run by LLC's. Other than increased fee, the pre and post 2004 contracts are very nearly the same. We asked the NNSA if the increased fee drove behavior in a way the public interest was at risk. The answer was no. We asked the laboratory directors whether fee drove their management decisions and they emphatically said no. We looked at turnover of the laboratory population and found that it is about 4% annually and that is unchanged before and after 2004. We talked with all levels of management and bench scientists to determine whether specific concerns could be traced to the contract change. We could find none. We did find the formation of the LLC cost each of the labs about $100 million dollars. We did find that at about the same time that the contracts changed there were modifications to the benefits of all the Laboratories including the LLC managed labs. We found that in the case of Livermore there was a budget reduction that resulted in layoffs. We asked concerned laboratory staff members to help us to identify and quantify specific issues arriving from the new contracting paradigm to form a basis for commenting on the contract changes. We were unable to obtain verifiable information to guide us. We made a comment in our report that the issue of acting in the public interest is so important that although we were not able to identify problems, constant vigilance will be required going into the future.

Mr. TURNER. 7) The NAS study committee said it had examined many previous reports and efforts to fix the management relationship. We've seen dozens of reports in the past two decades talking about the broken management structure, first between DOE and the labs, then between NNSA and the labs. What needs to happen to see real, concrete changes that address these recurring problems? Fundamentally, can this problem be fixed? What steps should Congress take?

Dr. CURTIS. 7) The Subcommittee is correct that the management structure/governance of the laboratories is badly broken and that there is a long series of reports that have documented this circumstance. Unfortunately, there are no easy corrections to the problem. Fundamentally, we believe that the difficulty arises from an erosion of trust on both sides of the contractual relationship between the laboratories and the laboratories' overseers. To fix this situation will require time and a lot of hard work and dedication of all parties. A fundamental rebalancing of responsibilities is required and a greater investment must be made in laboratory management latitude and discretion.

The Congress needs to be committed to this undertaking and should sustain the effort through structured annual hearings which examine the progress that has been made and the steps planned for the future. Only through this effort will the public trust be maintained and progress assured.

Mr. TURNER. 8) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" with a broader mission set is well under way. The report says that expansion of the labs' missions to new arenas "offers the prospect of increasing the Laboratories' appeal to top-quality scientists and engineers while also serving important national security missions. Thus, the quality of science and engineering, being preconditioned on attracting high-quality people,

depends in the long run on successfully making this transition to National Security Laboratories."

- Does the NAS believe the governance and management structure for the labs is set up to facilitate this expansion into new, non-nuclear work? How should it be changed to better enable this broader mission?
- Does NAS believe expansion into these new work areas will cause the labs to "take their eyes off the ball"—distract them from their core mission of sustaining the nuclear weapons stockpile?
- How does this "Work for Others" (the labs working on programs not directly related to the nuclear weapons mission) support or detract from the mission of nuclear stockpile stewardship?

Dr. CURTIS. 8) The evolution of the laboratories to "National Security laboratories" is an extremely important development. The Committee strongly supports this evolution, but it recognizes that these laboratories must maintain their essential focus on the core mission of sustaining the nuclear weapons stockpile. At present, we believe that the three laboratories are committed to this core mission and correctly see the evolution to a broader concept of National Security service as contributing strongly to their ability to execute their core mission responsibility to assure the safety, security and effectiveness of our Nation's nuclear deterrent. There is, of course, a risk here that the laboratories might lose focus and become mere contracting entities to various Departments and Agencies. We believe that existing NNSA management and the laboratories have done a good job to guard against this risk. The current structured collaboration among NNSA, the Department of Homeland Security, the Department of Defense and the Director of National Intelligence provide an important safeguard against any potential loss of focus.

Mr. TURNER. 9) Your National Academies of Science report says that the relationship between the labs and NNSA has strayed from the original intent of the labs as federally funded research and development corporations (FFRDC) that are operated through a "government-owned, contractor-operated" model. Basically, while the letter of the model is still in place, the spirit and the intent of the model have been abandoned. Today, Federal employees are being very prescriptive on "how" the labs should carry out their work.

- The National Academies implies that there are inefficiencies in this management approach, saying "this approach precludes taking full advantage of the intellectual and management skills that taxpayer dollars have purchased." How should we address these inefficiencies? What should Congress do?
- The FFRDC construct was created to allow the Federal Government to broadly determine "what" work needs to be done while the FFRDC (i.e., the lab) determines "how" to accomplish the work. Does NNSA's current management and governance model for the labs operate in this fashion?
- Federal Procurement Policy guidelines (OFPP Policy Letter 84-1) say that the Federal Government's monitoring of FFRDC performance "shall not be as . . . to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work." Does the NAS study group believe NNSA's current management and governance model for the labs operates in the spirit and intent of the FFRDC model? Why or why not?

Dr. CURTIS. 9) Over time, the original "government-owned, contractor-operated" model has eroded, shifting more of the operational responsibility to Government overseers. The fragmentation of responsibility has also resulted in a fragmentation of authority and a lessening of reliance on laboratory management. This is not a healthy or cost-effective circumstance. We believe a considerable effort should be undertaken to rebalance the governance system to draw clear boundaries of responsibility and to invest clearer managerial latitude in laboratory managers. We also want to emphasize that we believe this can be done, indeed it must be done, while maintaining high standards of environmental, safety, and security responsibility for the work of the laboratories and while assuring their fiscal integrity. We are not arguing in any way for a lessening of these primary public responsibilities. The Congress' role in this matter is to state clearly that it wishes this rebalancing to occur and that it will invest its time and its energies to assure that it is done and that it is done well.

Mr. TURNER. 10) The National Academies study group found "issues in transactional oversight of safety, business, security, and operations. Science and engineering quality is at risk when Laboratory scientists and engineers are not encouraged to bring forth their creative ideas in partnership with NNSA to solve problems vital to our national security." Is the "transactional oversight of safety, business, security, and operations," noted by the National Academies report needed? Is it adding value? Should it be reduced, or modified in some fashion? How? What should NNSA's role be in governing the labs? What should the contractor's role be?

Dr. CURTIS. 10) We believe "transactional oversight of safety, business, security and operations" is needed and adds value. Our point is that it is out of kilter and requires rebalancing which will migrate some greater latitude and responsibility to laboratory managers and reduce some of the prescriptive requirements of Government overseers. By placing greater management authority in the laboratories, it will be possible to insist on greater management responsibility in the laboratories and,in the end, necessary transactional oversight of safety, business, security and operations should actually improve and add greater value.

Mr. TURNER. 11) The NAS study committee recommends that "NNSA, Congress, and top management of the Laboratories recognize that safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced, so that they not impose an excessive burden on essential science and engineering activities." What specific, concrete actions should Congress take to address this recommendation by the NAS?

Dr. CURTIS. 11) The Committee concluded that the "current contract and fee structure" has not been shown to impair the work of the laboratories, although we recognize that the potential exists. We do believe, however,that the "system of governance" demonstrably puts at risk the laboratories' ability to provide high quality science and engineering and, over time, will surely erode mission accomplishment. This is not a problem of communication or leadership. Rather, it is a manifestation of a governance system that has relied increasingly on operational formality to assure safety and environmental responsibility, security and fiscal integrity. We found that the workforce at the laboratories remains strongly committed to their public service duties. However, there is an undercurrent of concern with their ability to do experimental work and a concern that oversight of the laboratories by the Department of Energy, the National Nuclear Security Administration, the Defense Nuclear Facilities Safety Board, the Government Accounting Office, the Congress, and the management of the laboratories themselves is inclined to be risk-averse at the cost of science and engineering quality and innovation. The Committee shares that concern and, for this reason, has recommended a concerted effort be undertaken to rebalance the governance relationship to remove unnecessary operational formality and rebuild trust among the various parties. We believe this rebalancing can and must take place while maintaining high standards of safety, environmental control, security and fiscal integrity.

This will take an effort by the Congress as well. We have suggested structured oversight of the process of rebalancing of the governance relationship. This is hard work and it will take time. It will add to the burdens of the Subcommittee. But the efforts must be made; the stakes are very high.

Much more than cost efficiency is involved. These laboratories are national assets of great importance to the future and the security of our Nation. Preserving the excellence of science and engineering quality at the laboratories should be the enduring focus of this rebalancing effort and the oversight required to make it sustaining and successful.

Mr. TURNER. 12) Some current and former employees of the national labs have expressed concern to this committee that, since required by Congress in 2004, the labs are now managed to incentivize their managing and operating contractors with fee or profit motive—and that this is harming their ability to do world-class research and that the labs have shifted away from their original public service culture and motivation. But the National Academies report finds that the bureaucratic frustrations that are affecting all levels within the labs, "are not traceable to the M&O contractor or the contracts themselves," and found that the lab directors' "primary objective remains to manage the Laboratories in the public interest."

- Does the National Academies study committee believe that the labs can do public service-oriented, world-class research under their current governance-, contract-, and fee-structure? Does the study committee recommend any changes in the contracting approach?
- Do the lab directors need to communicate their public service motivations more clearly and consistently to lab employees? Is this a communications and leadership problem, or something deeper?
- Are such sentiments—that the for-profit motive is harming the labs—pervasive throughout the workforce at the labs, or do strong public service sentiments still exist?

Dr. CURTIS. 12) See answer for Question 21 [Now Question 11].

Mr. TURNER. 13) In your January 31, 2012, report, GAO says: "In fiscal years 2007 through 2009, total support costs for NNSA and [DOE Office of] Science sites grew from $5 billion to about $5.5 billion (nominal dollars)."

- With GAO having noted the poor quality of NNSA's cost data, does GAO believe that NNSA can fully justify this growth in support and overhead costs?
- How much cost savings does GAO estimate could be realized by implementing consistent and accurate data across the enterprise?
- Does GAO believe this growth in support and overhead costs could be attributed to the problems and inefficiencies identified by the National Academies report, such as transactional-level oversight of business systems?
- What could Congress do to address GAO's concerns in this area?

Mr. ALOISE. 13) NNSA's oversight of sites' support costs is limited by its data. Because contractors that manage and operate DOE sites classify incurred costs differently from one another (as direct or indirect costs), DOE has long attempted to collect comparable data on its sites' support costs. As we reported in January 31, 2012, however, DOE's data for fiscal years 2007 through 2009 may be appropriate for understanding sites' aggregate support function costs but not for comparing the costs of individual support functions at sites (*e.g.,* site security, human resources, facility maintenance, *etc.*). As a result, NNSA's ability to explain apparent trends in its sites' support costs in those years is limited. Changes beginning in 2010 to DOE's data collection approach could eventually improve the quality and usefulness of the data. But as we recommended, DOE needs to fully implement a quality control system to ensure it has complete and comparable cost data going forward. Congress could help ensure that DOE is implementing peer reviews or other quality control steps and—to help maximize the usefulness of the data—continuing to collect data on both the direct and indirect support function costs at its sites.[1]

We have not examined the potential cost savings from having consistent and accurate support cost data nor have we examined whether NNSA's approach to overseeing its contractors has contributed to growth in its sites' support cost.

Mr. TURNER. 14) Would GAO be comfortable with an oversight model whereby NNSA sets auditable performance standards for the labs, audits to those standards once a year, and then holds the contractor accountable for not meeting the standards? Basically, a performance- or outcome-based oversight model rather than the current transactional-oversight model?

Mr. ALOISE. 14) We are supportive of NNSA's moves toward a more performance-based approach to oversight. For example, in our review of security at Los Alamos National Laboratory we recommended that the Administrator of NNSA provide meaningful financial incentives in future performance evaluation plans for implementation of this comprehensive strategic plan for laboratory security.[2] We similarly recommended providing financial incentives to LLNL's contractor to sustain security performance improvements.[3] However, in our view, effectively evaluating performance, as opposed to compliance or transactions, is likely to be more demanding, will require skilled personnel, and needs to be done more than once a year. More specifically, our past work has found issues with NNSA's oversight of security to include staffing shortages at NNSA site offices, inadequate security staff training, and lack of comprehensive security data. This has hampered the agency's understanding of the overall effectiveness of its security program.[4]

We have made similar findings regarding NNSA's project management. While noting recent actions, we believe that DOE needs to ensure that NNSA has the capacity—that is, the people and other resources—to resolve its project management difficulties and that it has a program to monitor and independently validate the effectiveness and sustainability of its corrective measures. This is particularly important as NNSA embarks on its long-term, multibillion dollar effort to modernize the nuclear security enterprise.[5]

Mr. TURNER. 15) In its 2007 report, GAO said "management problems continue, in part, because NNSA and DOE have not fully agreed on how NNSA should function within the department as a separately organized agency. This lack of agree-

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[1] GAO, *Department of Energy: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Sites,* GAO–12–255 (Washington, D.C.: Jan. 31, 2012).

[2] GAO, *Los Alamos National Laboratory: Long-Term Strategies Needed to Improve Security and Management Oversight,* GAO–08–694 (Washington, D.C.: June 13, 2008).

[3] GAO, *Nuclear Security: Better Oversight Needed to Ensure That Security Improvements at Lawrence Livermore National Laboratory Are Fully Implemented and Sustained,* GAO–09–321 (Washington, D.C.: Mar. 16, 2009).

[4] GAO, *National Nuclear Security Administration: Additional Actions Needed to Improve Management of the Nation's Nuclear Programs,* GAO–07–36 (Washington, D.C.: Jan 19, 2007).

[5] GAO, *National Nuclear Security Administration: Observations on NNSA's Management and Oversight of the Nuclear Security Enterprise,* GAO–12–473 (Washington, D.C.: Feb. 16, 2012).

ment has resulted in organizational conflicts that have inhibited effective operations."

- Does GAO believe NNSA and DOE have agreed upon—and implemented—a coherent and rational management structure for how NNSA should function within DOE as a "semi-autonomous" agency, as was intended by the NNSA Act?
- Does GAO agree with the Strategic Posture Commission, the Stimson Center, and others that NNSA is still too tightly integrated with DOE, and the semi-autonomy of the NNSA Act was never achieved?

Mr. ALOISE. 15) GAO last formally audited NNSA's relationship with DOE in 2007.[6] At that time, we found that NNSA had focused considerable attention on reorganizing its internal operations, but it and DOE continued to struggle with establishing how NNSA should operate as a separately organized agency within the department. Two factors contributed to this situation. First, DOE and NNSA did not have a useful model to follow for establishing a separately organized agency in DOE. Second, the January 2000 NNSA implementation plan, required by the NNSA Act, did not define how NNSA would operate as a separately organized agency within DOE. As a result, although some NNSA programs have set up procedures for interacting with DOE, other programs have not, resulting in organizational conflict. Even where formal procedures have been developed, interpersonal disagreements have hindered effective cooperation.

We recommended that, to ensure that NNSA functions as a separately organized agency, the Secretary of Energy and the Administrator, NNSA, should clearly define NNSA's status as a separately organized agency within the department. In his 31 USC Section 720 response to our report, the Deputy Secretary of Energy stated that he did not concur with this recommendation. He stated that elements of the Department and the NNSA had executed memoranda of understanding specifying how certain Department-wide functions would be performed while respecting the statutory insulation of NNSA personnel. He also stated that the Department will consider issuing circumstance-specific guidance where required to correct misperceptions about the effect of the NNSA's act limitations. Since we received the letter, there have been instances where the DOE/NNSA relationship has become less clear. For example, DOE recently announced that DOE's Environmental Management program will begin to report to NNSA Administrator, who simultaneously is an Under Secretary for Energy. As a result, we have left this recommendation open and still believe that further clarification of the NNSA–DOE relationship is needed.

Mr. TURNER. 16) GAO has criticized NNSA's cost-estimating techniques, particularly with regard to several large, multibillion dollar construction programs NNSA is carrying out.

- Does GAO believe NNSA's approach of waiting to baseline costs until a design is 90% complete is the best approach?
- What are the key reasons for NNSA's poor record of cost and schedule overruns?
- What should NNSA change to improve its cost-estimation approach?

Mr. ALOISE. 16) NNSA remains on our high-risk list and remains vulnerable to fraud, waste, abuse, and mismanagement. DOE has recently taken a number of actions to improve management of major projects, including those overseen by NNSA. For example, DOE has updated program and project management policies and guidance in an effort to improve the reliability of project cost estimates, better assess project risks, and better ensure project reviews that are timely, useful and identify problems early. Although DOE's responses to our recommendations and its own findings have been largely positive, and a number of corrective actions have been taken, problems persist as demonstrated by a number of our recent reports which are summarized in our February 2012 testimony. However, DOE needs to ensure that NNSA has the capacity—that is, the people and other resources—to resolve its project management difficulties and that it has a program to monitor and independently validate the effectiveness and sustainability of its corrective measures. This is particularly important as NNSA embarks on its long-term, multibillion dollar effort to modernize the nuclear security enterprise.

In 2010, NNSA announced that project baseline cost and schedule will not be finalized until the total project achieves 90 percent design maturity. NNSA also announced that subproject activities such as advanced procurement and road and utility relocations will begin only when those individual subprojects each achieve 90 percent design maturity and baseline approval.

We have not evaluated this policy change but it is at least partly in line with a previous GAO recommendation. More specifically, in April 2006, we recommended that a DOE major facility design or facility component design have reached at least

[6] GAO–07–36.

90 percent completion and that technical and safety problems have been satisfactorily addressed before restarting construction.[7] We also recommended other management actions to help ensure that the new project baseline will be reliable and that controls and accountability are such that contractors will safely and effectively complete the project. This recommendation, we note, is consistent with nuclear industry construction guidelines and take a more conservative approach to design and construction activities. Having said this, we believe that cost estimation is largely a continuous process that involves having a baseline cost estimate in place early with a risk adjustment to account for changes in design that will happen until the 90% design complete level is obtained. We believe that NNSA's application of 90 percent design maturity may need to be reviewed for its projects that have prolonged and/or expensive design phases.

We have recently noted some progress in NNSA's development of cost estimates, finding in March 2012 that the cost estimates for a recently deferred NNSA facility were generally well prepared.[8] Despite this progress, we still note some weaknesses. For example, a high-quality schedule requires a schedule risk analysis that incorporates known risks to predict the level of confidence in meeting a project's completion date and the amount of contingency time needed to cover unexpected delays. Project officials identified hundreds of risks to the project, but we found that these risks were not used in preparing a schedule risk analysis. As a result of these weaknesses, we continue to believe that NNSA cannot be fully confident, once it decides to resume the project, that the project will be completed on time and within estimated costs.

Mr. TURNER. 17) The current National Academies report, the 1999 Chiles Commission, and the Strategic Posture Commission have all cited an ability to attract and retain world-class scientists and engineers as the critical foundation for having a world-class lab.

- Do you believe the labs are able to attract world-class personnel today? What attracts such people and makes them want to stay?
- Have we seen any loss of world-class people already?
- How does having modern facilities, labs, and infrastructure play into the labs' ability to attract and retain world-class scientists and engineers? Do you have any worries in this regard? Would you care to comment on the recent cancellation of CMRR, and how that will affect the ability of the nuclear security enterprise—and Los Alamos in particular—to both attract and retain world-class plutonium scientists?

Dr. ANASTASIO. 17) The heart of any organization is its people. Understanding nuclear weapons requires a broad, diverse and deep set of scientific and engineering skills—such a workforce of world-class scientists and engineers has been the critical foundation for the unprecedented successes of these laboratories over many decades.

World-class personnel are attracted and retained because of a sustained mission of national importance, a work environment that fosters innovation and creativity, and the availability of tools, facilities and resources that are also world-class.

As I stated in my testimony before your subcommittee on February 16, 2012, "An aversion to risk and a deterioration of trust, increases in transactional oversight and in unfunded requirements, combined with an uncertain policy direction and unstable budget outlook hurt the ability of the Nuclear Security Enterprise to attract, develop, and retain the best technical staff available. It is very difficult to convince top-quality technical staff to join an organization where they are told how to do their work and left wondering if there is going to be an opportunity to discover and innovate. This has already resulted in the loss of some of the best mid-career scientists from the Laboratories." The increased engagement of members of the local NNSA Site Offices in the day-to-day decisionmaking processes of the Laboratory (transactional oversight) directly contributes to the frustrations and disenchantment of the technical staff.

The Administration's budget proposal regarding CMRR certainly affects the morale of laboratory scientists and engineers, especially those working in the field of plutonium science. Since the country's expertise in this field largely resides at Los Alamos and Lawrence Livermore, the lack of a safe, modern, world-class facility for plutonium science puts our national capability at risk.

Mr. TURNER. 18) As I noted in my opening statement, in 2009 a Stimson Center report said: "the implementation of the NNSA Act failed to achieve the intended au-

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[7] GAO, *Hanford Waste Treatment Plant: Contractor and DOE Management Problems Have Led to Higher Costs, Construction Delays, and Safety Concerns,* GAO–06–602T (Washington, D.C., Apr 6, 2006).

[8] GAO, *Modernizing the Nuclear Security Enterprise: New Plutonium Research Facility at Los Alamos May Not Meet All Mission Needs,* GAO–12–337 (Washington, D.C.: Mar 26, 2012).

tonomy for NNSA within the Department of Energy. The Labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well." Also in 2009, the Strategic Posture Commission said that, "the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being."

- Do you believe the intent of the NNSA Act has been implemented? In other words, is NNSA truly semi-autonomous from DOE?
- Do you believe the roles, responsibilities, and lines of authority between DOE and NNSA are clear?
- What should Congress do to address this?

Dr. ANASTASIO. 18) The NNSA is not in practice a semi-autonomous organization within the Department of Energy. The roles, responsibilities, and lines of authority are not clear, often leading to inefficiency and ineffectiveness. It is often not clear who can actually make a decision but many can keep a decision from being made.

There have been many assessments that have recommended changes to improve the efficiency and effectiveness of NNSA as noted in many of your questions. They range from making improvements within the existing structure (I made four such recommendations in my testimony before this subcommittee) to starting over with NNSA reconstituted as an entirely new independent agency. At a minimum Congress should implement improvements like those below that should put the Enterprise on a better path:

- Reduce indirect costs of the Enterprise through oversight of outcomes rather than oversight of activities. The existing accountability mechanisms available in the current contracts are more than adequate.
- Accompany this with cuts in budget/people engaged in oversight and indirect activities starting with the Federal workforce.
- Strengthen the balance across mission delivery and operations. New requirements or interpretations of existing ones (by internal or external organizations) must be coupled with a cost-benefit analysis.
- Reduce the number of congressional budget control levels to increase flexibility in execution at the NNSA sites.

The simplest first step could be eliminating duplicative overhead functions between NNSA and DOE and reducing the staff at the site offices (a good target would be a 1-to-100 ratio of Federal to permanent contractor workforce at each site). These cost savings should then be reapplied back into the laboratories for programmatic activities.

However, like many others I fear that the record of many unsuccessful efforts by well-meaning people within NNSA and DOE over the last decade suggests that it is time for a new approach. Reconstituting NNSA as an independent agency may be necessary, IF it is structured in a way that the national security leadership, Administration, and Congress all agree on and can successfully implement.

Mr. TURNER. 19) The 2009 Stimson Center report and the Strategic Posture Commission both concluded that major reform of NNSA was needed. Both groups recommended making NNSA fully independent from DOE. In his statement for the record for this hearing, Ambassador Linton Brooks, the former head of NNSA, says that major reform is now needed again. Ambassador Brooks says that the Strategic Posture Commission concluded that the current governance structure of NNSA "cannot be effective in the long term. The record of recent years points to no other conclusion." On this conclusion, Ambassador Brooks said: "I agree. The current 'semi-autonomous' structure has proven to be too dependent on the personalities of DOE and NNSA leadership to be consistently reliable and effective . . . " On whether Congress should revisit the Strategic Posture Commission's recommendation to make NNSA a wholly independent agency, Brooks says: "My answer is yes. The present system has been tried for a decade by dedicated, hard-working and competent civil servants. It has not lived up to the Nation's hopes. We can do better."

- Do you agree with Ambassador Brooks? Do you believe such large-scale change is again needed? Why or why not?
- Would such organizational change fix all of the issues identified by the NAS report, the Strategic Posture Commission, the Stimson Center report, and the myriad other reports? In addition to organizational change, what else would need to be done to address these problems?

Dr. ANASTASIO. 19) I agree change is required. I would go beyond Ambassador's statement that "We can do better" and say that we must do better. We are facing a crisis both in our ability to execute the mission in the near term and in our ability to enable success over the long term.

We can work through the challenges of large-scale change—reconstituting NNSA as an independent agency—IF it is structured in a way that the national security

leadership, Administration, and Congress all agree and can/do successfully implement.

Any such ambitious change must be accompanied by leadership of the new organization that is committed to the goals of the change and who is empowered to pick the Federal workforce and processes they deem necessary to make it happen.

Mr. TURNER. 20) The NAS study committee recommended that NNSA "purposely free directors to establish strategic science and engineering direction at the Laboratories." What concrete actions would you recommend NNSA and Congress take to "free [lab] directors to establish strategic science and engineering direction at the labs?"

Dr. ANASTASIO. 20) Establishing the strategic science and engineering direction for the lab is one of the most important roles, and a unique role, for the Laboratory Director. In my experience of over 9 years as Director at LLNL and LANL it became increasing difficult to focus on that role.

Freeing the lab directors from the minutiae and tactical imperatives of the current practices and behaviors of NNSA would allow for greater focus on strategic issues. Implementing the recommendations that I included in my testimony before this subcommittee would help. Specifically, the first three recommendations will free up the directors:

- Reduce indirect costs of the Enterprise through oversight of outcomes rather than oversight of activities. The existing accountability mechanisms available in the current contracts are more than adequate.
- Accompany this with cuts in budget/people engaged in oversight and indirect activities starting with the Federal workforce.
- Strengthen the balance across mission delivery and operations. New requirements or interpretations of existing ones (by internal or external organizations) must be coupled with a cost-benefit analysis.

In addition, the fourth recommendation—

- Reduce the number of congressional budget control levels to increase flexibility in execution at the NNSA sites.

—will allow more flexible decisions on the funding of emerging scientific and engineering strategic directions. There are two other congressional actions that are also key to the strategic health of science and engineering at the labs:

- Strongly endorse the continuation of Laboratory Directed Research and Development (LDRD) at current funding levels
- Streamline the processes for funding of the labs by national security elements other than NNSA (Work for Others).

Mr. TURNER. 21) Do you agree with the NAS study committee's recommendation to "rebalance the relationship and the set of principles laying out the boundaries and roles of each management structure" and memorialize such principles and relationships "in memoranda of understanding between NNSA and its Laboratories"? What principles of the relationship between NNSA and the labs would you suggest be included in such an agreement? What would be a potential enforcement mechanism for such memoranda of understanding?

Dr. ANASTASIO. 21) While I support the recommendation to "rebalance the relationship and the set of principles laying out the boundaries and roles of each management structure," I do not believe that the idea of an MOU between the Laboratories and NNSA by itself will be effective. I do not see a way to enforce the implementation of such an agreement nor do I see this as resulting in modified behaviors. The last decade of effort to structure NNSA led me to believe that we are beyond the point where a written agreement, even if it could be agreed to, would have a significant positive impact.

Mr. TURNER. 22) In May 2011, the National Laboratories Directors Council sent a paper to Secretary of Energy Chu—at his request—on "Prioritization of Burdensome Policies and Practices." This paper outlined, from the perspective of the lab directors, specific ways DOE could reduce burdensome management policies and practices that hamper the ability of the labs to execute their mission.

- Has DOE been responsive to the recommendations in this paper? Has progress been made? Why or why not?
- Secretary Chu asked for and received similar input from the directors of the national labs in April 2009. Has DOE been responsive to that input?
- Why do you think we need to continually revisit this same issue every few years? Have the recommendations changed over the years?

Dr. ANASTASIO. 22) I cannot comment on DOE actions after my retirement as LANL director in May 2011.

While important, the elimination of burdensome policies and practices is not the key issue. Rather it is how those policies and practices are interpreted (and by

whom) and the consistency of this interpretation over time and across different levels within and across DOE.

Until there is alignment of the Federal workforce from the Secretary to the newest employee across all elements of the Department as to performance expectations for the Laboratories, this will continue to be an unresolved source of ineffectiveness and inefficiency.

Mr. TURNER. 23) Going back to the early 1990s—to the Galvin Commission and before—there have been dozens of national commissions, studies, and reports recommending significant reform to the way DOE and NNSA govern and manage the labs. Many leaders in NNSA and DOE have tried to carry out reforms, streamlining efforts, and initiatives to reduce burdensome policies and practices. But, today, the NAS report still finds major problems with the governance and management structure NNSA uses for the labs. Why aren't we making any progress in improving the governance and management structure for the labs? Are these recurring problems affecting morale at the labs? Are they impacting the quality of the science and engineering? Are they impacting the labs' ability to attract and retain world-class people?

Dr. ANASTASIO. 23) The major problems are not a result of the management structure per se, rather the practices (e.g., oversight of activities instead of outcomes) and risk-averse behaviors of the bureaucracy. The persistence of these problems continuously degrades the morale and ability to attract and retain world-class scientists and engineers.

The simplest way to frame the path to improvement is to get the bureaucracy out of the way and let the M&O contractors do the job they have been chosen to do—have the NNSA set the goals for the M&Os to meet, let the M&Os find the best way to achieve that, and then hold them accountable for success.

Mr. TURNER. 24) The NAS study committee identifies a loss of trust between the NNSA and its labs as a key problem that is contributing to a poor management relationship and burdensome oversight policies and practices. The NAS report identifies this loss of trust for increased risk aversion at NNSA, which discourages the labs from conducting real-world experiments. Do you agree? What is the impact on the quality of the science and engineering at the labs—and the labs' ability to execute their missions—if risk aversion leads to fewer and fewer experiments? Do you believe the sustainment of our nuclear deterrent might be at risk because of the safety requirements that lead to risk aversion and fewer experiments?

Dr. ANASTASIO. 24) As I said in my testimony before this subcommittee, ". . . because of the large number of external entities peering into NNSA and its inner workings, with disproportionate attention relative to that seen in other parts of the Government, a significant risk aversion has developed within the bureaucracy at NNSA. This risk aversion has manifested itself in a growing focus on compliance at the expense of delivering the mission."

The burdens of this growing focus on compliance, and concomitant transactional oversight, falls most heavily on experimental activities, especially those that are classified, involve high explosives, and/or nuclear materials—just those most important to the labs' mission. These burdens drive up the costs and lengthen the timeframe for execution of experiments, limiting the number that can be accomplished. In addition, these burdens can discourage some from even trying to do experiments. With less experimental data available, the risk in the conclusions that are drawn increases significantly.

Mr. TURNER. 25) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" is well under way, and that this will enable an expansion of the labs' work solving national security problems for many different Federal agencies. Within NNSA, this is called "work for others," or "WFO." The NAS notes that this evolution is critical to the future vitality of the labs.

- Does the current governance and management structure facilitate or impede WFO work at the labs?
- What steps could Congress take to make WFO work easier, more efficient, and more effective?
- Do you believe the labs can continue to expand their WFO work and not be distracted from their core mission of sustaining the nuclear weapons stockpile? As lab directors, how did you ensure this continued focus while also broadening the work conducted at the labs?
- In 2009, the Strategic Posture Commission said the President, "should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the laboratories." Do you agree? How would such a structure operate—how should it be designed?

Dr. ANASTASIO. 25) The WFO activities at the laboratories have been very important for the health and vitality of the science and engineering. These activities stress the science and engineering in different ways, driving advancements that benefit the core nuclear weapons mission. At the same time they are an invaluable tool to attract and retain a world-class workforce. I am very concerned that the current processes that bring this type of work activities to the labs are not functioning smoothly. NNSA feels responsible that the WFO activities do not conflict with the core mission, for how those activities are executed, that the funding is well managed, and that there are no legacy issues at the conclusion of the activities. The end result is that the processes to address these concerns inordinately slow things down at every step and are repeated for every potential WFO project. Funding allocations are delayed and squabbles about the appropriateness of any activity not directly funded by NNSA arise. This can discourage the sponsor agency from considering such work in the future to the detriment of the sponsor and the lab. One approach to addressing this problem was offered by the Stimson Center report, where umbrella agreements would be put in place between NNSA and each of the other national security agencies that spell out for activities that meet certain requirements how they would be carried out. No further approvals would be needed unless they do not meet the requirements. This would greatly streamline WFO.

There would be value in the recommendation of the Congressional Commission of involving the other cabinet agencies (and the IC) in the health and vitality of the labs' science and engineering capabilities. An annual review for that group that identifies gaps, especially gaps in long-term capabilities relevant to those agencies' mission, and develops plans with the labs to address those gaps would benefit all.

Mr. TURNER. 26) The labs are operated as federally funded research and development centers (FFRDCs). The FFRDC construct was created to allow the Federal Government to broadly determine "what" work needed to be done while the FFRDC determines "how" to accomplish the work. Federal Procurement Policy guidelines (OFPP Policy Letter 84–1) say that the Federal Government's monitoring of FFRDC performance "shall not be as . . . to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work."

- Do you believe NNSA's current management and governance model for the labs operates in the spirit and intent of the FFRDC model? Why or why not?
- What might Congress do to ensure the FFRDC model is robust and executed appropriately?

Dr. ANASTASIO. 26) As I have mentioned earlier, the FFRDC model is not functioning as it was intended. The FFRDC model envisioned an approach where the Federal agency selects a contractor with the expertise to execute the mission (an expertise not generally available in the Federal Government), provides direction on what is to be accomplished, trusts the M&O to manage the work, and holds them accountable that it was accomplished. This is not the relationship that is in place today between NNSA and the laboratories, rather it is a relationship that is detrimental to the productivity and/or quality of the FFRDC's work.

I have previously made a number of recommendations for Congress in my testimony before this subcommittee and in the answer to previous questions for the record that can improve the current situation.

Mr. TURNER. 27) The current National Academies report, the 1999 Chiles Commission, and the Strategic Posture Commission have all cited an ability to attract and retain world-class scientists and engineers as the critical foundation for having a world-class lab.

- Do you believe the labs are able to attract world-class personnel today? What attracts such people and makes them want to stay?
- Have we seen any loss of world-class people already?
- How does having modern facilities, labs, and infrastructure play into the labs' ability to attract and retain world-class scientists and engineers? Do you have any worries in this regard? Would you care to comment on the recent cancellation of CMRR, and how that will affect the ability of the nuclear security enterprise—and Los Alamos in particular—to both attract and retain world-class plutonium scientists?

Dr. MILLER. 27) The most important factor in attracting and retaining world-class scientist is the opportunity the Laboratory offers to engage in cutting-edge science and technology directed at meeting important national needs. Service to the Nation is a shared value that permeates the Laboratory.

Overall, I believe that we remain able to attract and retain quality people. Our retention rate remains high and, for example, the number of post-doctoral fellows at Livermore is more than 200, nearly double the number compared to 2 years ago. The Laboratory's post-doctoral fellow program is an important pipeline for new em-

ployees. While the overall statistics are good, there is some anecdotal evidence that we are losing a few of our very best people and that others are open to recruitment from outside the Laboratory. This is particularly true for some highly sought after, specialized skills like computer science and cybersecurity.

One key concern about attracting and retaining top-notch talent is program stability. Vagaries about future budgets impact people's thinking about long-term careers at an institution. The laboratories would greatly benefit from a clear and consistent message from successive administrations and congresses that the work of the Laboratory is important, together with stable funding.

Another factor that aided in employee retention in the past was the defined benefit program that was offered when the University of California managed LLNL. The retirement system tended to lock employees into the Laboratory after 10 years of service. The 401(k) program now offered to new employees establishes no such bond. Today's highly mobile workforce is not advantageous for an institution that has to make considerable investment in training and nurturing workforce skills. This issue is particularly acute for computer scientists, who have many lucrative opportunities in the San Francisco Bay area.

More flexibility for the Laboratory director in setting individual salaries and establishing positive work-environment programs within the existing budget envelope would help. So would the presence of modern facilities, laboratories, and infrastructure. We need to continually reinvest in facilities and infrastructure, and in times of austere budgets, recapitalization tends to suffer. Readiness in Technical Base and Facilities (RTBF) funding to LLNL is the lowest in the NNSA complex and we are falling behind in basic upkeep of the infrastructure and its related services. At some point it will affect the recruiting and retention given it is based on the ability to do cutting-edge research!

The cancellation of CMRR–NF has greater impact on sustainment of the stockpile (e.g., LEPs) than plutonium science per se. Much of the plutonium science work is small scale. At LLNL, there are opportunities to do cutting-edge work on plutonium science using JASPER, diamond anvil experiments at various facilities, Superblock, and (in the future) potentially at NIF. Simulations are also an important aspect of plutonium science. I am most concerned over where we will be in 5 years when the restart of CMRR–NF will be considered as it will then be faced with then budget pressures and more needs in the failing infrastructure arena.

Mr. TURNER. 28) As I noted in my opening statement, in 2009 a Stimson Center report said: "the implementation of the NNSA Act failed to achieve the intended autonomy for NNSA within the Department of Energy. The Labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well." Also in 2009, the Strategic Posture Commission said that, "the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being."

- Do you believe the intent of the NNSA Act has been implemented? In other words, is NNSA truly semi-autonomous from DOE?
- Do you believe the roles, responsibilities, and lines of authority between DOE and NNSA are clear?
- What should Congress do to address this?

Dr. MILLER. 28) The NNSA Act of 2000 established a separate NNSA organization within DOE, consolidating nuclear security programs under an Administrator. According to the Act, NNSA and Contractor personnel are not responsible to any DOE employee or agent except for the Secretary of Energy. However, the Act has since been amended (updated October 1, 2010), creating the position of Under Secretary for Nuclear Security, who serves as NNSA Administrator. Also according to the Act, the Under Secretary shall be subject to the authority, direction, and control of the Secretary; and the Secretary shall be responsible for establishing policy for NNSA. Currently, as examples, the NNSA CFO reports to the DOE CFO. NNSA Contracting Officers report to the DOE Office of Procurement. These changes limit the autonomy of NNSA and have increased layers of management. The Laboratory is also subject to reviews by the DOE Office of Enforcement/Health Safety and Security (OE/HSS) Division, and independent oversight organizations such as the DOE Inspector General (IG) and the Government Accountability Office (GAO).

While the lack of full autonomy has certainly added to the bureaucratic inefficiency that burdens Laboratory operations, the extent to which NNSA is autonomous, however, does not have much bearing on the fundamental underlying issue, which both my testimony and the recent National Academy of Sciences study identify: the lack of trust and partnership in the relationship between DOE/NNSA and the national laboratories. Unless this issue is faced and dealt with, organizational issues and proposed changes are, in my view, of secondary importance. Changes

might reduce the bureaucracy somewhat especially in the areas of redundant or overlapping layers of oversight, but unless there is a cultural change, it is unlikely to make much difference in the long run.

Mr. TURNER. 29) The 2009 Stimson Center report and the Strategic Posture Commission both concluded that major reform of NNSA was needed. Both groups recommended making NNSA fully independent from DOE. In his statement for the record for this hearing, Ambassador Linton Brooks, the former head of NNSA, says that major reform is now needed again. Ambassador Brooks says that the Strategic Posture Commission concluded that the current governance structure of NNSA "cannot be effective in the long term. The record of recent years points to no other conclusion." On this conclusion, Ambassador Brooks said: "I agree. The current 'semi-autonomous' structure has proven to be too dependent on the personalities of DOE and NNSA leadership to be consistently reliable and effective . . . " On whether Congress should revisit the Strategic Posture Commission's recommendation to make NNSA a wholly independent agency, Brooks says: "My answer is yes. The present system has been tried for a decade by dedicated, hard-working and competent civil servants. It has not lived up to the Nation's hopes. We can do better."

- Do you agree with Ambassador Brooks? Do you believe such large-scale change is again needed? Why or why not?
- Would such organizational change fix all of the issues identified by the NAS report, the Strategic Posture Commission, the Stimson Center report, and the myriad other reports? In addition to organizational change, what else would need to be done to address these problems?

Dr. MILLER. 29) I believe the last of these questions is, by far, the most important. As I stated in my answer to Question 33 [Now Question 28]):

The extent to which NNSA is autonomous, however, does not have much bearing on the fundamental underlying issue, which both my testimony and the recent National Academy of Sciences study identify: the lack of trust and partnership in the relationship between DOE/NNSA and the national laboratories. Unless this is issue is faced and dealt with, organizational issues and proposed changes are, in my view, of secondary importance. Changes might reduce the bureaucracy somewhat, but unless there is a cultural change to restore trust and partnership approach, change is unlikely to make much difference in the long run.

As for the various proposed changes, each has pluses and minuses. Perhaps more important than what the organization is changed to (including a modified form of NNSA as an option), there must be the will and follow-through of the new management team to streamline. I believe that most important of all is to focus on the mission—that is why these laboratories exist. From an operation point of view, my written testimony before the committee concluded with three "Ts": restore TRUST, eliminate TRANSACTIONAL oversight; and TURN OVER management to the people you hired to manage (the directors of the laboratories).

Mr. TURNER. 30) The NAS study committee recommended that NNSA "purposely free directors to establish strategic science and engineering direction at the Laboratories." What concrete actions would you recommend NNSA and Congress take to "free [lab] directors to establish strategic science and engineering direction at the labs"?

Dr. MILLER. 30) I strongly concur with two particularly pertinent recommendations made by NAS study committee. It is essential that the laboratory directors be able to focus on both the near-term deliverables and the long-term health of the laboratory and the future needs of the mission.

First, the Laboratory Directed Research and Development (LDRD) Program is absolutely essential to the long-term health of science and technology at the Laboratory. LDRD provides essentially the only funds we have to invest in exploratory research in support of our missions. These investments strive for breakthroughs that can make a dramatic difference, and with demonstration of feasibility of the idea, the concept can blossom into a program of great interest to a Government sponsor. It also is an important tool for attracting, retaining, and getting the best out of top-notch talent. The NAS study recommends ". . . that Congress and NNSA maintain strong support of the LDRD program as it is an essential component of enabling the long-term viability of the Laboratories."

Secondly, it is very hard to effectively manage complex research and development programs when the work is fractionated into small work bins with little flexibility to balance the effort—using funding for tasks in an overall project area that runs more smoothly than anticipated to help along tasks in the same area that prove to be more difficult than expected or to perform more basic research and development supportive of the overall project goal. In specific, the NAS study recommends ". . . that Congress reduce the number of restrictive budget reporting categories in the Nuclear Weapons Program and permit use of such funds to support a robust core

weapons research program and further develop necessary S&E capability." Investment strategy should precede or even override any drive toward restrictive and less agile accounting controls especially in a future-oriented research and discovery operational mission.

Mr. TURNER. 31) Do you agree with the NAS study committee's recommendation to "rebalance the relationship and the set of principles laying out the boundaries and roles of each management structure" and memorialize such principles and relationships "in memoranda of understanding between NNSA and its Laboratories"? What principles of the relationship between NNSA and the labs would you suggest be included in such an agreement? What would be a potential enforcement mechanism for such memoranda of understanding?

Dr. MILLER. 31) As I have stated in the answer to previous questions, the most important issue is trust. If it is a trusted working relationship, this should not be much of an issue. The National Aeronautics and Space Administration and the Jet Propulsion Laboratory (an FFRDC managed by Caltech), for example, seem to get along fine without roles and responsibilities being an issue.

Policy guidelines have been established for FFRDCs. As pertaining to the specifics of the relationship between the national laboratories and DOE, I believe that language about principles has been suggested by previous committees (e.g., the Chiles commission). It is likely not necessary to "reinvent the wheel." In general, if contentious negotiations are needed to define roles and responsibilities—as well as a complicated enforcement mechanism—something is likely wrong with the relationship that will not be fixed by a set of principles.

Mr. TURNER. 32) In May 2011, the National Laboratories Directors Council sent a paper to Secretary of Energy Chu—at his request—on "Prioritization of Burdensome Policies and Practices." This paper outlined, from the perspective of the lab directors, specific ways DOE could reduce burdensome management policies and practices that hamper the ability of the labs to execute their mission.

- Has DOE been responsive to the recommendations in this paper? Has progress been made? Why or why not?
- Secretary Chu asked for and received similar input from the directors of the national labs in April 2009. Has DOE been responsive to that input?
- Why do you think we need to continually revisit this same issue every few years? Have the recommendations changed over the years?

Dr. MILLER. 32) I was a part of the NLDC effort you mention. Activities have been under way to examine existing directives and standards to reduce their number. The number of directives and standards affecting management and operation of LLNL rose from 137 to a peak of about 160 in 2009; DOE/NNSA governance reform efforts have reduced the number to 131. As for DOE Orders and NNSA Policies (NAPs), there are currently 845 requirement documents with thousands of requirements. The total is altogether too large and imposes too many non-value-adding requirements that divert precious dollars and attention from the national lab missions.

One needs to recognize that "burdensome policies and practices" pertains to more than numbers; burdensomeness arises from the transactional manner in which they are enforced and the duplicative, multi-layered, and poorly aligned governance system that results in considerable cost to the taxpayers through unnecessary effort at the laboratories and NNSA. In FY 2011, there were more than 1,300 external audits conducted at LLNL. One could shorten the list of requirements, but if myriad offices still have say and feel compelled to independently oversee enforcement in a highly transactional manner, little will change. Solving issues for the enterprise must be the true test, not how many inspectors detail the problem.

As stated in my testimony, one major step forward would be to use, whenever possible, external standards, certifications and oversight for operational systems and eliminate the DOE and NNSA oversight. Many such standards are already in place based on the International Standards Organization (ISO) and the DOE/NNSA facilities are already subject to both State and Federal oversight from other organizations. This move would both eliminate redundancy and move to a more process-oriented, results-based operation rather than transactional-oriented system. It would also allow a significant reduction in the onsite DOE/NNSA personnel to a number more in line with the oversight presence at sites managed by many other Federal organizations.

Mr. TURNER. 33) Going back to the early 1990s—to the Galvin Commission and before—there have been dozens of national commissions, studies, and reports recommending significant reform to the way DOE and NNSA govern and manage the labs. Many leaders in NNSA and DOE have tried to carry out reforms, streamlining efforts, and initiatives to reduce burdensome policies and practices. But, today, the NAS report still finds major problems with the governance and management struc-

ture NNSA uses for the labs. Why aren't we making any progress in improving the governance and management structure for the labs? Are these recurring problems affecting morale at the labs? Are they impacting the quality of the science and engineering? Are they impacting the labs' ability to attract and retain world-class people?

Dr. MILLER. 33) As I stressed in my written testimony, the key underlying problem is a lack of trust and the absence of a true Government–FFRDC relationship. Efforts at reform are often undertaken in small steps and in a bureaucratic manner that are abandoned or have had little lasting impact.

In a larger sense, we all share some blame for the current situation: too much transactional oversight by a multi-layered DOE organization. This largely started as the Cold War ended with Secretary of Energy James Watkins' concern about implementation of business and safety practices at the laboratories and plants. Improvements were needed but the path taken to oversee implementation of a rigid set of improvements (without cost–benefit analyses) started down the path of cost inefficiencies and transactional oversight.

Then, after the implementation of performance-based management at the laboratories and plants, the system steadily evolved from a few top-level measures to performance evaluation plans with more and more measures that DOE/NNSA thought necessary to review in increasing detail. This trend was exacerbated by occasional bad events, such as the Wen Ho Lee espionage case and the thought-to-be loss (actually a recordkeeping problem) of classified portable computer data storage devices at one of the laboratories. The reaction within the Government and in the press was very vocal and demanding of immediate changes. This has a lasting effect on trust and invariably led to more policy changes, more directives and standards that tend to be overly broad, sometimes contradictory, subject to interpretation, and difficult and expensive to implement. Increased transactional oversight came with these changes.

Within the laboratories, recurring events bringing broad-brushed blame and disparagement have affected morale in a way that takes time to heal. Rather than dealing with the specific issues, the added oversight in each case is burdensome to all employees, invariably lowering productivity. The impact on recruitment and retention has not been great to date, but this is a serious concern if a more trusted partnership in national security is not restored and precious dollars are drained away from the mission work to unnecessary and redundant oversight.

Mr. TURNER. 34) The NAS study committee identifies a loss of trust between the NNSA and its labs as a key problem that is contributing to a poor management relationship and burdensome oversight policies and practices. The NAS report identifies this loss of trust for increased risk aversion at NNSA, which discourages the labs from conducting real-world experiments. Do you agree? What is the impact on the quality of the science and engineering at the labs—and the labs' ability to execute their missions—if risk aversion leads to fewer and fewer experiments? Do you believe the sustainment of our nuclear deterrent might be at risk because of the safety requirements that lead to risk aversion and fewer experiments?

Dr. MILLER. 34) DOE Orders and NNSA Policies (NAPs) and the resulting oversight decisions are conservative and generally not based on National Standards. The focus is on process compliance, and over time, there has been an escalation of requirements. Currently there are 845 requirement documents with thousands of requirements.

These requirements are especially pernicious in three ways. First, they can impede the adaption of best operational and business practices widely used in industry if they do not exactly conform to an existing Government requirement. Secondly, they tend to accentuate overly conservative risk-averse behavior. What often gets implemented is the most conservative interpretation of a requirement that does not balance costs and risks. The most conservative interpretation could arise in any one of the stovepipes that have a say in implementation or become a self-imposed constraint to avoid engaging the issue to avoid an excessive number of bureaucratic hurdles and roadblocks. Finally, the necessary extensive paperwork and non-value-added requirements often add difficulty in conducting research efficiently, adding major frustrations to the scientists.

In addition, there is risk aversion in programmatic decisions (in NNSA and more generally, throughout Government and industry) driven by "fear of failure." Collectively, we have lost sight of the perspective that if every experiment is a success, you aren't trying hard enough. This makes it much harder for the laboratories to get funding for programs that attempt to take bold steps that would result in dramatic improvements in capabilities to meet an important national need. Also, when there is a setback or lack of progress in a program area at the Laboratory, there is a tendency in the system to micromanage the program based on the latest results,

without looking at the bigger picture and overall progress toward a long-term goal. Progress- and strategy-based investment needs to carry the day, and not the ever-present Monday morning quarterback just avoiding the one-day story!

One wonders whether the highly successful bold choices made at the start of the Stockpile Stewardship Program, such as the Accelerated Strategic Computing Initiative (resulting in a million-fold improvement in computing in a decade) and the construction of the National Ignition Facility (now providing the ability to create and study in detail the conditions in an operating nuclear weapon in a setting laboratory), would have been made in today's risk-averse climate. Also, one wonders whether they could have succeeded in today's governance and oversight climate in DOE/NNSA.

Mr. TURNER. 35) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" is well under way, and that this will enable an expansion of the labs' work solving national security problems for many different Federal agencies. Within NNSA, this is called "work for others," or "WFO." The NAS notes that this evolution is critical to the future vitality of the labs.

- Does the current governance and management structure facilitate or impede WFO work at the labs?
- What steps could Congress take to make WFO work easier, more efficient, and more effective?
- Do you believe the labs can continue to expand their WFO work and not be distracted from their core mission of sustaining the nuclear weapons stockpile? As lab directors, how did you ensure this continued focus while also broadening the work conducted at the labs?
- In 2009, the Strategic Posture Commission said the President, "should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the laboratories." Do you agree? How would such a structure operate—how should it be designed?

Dr. MILLER. 35) The NNSA laboratories have very special capabilities that derive from their fundamental nuclear mission that can be brought to bear on major challenges facing the Nation. These activities leverage and reinforce the investments made in the Stockpile Stewardship Program. Currently, LLNL applies its exceptional science, technology, and engineering and its leadership in high-performance computing to programs in weapons-of-mass-destruction nonproliferation and counterterrorism; the security of cyberspace and space assets in a highly connected world; protection of U.S. Armed Forces engaged in unconventional conflicts; energy and environmental security; and innovation supporting U.S. economic competiveness. In addition, these programs are critical in helping to attract a world-class workforce to our Laboratory.

Management of the WFO projects, which exceed 600 in number, encounters red tape and bureaucratic inefficiencies. Each project is required by NNSA to have a separate Inter-Agency Agreement (IAA), which is submitted to the Livermore Site Office (LSO) for approval. Prior to project initiation, the Albuquerque Complex must certify availability of funds. Once certified, the LSO Contracting Officer signs the document and adds it to the contract. The Office of Management and Budget recommends an Umbrella "Part A" agreement that defines each agency's roles, responsibilities and accountabilities. Each task order "Part B" would be a Statement of Work (SOW) and a fund transfer document. Application of this policy would greatly streamline the process.

In addition to the work for NNSA, the work performed for other Federal sponsors would benefit from lower operational costs at the laboratories that could be achieved through the streamlined governance and oversight discussed in answer to previous questions. This together with fewer impediments to arranging interagency work would maximize the value to the Nation from the NNSA laboratories at a time when scientific and technological advances are sorely needed to address 21st-century challenges to U. S. security.

It is important to emphasize that, rather than a distraction, WFO is a valuable augmentation to SSP. The work adds depth, breadth, and strength to the laboratories' capabilities. SSP funding alone is not able to sustain our Laboratory's technical base; loss of WFO would jeopardize the long-term success of stockpile stewardship and the health of science and technology at LLNL. Many agencies of Government would benefit from access to the entire national laboratory system with the correct, efficient business model.

The size of the SSP is constrained by funding, not by the availability of quality personnel at the Laboratory to perform the work. In fact it is very fortunate that WFO programs have been able to absorb the decrease in the size of the workforce directly supporting the SSP that has transpired (from 1,252 full-time equivalent

(FTEs) in 2005 to 1,083 in 2011). Otherwise, this talent would have been lost from the Laboratory and the many national security missions.

As for an improved way to ensure multiagency support for and investment in the laboratories, this is a complex issue. There are pros and cons for all future arrangements (including consideration of fixes to NNSA). This is not just an executive branch issue, appropriations and budget authorization is the responsibility of many different committees in Congress.

There is no easy answer. The Office of Science and Technology Policy has requested IDA's Science and Technology Policy Institute to address the governance of the Federal laboratories, particularly in the context of the future national security challenges. I encourage this effort and expect it to consider the extensive recommendations made from a series of national studies in developing recommendations how to best fit the national laboratory into the Federal structure in a way that they can maximize their value to the Nation—this must be the gold standard for future success in my view.

Mr. TURNER. 36) The labs are operated as federally funded research and development centers (FFRDCs). The FFRDC construct was created to allow the Federal Government to broadly determine "what" work needed to be done while the FFRDC determines "how" to accomplish the work. Federal Procurement Policy guidelines (OFPP Policy Letter 84–1) say that the Federal Government's monitoring of FFRDC performance "shall not be as . . . to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work."

- Do you believe NNSA's current management and governance model for the labs operates in the spirit and intent of the FFRDC model? Why or why not?
- What might Congress do to ensure the FFRDC model is robust and executed appropriately?

Dr. MILLER. 36) In the written testimony I submitted for the record, I provide ample information and data that support my view that the FFRDC construct has broken down between DOE/NNSA and the laboratories. I concluded my statement with three "Ts": restore TRUST, eliminate TRANSACTIONAL oversight; and TURN OVER management to the people you hired to manage (the directors of the laboratories). Unfortunately, I do not know how to restore trust through congressional legislation and that is key for a positive future you and the Nation can depend on for solutions to our most vexing problems.

Mr. TURNER. 37) The current National Academies report, the 1999 Chiles Commission, and the Strategic Posture Commission have all cited an ability to attract and retain world-class scientists and engineers as the critical foundation for having a world-class lab.

- Do you believe the labs are able to attract world-class personnel today? What attracts such people and makes them want to stay?
- Have we seen any loss of world-class people already?
- How does having modern facilities, labs, and infrastructure play into the labs' ability to attract and retain world-class scientists and engineers? Do you have any worries in this regard? Would you care to comment on the recent cancellation of CMRR, and how that will affect the ability of the nuclear security enterprise—and Los Alamos in particular—to both attract and retain world-class plutonium scientists?

Dr. ROBINSON. 37) First, let me address attracting world-class personnel:

About 20 years ago Sandia created a program we called Strategic University Campuses to directly address our ability to find and hire the most outstanding individuals to our lab. We began with a list of universities where we had in the past sponsored R&D efforts (and thus where an alignment of some relevant technologies already existed, i.e such schools as Cornell and Purdue). We also added some universities based on their having Departments of Excellence in fields that matched our Core Competencies (e.g. MIT and Carnegie-Mellon). Finally, we added over time key regional universities that had supplied graduates in the past (University of New Mexico, Texas A&M, and New Mexico State), or universities that gave us wider access to a wider diversity of women and minority students in science and engineering (e.g. North Carolina A&T and UTEP). We periodically would invite the Deans of Arts and Sciences and Deans of Engineering to attend a Dean's Day, during which we explained the program's opportunities and our projected needs for technical staffing. We found enormous enthusiasm for this participation, with the intended effect that the faculty at those schools began to identify and "push" the most outstanding students in our needed specialties to consider careers at Sandia. In many cases we moved early to hire those they identified for summer internships or for Co-Op years at our labs.

We can cite numerous hires over the past 20 years through this effort, where we hired "the top computer science student in decades," or "the most outstanding electrical engineer or physicist in recent memory." Many prospective grads had made perfect scores on the SAT's were identified to us, and we were nearly always successful in recruiting them to Sandia and have been more than delighted with their subsequent development here. We observed that this approach gave real meaning to "affirmative action," as we often were able to improve our diversity with the most outstanding academic performers. The Strategic Campus program resulted in our appointing our own senior executives to become Campus Executives at these schools, where they often serve on university advisory boards or R&D boards. They commit to also lead an annual recruiting effort at these universities. Unlike Government labs, where periodic "hiring freezes" are periodically imposed, we fought hard to "never close the door to hiring outstanding candidates," and our staff improvements shows the benefit of all of these multiyear efforts.

Staff Retention: Once our hires get to know and respect the fact that "theirs is not just a job, or even just careers, but when they are given key responsibilities for efforts that are vital to the security and future well-being of the Nation itself," they remain here and make major and important contributions.

Major declines in morale have resulted from more and more burdensome bureaucratic requirements being piled on—particularly those that more often or not waste staff's precious time. These bright people do not hesitate to speak out. The reality, that these highly educated and conscientious people should not have to suffer such foolishness (as represented by many of the DOE safety and security orders and "permission slips"), is taken seriously by those of us who have been responsible for the leadership as all three labs will unanimously tell you. As I said in my written testimony, our attempts to reform these "requirements" were almost never successful. I would challenge you to ask past NNSA leaders how often we, as well as they, attempted to gain relief; yet it almost never happened. I would wager that this is a prime factor in why all of the past NNSA officials, and review groups, have unanimously called for major reform. Without major changes to safety and security efforts—to make them more rational and raise their quality—the adverse consequences to the Nation's highest security strategies will grow to be truly severe.

Mr. TURNER. 38) As I noted in my opening statement, in 2009 a Stimson Center report said: "the implementation of the NNSA Act failed to achieve the intended autonomy for NNSA within the Department of Energy. The Labs now must operate within a complicated set of bureaucratic relationships with both DOE and NNSA. An excessively bureaucratic DOE culture has infiltrated NNSA as well." Also in 2009, the Strategic Posture Commission said that, "the original intent of the legislation creating the NNSA has not been realized. The desired autonomy has not come into being."

- Do you believe the intent of the NNSA Act has been implemented? In other words, is NNSA truly semi-autonomous from DOE?
- Do you believe the roles, responsibilities, and lines of authority between DOE and NNSA are clear?
- What should Congress do to address this?

Dr. ROBINSON. 38) Many of the aims for autonomy were designed to eliminate the foolish bureaucratic and misguided policies that had grown in over time. Against those aims, NNSA has been a failure. The then-Secretary of Energy when the NNSA Law took effect opposed many of the provisions, although the reasons for his opposition were never stated to the Congress (nor were understood by us). He refused to follow the terms of the NNSA Law: specifically in "double-hatting" both the security and safety organizations to take overall responsibility for the NNSA labs and plants, despite the direct prohibition against that within the NNSA act. My written statement discusses these intentional actions by that Secretary, assigning these major authorities exclusively to already poorly-performing DOE organizations which had no commitment to the success of NNSA missions. Yet they spend large amounts of NNSA funds, and impose onerous requirements on the NNSA labs and plants, without consideration of the adverse impacts they have caused to the strategic nuclear weapons programs. I once received a phone call from a very senior DOE OFFICIAL, who had recently been appointed, saying he was shocked by the Department's rhetoric, which he had just read, that *"No job is more important than the safety of the personnel and the environment."* He said, "While of course protecting employees and the local environment and citizens are important, he had always believed that preserving the strategic future of the United States carried higher importance than anything he could imagine." He then asked me, "What has happened to the priority of the strategic mission we all used to be devoted to?"

Thus, to summarize, the answer to this question is: "No. There is no autonomy for NNSA. Other DOE Organizations still direct the Labs, and can spend the budg-

ets of the NNSA, without balancing these expenditures against the loss of mission effectiveness that these expenditures cause. Unfortunately, such wrong-headed decisions have now become commonplace, rather than exceptions, within the NNSA Programs, and we seldom even hear NNSA or senior DOE officials complaining about it. Certainly the GOCO model, where science and technology labs were to have the leadership in "HOW" to do their work, with the Government concentrating on "WHAT" were to be the goals and funding, has been effectively shredded.

Mr. TURNER. 39) The 2009 Stimson Center report and the Strategic Posture Commission both concluded that major reform of NNSA was needed. Both groups recommended making NNSA fully independent from DOE. In his statement for the record for this hearing, Ambassador Linton Brooks, the former head of NNSA, says that major reform is now needed again. Ambassador Brooks says that the Strategic Posture Commission concluded that the current governance structure of NNSA "cannot be effective in the long term. The record of recent years points to no other conclusion." On this conclusion, Ambassador Brooks said: "I agree. The current 'semi-autonomous' structure has proven to be too dependent on the personalities of DOE and NNSA leadership to be consistently reliable and effective . . . " On whether Congress should revisit the Strategic Posture Commission's recommendation to make NNSA a wholly-independent agency, Brooks says: "My answer is yes. The present system has been tried for a decade by dedicated, hard-working and competent civil servants. It has not lived up to the Nation's hopes. We can do better."

- Do you agree with Ambassador Brooks? Do you believe such large-scale change is again needed? Why or why not?
- Would such organizational change fix all of the issues identified by the NAS report, the Strategic Posture Commission, the Stimson Center report, and the myriad other reports? In addition to organizational change, what else would need to be done to address these problems?

Dr. ROBINSON. 39) I strongly support that the opinions of Ambassador Brooks deserve your careful considerations. He is a wise and pragmatic man. (He took over the leadership of NNSA in its early years, and knows well all of the problems I outlined in the previous question.) I noted the difficulties he had in "criticizing his parent organizations or his direct supervisors", which was something counter-cultural for a career military officer; yet he has come to be quite open about the paralyzing effect of having the bureauracy take over control of operations. Unless this is turned around, the Government will continue to waste both opportunities to improve our national security as well as to waste large sums of money.

We can indeed do far better, and the past legacy of the Labs demonstrates this. The major organizational changes I implored you to consider within my statement, were designed to once again allow the Labs to make their maximum contributions to the national interest, and be far more effective in terms of important security contributions and cost-effectiveness for the taxpayers than has been the case for many decades. I urge your action to realize these opportunities for improvement.

Mr. TURNER. 40) Your written statement recommends eliminating NNSA and standing up a new, leaner, more focused agency reporting to the Secretary of Defense. What are the benefits of this approach? What are the challenges?

Dr. ROBINSON. 40) The principal benefits derive from reporting to an organization where there is a high level of trust already in place between the labs and the DOD and military services. There is complete alignment between the organizations which would be joined together in their highest purpose: *to ensure the preservation of peace and freedom of these United States for all time.* It is hard to articulate any analogous "purpose" for the bureaucracy that has grown to be today's Department of Energy. For the most part, while the history of their actions would suggest a total disregard for the overarching importance we in the Labs would attach to "preserving the Nation's security", the DOE is seemingly much more strongly motivated by self-preservation of their own bureaucratic structure and power.

Immediate benefits of being in DOD would include "inherent trust relationships along with tighter communications between the "customers and the suppliers." It would tear down the artificial boundaries now erected between the Labs and their Federal sponsors, and would indeed result in implementation of the original FFRDC (federally funded research and development centers) principles. I note once more that the DOD has proven itself to be a very successful example of a "civilian-controlled" department. The intended roles of who should determine WHAT, versus HOW, would be natural, and not in conflict, as has been too often the case in the past.

Other questions and answers (below) deal with these same points, especially in my answer to Question 55 [Now Question 45], where I have provided a longer discussion of the issues and my judgment on a path forward.

Mr. TURNER. 41) The NAS study committee recommended that NNSA "purposely free directors to establish strategic science and engineering direction at the Laboratories." What concrete actions would you recommend NNSA and Congress take to "free [lab] directors to establish strategic science and engineering direction at the labs?"

Dr. ROBINSON. 41) I am embarrassed that the NAS did not find that to still be the case at Sandia, as there is no question but that the pursuit of strategic science and technology was my highest priority, and for my entire management team of Vice Presidents, Directors and Managers, for the ten years I served as Laboratories Director (1995–2005). It would be an impossible task to lead a complex, multiprogram laboratory with nearly 2,000 Ph.Ds and nearly 8,000 direct employees like Sandia (or similarly for LANL or LLNL) without such a highly skilled, hands-on management team. We spent much of our time in deeply technical discussions, and in strategic and mission planning, problem solving, and in examining alternatives and opportunities for major advancements. I can imagine no other approach for advancing the state of the art for scientific discoveries and applying them to meet the needs of highly classified missions, even with the harnessing of the best of modern computing and communication tools, than having such a closely knit local team with constant interchanges.

The labs have often pointed out that, even after hiring the brightest and best recent graduates with Ph.Ds or other advanced degrees, it takes approximately 10 years before they can learn and understand past classified advances to a sufficient level as to be capable of making independent advances in specific technologies. It takes even longer times and a wider set of experiences and learnings before even the most talented individuals can be qualified to take on important management responsibilities for multidisciplined programs or projects within the Labs. Thus, it was crucial that the senior management devote much effort to "Succession Planning" through identifying individuals with the right skills, demeanor, and potential; so we could then manage their careers at the laboratory to prepare them with the right knowledge and experiences be able to succeed in leadership positions for future complex and multi-disciplined programs and activities. I found that over the years, this training is very much akin to having earned Ph.D. equivalencies in at least 5 to 8 technical fields, before you were qualified to lead major Lab efforts. These enduring requirements thus inevitably mean a lifetime career commitment has to be made by these individuals to the Laboratories and their missions. Thus, it is in my mind nothing short of a tragedy, when the recent contract changes in the GOCO "parent organizations" led to immediate budget shortfalls and the resultant large-scale (i.e. thousands of) lay-offs—voluntary or involuntary—at Los Alamos and Lawrence Livermore in recent years. The tremendous loss of talented people, including a great many who were in that process to become future scientific leaders within the Labs, has caused major damage. But, just as damaging has been the endless growth of useless bureaucratic tasks imposed by the DOE its predecessors, that have discouraged many of the talented scientists and engineers at all ages from continuing their "lifetime commitment" to the Laboratories' futures. Many have just "given up" and left. I realize my testimony to the HASC may be seen as harsh criticism of the current situation, but against the backdrop which I have just described to you, I hope it will be even more apparent to you that these problems must be solved and quickly, (and that such errors not be repeated for the upcoming "recompetition" for the Sandia contract, now being formulated and scheduled within the DOE and NNSA.) I once again urge you to make very major changes to the "failed GOCO" we now all find ourselves caught up in.

Mr. TURNER. 42) Do you agree with the NAS study committee's recommendation to "rebalance the relationship and the set of principles laying out the boundaries and roles of each management structure" and memorialize such principles and relationships "in memoranda of understanding between NNSA and its Laboratories"? What principles of the relationship between NNSA and the labs would you suggest be included in such an agreement? What would be a potential enforcement mechanism for such memoranda of understanding?

Dr. ROBINSON. 42) You have doubtless heard the simplified description of the desired relationship between the Labs and the Government in a "GOCO" relationship (Government-owned and contractor-operated) described as *"the Government should decide 'WHAT' is to be done, and the Lab decides 'HOW' it will be done."* A better description of how the relationship ought to work is where *"the Lab proposes, and the Government disposes."* For example, in my service at Sandia, we placed a very strong emphasis on Strategic Planning, emphasizing that we needed to plan our research and development efforts, our core competencies, and our detailed annual plans and budgets to align with our missions. That provided a basis to ensure that we would be addressing the highest priority assignments and opportunities to suc-

ceed in our mission responsibilities, and that all parts of the laboratory would be knowledgeable of, and strongly connected to, these mission efforts. An ideal arrangement would be to have the NNSA (or its successor organization) review in detail, and discuss and approve the Strategic Plan and its more detailed annual Plan. Their approval should be confirmed in writing to note their satisfaction with "WHAT" is to be done, and they must step back from further management of "HOW" (or, God-forbid, the "micromanagement" that has increasingly characterized the recent decades will continue to grow.)

Appropriate vs. Inappropriate Organizations: One of the great tragedies that was visited upon the Government/lab relationship in recent years (primarily since the end of the Cold War) has been the creation of new job titles within NNSA called "Program Managers." I used the word "titles" because the classic role for Program Managers was not what should have been intended for these individuals, and there were no consensus job descriptions of what their duties would or would not be. Over time these individuals have increasingly attempted to serve as "real" program managers and to attempt to dictate at a more detailed level the individual budgets and tasks for the labs, in the classic sense of "Government sponsors" and their "contractors." (The DOE in fact most often uses the term "contractors" when referring to the GOCOs, which is not at all what was considered of the basis for establishing and depending upon GOCOs to lead and operate the efforts of researching, designing, and delivering the designs for U.S. nuclear weapons, nor for the other missions of nuclear detection, preventing nuclear proliferation, or combatting nuclear terrorism.) I can assert here that to believe it could even be done in "a Washington detailed-direction and management of these unique high-tech efforts by a Washington bureaucracy" was recognized to be *an impossibility* by the wise leaders who created the Manhattan Project and the original GOCO model. They made a clear choice to "put the scientists in charge" of the mission, and while they provided close support and monitoring of the tasks, but the Government role was never seen to be a "detailed management role" but was to exist as *a partnership,* with each doing appropriate tasks: the NNSA staff should be primarily working in close liaison with the labs and with other Government entities, such as the White House and the NSC, the Department of Defense and the Intelligence agencies, the Congress, and the OMB. Today, we would add the Dept. of Homeland Security to the list.

A startling example of how bad the situation has become at the NNSA, as it has been in a self-generated evolution to attempt to pervert the arrangement from the original GOCO model to "a sponsor/contractor relationship"—in which the Government entity undertakes "to directly manage the technical programs"—can be seen from recent budget difficulties which have become a very great concern in recent years. When the price for developing, manufacturing, and delivering a new Life Extension Program (LEP) for a major nuclear weapons system seemed to be unaffordable, one Lab stepped forward to the DOE/NNSA and said "We would be willing to readjust our overall suite of weapons activities—just as we did in the past—to accommodate the new tasking by reassigning our people internally from lower priority R&D tasks, in order to meet the deadlines required for this important deliverable to the DOD, *without any additions to our overall budget."* The response from the NNSA management was, however, "We have checked with the program managers (within the NNSA and DOE) and none of them want to give up any of their budgets or change the schedules for their activities at this time. Thus we guess we just won't be able to approve your taking these actions."

To say that this recent anecdote shows that the roles and responsibilities within the current GOCO have fully reached a point of impossibility is truly an understatement.

I would emphasize that the way in which this HASC question is asked fails to recognize the basic problem: the original GOCO contracts were at most a few pages in length, but they have grown to be large volumes by today—as the writers mistakenly believed them to be classic procurement contracts, rather than a direct assignment for the mission responsibilities for nuclear weapons RD&D mission to the Labs, as their partner institution. Exhaustive contracts are not the answer.

Thus, while having begun the answer to this question, with what must be changed, let me now attempt to write several "principles" which your question seeks. I cannot attempt to write "a complete set," nor do I believe that would even be the right approach for what is needed.

- The Government will return to a simple contract that outlines the mission responsibilities that will return to the Labs/GOCOs for day-to-day management.
- The scientific and technical directions and the management of the work programs will remain the exclusive responsibility of the Laboratory Director and his or her managers.

- The Federal entity and the Laboratories will work together to mutually develop schedules and accompanying budgets for carrying out the mission programs within the laboratories.
- The performance reviews for the Labs will exclusively focus on how successfully the "What's" have been addressed, and only should there be a case where there were very serious shortfalls to have happened in "How's" of the administrative, budgetary, safety, or security performances, would these administrative and institutional issues have any bearing on the judgment of performance.

Mr. TURNER. 43) Going back to the early 1990s—to the Galvin Commission and before—there have been dozens of national commissions, studies, and reports recommending significant reform to the way DOE and NNSA govern and manage the labs. Many leaders in NNSA and DOE have tried to carry out reforms, streamlining efforts, and initiatives to reduce burdensome policies and practices. But, today, the NAS report still finds major problems with the governance and management structure NNSA uses for the labs. Why aren't we making any progress in improving the governance and management structure for the labs? Are these recurring problems affecting morale at the labs? Are they impacting the quality of the science and engineering? Are they impacting the labs' ability to attract and retain world-class people?

Dr. ROBINSON. 43) This question set truly asks "the 64 dollar questions"! Let me use my own experience to attempt to address them. When I began at Los Alamos in 1967, as a fresh young Ph.D., the "halo effect" (from having succeeded in the accomplishment of the Manhattan Project to produce the devices that ended WORLD WAR II) was still very much in evidence. All major decisions were either already delegated to the Labs, or else the Atomic Energy Agency leadership would choose to meet directly with the lab leaders to discuss new challenges, opportunities, and assignments, with the Labs being tasked with several week deadlines to respond to what should be done to meet these. Soon after rising further within the Lab management at Los Alamos, I found that, if there were weaknesses in the system, it was primarily on the university side of the GOCO, where periodic reviews were carried out by "large committees of academics", who were mostly completely unfamiliar with the missions or the work within the Lab, and whose reviews were of a most "cursory nature." Worse yet, over time, as the military protests of the late '60s expanded, the membership of these committees began to include more and more professors who opposed nuclear weapons in general, and stated that the University of California should no longer be the responsible institution for overseeing these Labs. This internal dissent began to be more and more the focus of the exchanges during the university review committee meetings, rather than to analyze the growth of oppressive oversight by the the Energy Research and Development Administration (ERDA) as uncontrolled bureaucracies "exploded" on the scene. [Remember that *ERDA was formed by adding two political layers of Administrators over the top of the residual AEC organization,* with the disappearance of the five-member Commission that had led the AEC.]

As one might expect, with political appointees with little if any past knowledge of the nuclear weapons missions, or of the advanced science missions, these new Administrators put their focus on the "new mission" of the overall organization—to help address the energy crisis and related problems. In particular, with administrative and support organizations then having little contact with or direct management from the new top management, the bureaucratic tendencies and initiatives literally "ran amuck" and "grew like Topsy." It was at this point when the Department of Energy was created, primarily by adding in additional parts to ERDA from other agencies, while then *placing two additional "political layers of officials at the top."* These new officials were "even more politically focused than those of the past, and quickly showed to be even further out of touch with any of the operations, missions, or activities" of the resultant new Department. Taking advantage of that "inattention," the DOE bureaucracies then explosively grew in the sizes and greater number of divisions within these bureaucracies. The classic approach within all bureaucratic groups, "when they are left to their own devices," took hold, and they began to write even more and more detailed Instructions, Orders, and Directives from the "Washington Headquarters," beginning to enlarge the HQ role to achieve full dominance and control over all functions. With the increase in the lengths and numbers of Orders and Directives (which to those of us who had been in the GOCO system prior to that seemed like a total waste of human energies by all concerned), it seemed that those who were writing these "larger and larger volumes" *had almost no knowledge of what either R and D, nor nuclear matters were all about.* Certainly, it is fair to say that the two parts of the GOCO had grown "farther and farther apart," and communications either became more confused or even nonexistent. By the time of the Galvin Committee effort, primarily composed of industrial leaders, completed its

report entitled "Alternative Futures" (published in February of 1995), these industrial leaders who had examined the situation expressed considerable shock and dismay. Of course even though the Chairman, Bob Galvin, was enormously respected, as were the members, *the senior officials of Department of Energy neither understood, nor showed any interest in, either taking on the problems described or implementing any of the recommendations to address the multiplicity of problems cited.* The one enduring change was their recommendation that "Quality Principles and Methods" ought to be put into place in both the DOE and the Labs and Plants. This was embraced, and did achieve some marked differences in improvements within the institutions that voluntarily embraced Quality, but for the Government side quality initiatives all too quickly disappeared off their "attention screens."

The actions of the U.S. Senate to drive the legislative changes that created the National Nuclear Security Administration (NNSA) in 1999, was the primary subsequent attempt to respond to the problems that the Galvin Committee cited by reorganizing and improving the deteriorating situation for at least the Nuclear Weapons Labs, Plants, and Headquarters. It repeated the goal to recover the principles of the previous GOCO arrangement, but as I have exhaustively reported within my written statement for the HASC Strategic Forces Hearing (February, 2012) and elaborated further upon in addressing these QFR's; *the NNSA has failed to meet the hopes that all involved with that legislation had for it. Today its responsibilities and programs are experiencing very serious difficulties, with the conclusion having been reached by almost all associated with the NNSA that major changes are necessitated.*

Mr. TURNER. 44) The NAS study committee identifies a loss of trust between the NNSA and its labs as a key problem that is contributing to a poor management relationship and burdensome oversight policies and practices. The NAS report identifies this loss of trust for increased risk aversion at NNSA, which discourages the labs from conducting real-world experiments. Do you agree? What is the impact on the quality of the science and engineering at the labs—and the labs' ability to execute their missions—if risk aversion leads to fewer and fewer experiments? Do you believe the sustainment of our nuclear deterrent might be at risk because of the safety requirements that lead to risk aversion and fewer experiments?

Dr. ROBINSON. 44) This is a powerful question, and while the issues of "trust" and "risk aversion to experiments" have received little if any formal attention, they are in fact root causes of the manifold difficulties between "Government organizations" and "scientific institutions." Over my 50-year career I have seen the pendulum swing only in one direction, toward fewer and fewer experiments, but only part of that is good, and that is the reduction in experiment numbers for a given project because of computer modeling of each experiment, which allows better analysis and hence better predictions of the results of future experiments; so one can "skip" some steps that were always done in the past. However, I also see the conflict between Washington's increasing aversion to fund experiments that have any risk of either (1) not succeeding, or (2) potential safety risks for personnel engaged in experimental work. There is almost a textbook "lack of a common understanding" between those who fund and oversee experiments and those who carry them out. One of the greatest scientists of the Manhattan Project was Enrico Fermi, who used to chide the scientists during his time at Los Alamos not to forget "the scientific method," which requires experimental observations as the key to scientific advancement—insofar as experimental results either provide support for or evidence against proposed theories. He said *"Always remember it should not be called an experiment unless it has at least a 50% chance of failing."* What he meant was that experiments should be defined to delineate between opposing views by shedding light on which provides the best scientific explanation of what is observed. Thus, one should never get caught up in only taking conservative steps by limiting your experiments to those that are designed to be successful, rather than to carry out the best test to show which theory is "correct."

One fundamental conflict in this regard is when the ERDA Headquarters once published a document that declared that their new philosophy would be a preference to only fund "Demonstration Projects" (as these normally take such "baby steps" in pursuit of a goal that they have little if any scientific value). Ever since, this error has been repeated often in DOE plans and documents. Nothing could be more in conflict with how the Scientific method best works, as one can be misled that by taking what some consider the "preferred path and theory" without any basis of proof. By only building demonstrations around those initial assumptions, you have no basis for understanding what to do next when a demonstration fails. The optimum way to pursue understanding of the operative science for any aim is to carry out carefully planned experiments to demonstrate which factors are the driving ones, and based on their results, then move up the ladder to more refined tests of the hypotheses.

Nothing could be more fundamental in the "failures to communicate" between Washington and the Labs, than this fundamental difference in approaches. It undoubtedly provides the basis for "distrust," with the parties unable to even communicate sufficiently to decide on a different approach.

Mr. TURNER. 45) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" is well under way, and that this will enable an expansion of the labs' work solving national security problems for many different Federal agencies. Within NNSA, this is called "work for others," or "WFO." The NAS notes that this evolution is critical to the future vitality of the labs.

- Does the current governance and management structure facilitate or impede WFO work at the labs?
- What steps could Congress take to make WFO work easier, more efficient, and more effective?
- Do you believe the labs can continue to expand their WFO work and not be distracted from their core mission of sustaining the nuclear weapons stockpile? As lab directors, how did you ensure this continued focus while also broadening the work conducted at the labs?
- In 2009, the Strategic Posture Commission said the President, "should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the laboratories." Do you agree? How would such a structure operate—how should it be designed?

Dr. ROBINSON. 45) Let me note that the first five lines of this question are identical to Question 12 [Now Question 104], that also focuses on the movement to become "true national security labs," rather than only "nuclear weapons labs." I will attribute this to the "great minds" phenomena. The questions that begin at the end of line 5 are quite different, and I will address Question 55 [This Question] here, but suggest that there may also be other relevant and useful points in the answer to Question 12 [Now Question 104].

As the NAS Report points out, Sandia began the focus on wider national security issues earlier and is much further along in "becoming true national security labs."

That phrase is a goal we wrote in Sandia's Strategic Plans in the early '90s, and the achievement of which is perhaps my greatest contribution for the years I and my successor served as Sandia's President. Although the trend toward greater support from other national security agencies expanded greatly, 2 years after my retirement the "Work for Others" funding (from agencies such as DOD, IC, HSD, and military services) the WFO total finally exceeded the level of funds provided by DOE. I take this as evidence that we had reached a condition of being a true national security lab.

A central criterion in taking on any of this additional work was that it had to be synergistic and to either directly rely on, or directly improve the capabilities required for executing the nuclear weapons program responsibilities. For the most part, it is my experience that the WFO work has not been subjected to attempts at micromanagement by DOE or NNSA. Two years ago, in fact, NNSA publicly embraced the expansion of these Work for Other's efforts in the national security areas as an important factor for the future of the NNSA and the Labs. I believe the importance of the Labs' contributions overall to the Nation's security has been significantly enhanced by having expanded our security horizons. In the years since the end of World War II the uniqueness which our three Labs demonstrate in being large multidisciplined, multiprogram labs has made us more and more unique, while almost all large U.S. corporate labs and Government labs have consolidated or greatly declined, rather than expanding as the breadth of major scientific technical specialties has expanded and broadened.

When I became Sandia's President, I asked Lockheed Martin if they would expand the membership of Sandia's Board of Directors to include major figures from the wider defense communities, so that our total Board could be judged "to be even more representative of the national interest." They agreed, and we did so, by adding a former Secretary of Defense and former Director of CIA, several former flag officers at the four-star level, and a well-known defense scientist then at a university, plus two other "outside" (i.e. non-Lockheed Martin) board members. We then also created a specific National Security Advisory Board, staffed with a former Chairman of the JCS and other key military and agency leaders. We similarly expanded an existing Intelligence Advisory Board and elevated its membership. All of these made their reviews and recommendations to the Laboratory Director and to the Board of Directors, just as did our many academic and engineering review Boards.

In response to your question about whether the expansion of our responsibilities into other national security areas were "not a distraction from our core missions of sustaining the nuclear weapons stockpile." General Larry Welch, former Com-

mander to the Strategic Air Command (SAC) and former Chief of staff of the Air Force, who was and is a member of the Sandia Board of Directors, helped me address that same question when it was asked of me by the Board. He noted that in the years in which he commanded SAC, and later when he commanded the full Air Force, the direct nuclear weapons portion of their overall budgets that were devoted to nuclear weapons was only 10% of the total, but yet there was no question at any time that the nuclear defense was by far the most important part of our national defense efforts, or that they were given the highest priority for his energies and efforts, as commander. *We and the full board mutually agreed that even though Sandia was already on a trajectory for the nuclear weapons budget to become only half (or less) of our total laboratory budget, there was similarly no question that the nuclear weapons efforts at Sandia were of the highest importance among all of our programs, and would always be viewed as such by all of the management and employees, based on its strategic value to the Nation and to the uniqueness of our functions (which exist no where else).*

Finally, on the issue of the structure proposed by the Strategic Posture Commission, their recommendation is a small variation of a similar idea proposed in the Defense Science Board Report on Nuclear Capabilities (reported out in December 2006). This later report proposed that a (Government) Board of Directors should oversee an independent NNSA (equivalent) and the labs and plants, with the Secretary (or Deputy Secretary of Defense) as the Chairman, the Secretary of Energy as Vice Chair, with the heads of Intelligence, Homeland Security, and any other key stakeholders, added to the Board. That recommendation, like the similar Strategic Posture recommendations, would bring back many of the advantages of the original Atomic Energy Commission, with political appointees who are "states-men and -women," who are deeply knowledgeable about the missions and/or technology, and who could, together, provide creative approaches and better integration of the advanced technical capabilities for the Nation's overall defense. It is close to, if not the best, solution for the future.

Mr. TURNER. 46) The labs are operated as federally funded research and development centers (FFRDCs). The FFRDC construct was created to allow the Federal Government to broadly determine "what" work needed to be done while the FFRDC determines "how" to accomplish the work. Federal Procurement Policy guidelines (OFPP Policy Letter 84–1) say that the Federal Government's monitoring of FFRDC performance "shall not be as . . . to cause disruptions that are detrimental to the productivity and/or quality to the FFRDC's work."

- Do you believe NNSA's current management and governance model for the labs operates in the spirit and intent of the FFRDC model? Why or why not?
- What might Congress do to ensure the FFRDC model is robust and executed appropriately?

Dr. ROBINSON. 46) The FFRDC construct began and was used extensively during World War II, primarily on the premise that neither existing Government organizations nor private commercial organizations already had the means or the capability to attract the level of scientific and technical personnel needed to carry out high-priority R and D needs. FFRDCs were usually separate nonprofit organizations created for a specific purpose and for a specific Government agency (the War Department, and later, the Department of Defense), although a small number of FFRDCs have since been charted to simultaneously support several agencies (RAND, and MITRE.)

A review of the FFRDC model by the OTA stated that "GOCOs are not strictly FFRDCs," although there are great similarities, and indeed over the years, we at Sandia have carried out joint visitation interchanges with particular FFRDCs (at their requests) to share methodologies we each use for best ensuring the retention of key personnel and maintaining core technical competencies.

Other highlights from the OTA Notes (available online) that are apropos to this question are: (*here I have placed some items in Bold/Italics*)

Why Federally Funded Research and Development Centers?

- FFRDC set up to provide objective assessments of military problems/programs of increasing complexity. They have long-term partnership relationships with the Federal Government—provides long-term continuity. Federal Government's structure cannot attract needed scientific talent. *FFRDCs act as honest-broker, so they need insulation from their customers as well as private sector.*
- *FFRDCs established as private nonprofit organization separate from the Government—so that they do not experience pressure to conform, from Federal Government or industry.*
- Receive *long-term access to information (sometimes classified) from both Federal Government and industry* (which is why most FFRDCs are independent, non-

profit corporations, than university-sponsored centers—universities' perception that classified information runs counter to open inquiry).

Benefits

- FFRDCs maintain intellectual capital better than for-profit (which may need to give up talent due to contract win or loss)
- FFRDCs can give Federal Government means of integrating proprietary information from multiple for-profit companies
- *Lack of unified Federal Government regulations and policies:*
  - no protection for their function
  - *regulated by sponsoring agencies without comprehensive policy framework*
  - subject to acquisition regulations

Solved on case-by-case basis
Assets of research center belong to Federal Government or center?
How are assets disposed in the event of center closure?
Results of study accessible to outside the sponsoring agency?

Please note that today only the Department of Defense strictly has FFRDCs, and relocating a restructured NNSA along with the 3 nuclear weapons Labs to the DOD would permit such a structure quite naturally. From personnel experiences from the exchanges with the senior managers of DOD FFRDCs, I can state for sure that in the areas of the language you quoted in this question: sp., fed. gov.'s monitoring of FFRDC performance "shall not be as . . . to cause disruptions . . . detrimental to productivity and/or quality to the FFRDC's work"—my conclusion is that the DOD generally has succeeded over the years in those aspects, while, as this whole document points out, NNSA within the DOE is failing badly. Thus there are few grounds to conclude that the current (DOE/NNSA) management model for the Labs "operates in the spirit of the FFRDC model," rather "it is quite the contrary." The proven track record of DOD "not to micromanage" their FFRDCs, but to remain strongly supportive of the FFRDC's independence in remaining closely interested in the work of their FFRDCs, and in depending on them to help the DOD solve its important scientific and technical problems, is also suggestive of the way the Labs functioned under the Army Corps of Engineers during the Manhattan Project, versus the myriad of problems that have appeared and grown since the AEC was morphed into what is now the Department of Energy. This is reminiscent of my February testimony to you where I said (on page 9):

> "Regarding what to do, I kept asking myself, "Why is it, in the those years in which these organizations existed as GOCOs under the U.S. Army Corps of Engineers, their successes were so extraordinary and history making, but they have now degenerated so badly? The answer as to what might be done to fix the current situation almost suggests itself:

"Why not try going back to the much simpler organizational approach that functioned so well during the Manhattan Project?"

QUESTIONS SUBMITTED BY MS. SANCHEZ

Ms. SANCHEZ. 47) The NAS study committee recommends that "NNSA, Congress, and top management of the Laboratories recognize that safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced, so that they not impose an excessive burden on essential science and engineering activities."

- Does the NAS study committee have any examples of how these costs may be "an excessive burden?"
- What evidence did the committee consider in reaching this conclusion? Is your conclusion that there are no longer safety risks in nuclear operations at the labs?

Dr. SHANK. 47) Our study did not investigate the safety risks in nuclear operations at the Laboratories. Nuclear operations represent a small fraction of the work performed at the Laboratories. Our comments are pertinent to the vast majority of the work that looks very much like activities taking place in industry. Members of the committee had extensive experience in industrial research laboratories. The hundred-plus NNSA staff plus contractors perform oversight at a transaction level at each Laboratory. The Laboratories have hundreds of people responding to NNSA oversight. The performers of science and engineering work described the large amount of time they spend on an excessive formality of operations. To this point, several scientists and engineers complained that the burden was so great that it cre-

ated a bias against experimental work. Finally, the sizes of the safety organizations at the Laboratories are outsized compared to such operations at industrial laboratories.

Ms. SANCHEZ. 48) Who should have main line of responsibility to ensure nuclear safety and security? Is overseeing the safe operation of the Nation's nuclear weapons complex an inherently Governmental function? If so, should there not be strong DOE Headquarters and Site Office oversight functions for nuclear operations and their safety? Why/why not?

Dr. SHANK. 48) Nuclear operations represent a small fraction of the work at the Laboratories. We did not form an opinion on safety issues in nuclear operations in phase 1 of our study.

Ms. SANCHEZ. 49) A number of employees, including the unions who provided testimony to the NAS panel and at least one former lab director, have expressed concern that the private for-profit model is harming the labs, in that many senior scientists have chosen to leave, and production and research is driven by performance-based incentives. The NAS report finds that the bureaucratic frustrations that are affecting all levels within the labs, "are not traceable to the M&O contractor or the contracts themselves," and found that the lab directors' "primary objective remains to manage the Laboratories in the public interest."

- Do you think the criticism of some of these employees—that the for-profit motive is harming the labs—is valid?
- What pressures, if any, result from a fee-based incentive system?
- Have you heard of any concerns that pressure to meet the fee-based incentives have led to any underreporting of safety incidents or any other problems?

Dr. SHANK. 49) I repeat here the answer to Question 24 [Now Question 6] that is very similar. We did not receive any testimony that fee-based incentives led to underreporting of safety incidents or any other problems.

Answer to Question 6:

Our committee took the issue of private versus public contractors and the influence of increased fee following the congressional action in 2004 very seriously. We sought out and listened to current and former employees of the Laboratories. One lab, Sandia has been managed by a private entity since its inception. The other two labs are now run by LLCs. Other than increased fee, the pre- and post-2004 contracts are very nearly the same. We asked the NNSA if the increased fee drove behavior in a way the public interest was at risk. The answer was no. We asked the laboratory directors whether fee drove their management decisions and they emphatically said no. We looked at turnover of the laboratory population and found that it is about 4% annually and that is unchanged before and after 2004. We talked with all levels of management and bench scientists to determine whether specific concerns could be traced to the contract change. We could find none. We did find the formation of the LLC cost each of the labs about $100 million dollars. We did find that at about the same time that the contracts changed there were modifications to the benefits of all the Laboratories including the LLC-managed labs. We found that in the case of Livermore there was a budget reduction that resulted in layoffs. We asked concerned laboratory staff members to help us to identify and quantify specific issues arriving from the new contracting paradigm to form a basis for commenting on the contract changes. We were unable to obtain verifiable information to guide us. We made a comment in our report that the issue of acting in the public interest is so important that although we were not able to identify problems, constant vigilance will be required going into the future.

Ms. SANCHEZ. 50) Mr. Shank, in the question and answer session in response to the question of whether privatization of the labs contributed to the loss of senior personnel, that while conducting the NAS study you asked for "a list of significant people that have left the laboratory that affect the laboratory operation for the people who expressed that concern. We were not given information that was different than what we were able to understand. We asked that from the labs, the lab directors, and from the people who made the accusations, or that experienced the concerns. We could not verify that on a major scale." What information were you given? Was there information you asked for and were not given? What assumptions were made in reaching your conclusions?

Dr. SHANK. 50) We asked staff that raised these concerns to supply us with the names of significant people that left the laboratory and did not receive such a list. We asked the Laboratories about the turnover at the laboratories and found that it was about 4% annually, before the contract changes, and about that same level up to the present. We asked the Laboratories if there was significant loss of key personnel and the answer was no.

Ms. SANCHEZ. 51) What can and should be done to strengthen NNSA's ability to perform effective quality assurance? Does NNSA have the necessary expertise and leadership structure that is conducive to effective oversight?

Dr. SHANK. 51) NNSA has among its leadership and staff the necessary expertise and leadership to perform effective oversight. The problem is how the oversight is being performed. Our report describes the dysfunctional relationship between the Laboratories and NNSA oversight. In the answer to Question 7 [Now Question 99]. we talk about moving from costly and burdensome transactional oversight to auditing qualified systems. I repeat below the answer for Question 99.

Answer to Question 99 given below for completeness.

To address this question I think it is instructive to understand how we have come to the current situation. The response of Congress and the DOE to a series of single point failures at Laboratories and production facilities has been to create new structures, orders, and organizations to provide enhanced oversight at all DOE FFRDCs. The increase in compartmentalized oversight entities has led to an extraordinary burden for the Laboratories. The issue of trust arises because the Laboratories are treated as distrusted entities requiring large teams of people overseeing all transactions. This approach is costly, inefficient, and discourages the Science and Engineering Staff.

There is a small fraction of the work at the Laboratories where a failure would have a high consequence and therefore require a high degree of operational formality. The rest of the work looks like work done in a typical industrial environment. I believe that necessary oversight could be done in a manner accomplished by other similar institutions. There are widely accepted systems and standards for overseeing safety, finance, human resources, and facility operations. A straightforward approach would be for the Laboratories to qualify systems in each of the operational areas. Then, a vastly reduced number of people could audit the systems. A major barrier to accomplishing something like this is to realize that maintaining the current oversight apparatus in place, which has been sized for transactional oversight, will prevent any of the advantages to ensue. Another concern is that a new approach needs to be created with the idea there will be failures in the future and that whatever system in place must be resilient to single point failures.

Ms. SANCHEZ. 52) The NAS study committee recommends that "NNSA, Congress, and top management of the Laboratories recognize that safety and security systems at the Laboratories have been strengthened to the point where they no longer need special attention. NNSA and Laboratory management should explore ways by which the administrative, safety, and security costs can be reduced, so that they not impose an excessive burden on essential science and engineering activities."

- Does the NAS study committee have any examples of how these costs may be "an excessive burden"?
- What evidence did the committee consider in reaching this conclusion? Is your conclusion that there are no longer safety risks in nuclear operations at the labs?

Dr. CURTIS. 52) I tried to point out in my oral comments before the Subcommittee that safety, environmental responsibility, security, and fiscal integrity are essential—indeed primary—public responsibilities. The public's trust demands their faithful execution and mission accomplishment is critically dependent upon the maintenance of high standards in these critical areas.

We believe that rebalancing can occur and must occur while maintaining high standards of assurance in these systems. What we found was that the current operational formality was creating a bias against experimental work which is the very foundation of the scientific process. This situation, if allowed to persist, would assuredly over time detract from science and engineering quality and innovation.

Your question is an important one. These laboratories do dangerous things. There are important safety risks that must be guarded against. Security is essential to be maintained as is fiscal integrity and environmental responsibility. If breaches occur, the laboratories' "permission" to do this work on the public's behalf would assuredly be curtailed and their mission impaired. You are right to keep sharp focus on this responsibility.

Ms. SANCHEZ. 53) Who should have main line of responsibility to ensure nuclear safety and security? Is overseeing the safe operation of the Nation's nuclear weapons complex an inherently governmental function? If so, should there not be strong DOE Headquarters and Site Office oversight functions for nuclear operations and their safety? Why/why not?

Dr. CURTIS. 53) This seemingly straightforward question actually goes to the heart of the managerial/governance problems at the laboratories. The Government—the Department of Energy and NNSA—have the fundamental responsibility for as-

suring that the work of the laboratories is conducted safely and that security is maintained. This duty is best discharged through oversight in much the same way the Congress holds departments and agencies responsible for the discharge of their public duties but obviously in much greater detail. The primary operational responsibility to ensure nuclear safety and security must reside with the laboratories themselves. The problem with the management governance system of our laboratories is that it is highly fragmented and lines are not clearly drawn resulting in confusion, frustration, and inefficiencies that prevent both effective oversight and effective operational control.

Ms. SANCHEZ. 54) A number of employees, including the unions who provided testimony to the NAS panel and at least one former lab director, have expressed concern that the private for-profit model is harming the labs, in that many senior scientists have chosen to leave, and production and research is driven by performance-based incentives. The NAS report finds that the bureaucratic frustrations that are affecting all levels within the labs, "are not traceable to the M&O contractor or the contracts themselves," and found that the lab directors' "primary objective remains to manage the Laboratories in the public interest."

- Do you think the criticism of some of these employees—that the for-profit motive is harming the labs—is valid?
- What pressures, if any, result from a fee-based incentive system?
- Have you heard of any concerns that pressure to meet the fee-based incentives have led to any underreporting of safety incidents or any other problems?

Dr. CURTIS. 54) We did not find that the bureaucratic frustrations are traceable to M&O contractors or the contracts themselves. However, the potential for concern exists and vigilance is advised. From my personal point of view, the danger is that the contractor will be mostly concerned with the risk to the contractor's reputation and the risk that some failure could endanger the fee. This, in turn, could result in self-imposed operational formality that would be excessive and impair scientific and engineering quality. Again, we found no evidence of this, but we must acknowledge the potential exists.

We did not encounter any evidence that the fee-based incentives have led to underreporting of safety incidents or other problems.

Ms. SANCHEZ. 56) What can and should be done to strengthen NNSA's ability to perform effective quality assurance? Does NNSA have the necessary expertise and leadership structure that is conducive to effective oversight?

Dr. CURTIS. 56) NNSA and the Department of Energy have many highly qualified and talented individuals. But if the governance system is broken—as we believe it is—science quality will erode over time no matter the quality of the individuals involved.

Moreover, it is generally conceded that the most effective mechanism for assuring quality is a disciplined peer review system. The peer reviewers must be drawn from a broader universe of experts than is possible to assemble in the Government itself. This is always a challenge for governmental intramural research. But it is especially difficult to do at the NNSA Laboratories given the highly classified and specialized nature of the work. The JASONs provide important assistance to the laboratories and other mechanisms have been employed, but it is at best a less than fully developed quality assurance system.

Ms. SANCHEZ. 57) Do you agree with the findings and recommendations of the NAS report? Why/why not?

Mr. ALOISE. 57) While we have not fully evaluated the NAS report, we do agree that excessive oversight and micromanagement of contractors is not an efficient use of scarce Federal resources. However, the problems that GAO continues to identify, such as cost overruns on major projects, are not caused by excessive oversight but rather result from ineffective oversight by NNSA and DOE.

Ms. SANCHEZ. 58) Do you believe NNSA has the tools it needs to conduct effective oversight? What changes would GAO recommend to improve efficiency and effectiveness of NNSA's management and governance of the labs? Specifically, do you think the site offices have the necessary training and subject matter expertise to effectively oversee performance, rather than just compliance?

Mr. ALOISE. 58) In February 2002, NNSA proposed reorganizing its entire operation to solve important, long-standing management issues. Specifically, NNSA proposed a new organizational structure that would (1) remove a layer of management by converting existing operations offices to one support office, (2) locate NNSA operational oversight close to laboratories and plants by strengthening its site offices, and (3) streamline Federal staff and hold Federal staff and contractors more accountable.

NNSA site offices play a significant role in the day-to-day oversight of NNSA sites and contractors. We have, however, in past work found shortcomings in site office oversight, particularly in regard to security oversight. For example, we noted both security staffing shortages and inadequate security staff training at NNSA site offices.[9] In addition, we believe careful Federal oversight of NNSA's modernization of the nuclear security enterprise will be critical to ensure that resources are spent in as an effective and efficient manner as possible. GAO agrees that excessive oversight and micromanagement of contractors' activities are not an efficient use of scarce Federal resources, but that NNSA's problems are not caused by excessive oversight but instead result from ineffective departmental oversight.

Ms. SANCHEZ. 59) What can and should be done to strengthen NNSA's ability to perform effective quality assurance? Does NNSA have the necessary expertise and leadership structure that is conducive to effective oversight?

Mr. ALOISE. 59) Given NNSA's record of weak management of its major projects, safety and security issues, and lack of basic enterprise-wide data, we believe that careful and capable Federal oversight is critical to an efficient and effective nuclear weapons program. GAO supports NNSA's efforts to move to more effective, performance-based oversight. As our testimony shows, NNSA's progress has been mixed.[10] Based on our past and ongoing work, we believe important elements of performance based oversight include:

- Well-trained Federal personnel, both in headquarters and in the field, with a thorough understanding of NNSA sites and programs;
- Contracts with measurable performance targets and financial incentives to meet these targets;
- Contractor assurance systems that provide detailed information on, among other things, achieving performance targets;
- Strong Federal leadership to hold NNSA contractors accountable for their performance; and
- Vigorous independent oversight in the crucial areas of safety and security.

Ms. SANCHEZ. 60) Self-assessment: The labs conduct a self-assessment for their performance evaluation, which is then reviewed by NNSA. Is this the most effective model, and how can NNSA improve its ability to conduct oversight without relying as much on the lab contractor?

Mr. ALOISE. 60) For significant areas such as security, DOE and NNSA have multitiered oversight requirements and practices that consist of periodic contractor self-assessments, Federal site office surveys, and inspections by DOE's Office Independent Oversight. Contractor self-assessments are vitally important as they are conducted by personnel that are most familiar with site operations. Site office survey and independent inspections are important checks on self-assessments. Although this process is sound, we have found that, on occasion, it breaks down when site office expertise is not in place. For example, we reported on weaknesses in Livermore's contractor self-assessment program and the NNSA Livermore Site Office's oversight of the contractor. According to one DOE official, both programs were "broken" and missed even the "low-hanging fruit." The laboratory took corrective action to address these deficiencies, but we noted that better oversight was needed to ensure that security improvements were fully implemented and sustained.[11]

In October 2008, we reported that DOE's Office of Health, Safety and Security—which, among other things, develops, oversees, and helps enforce nuclear safety policies at DOE and NNSA sites—fell short of fully meeting our elements of effective independent oversight of nuclear safety. For example, the office's ability to function independently was limited because it had no role in reviewing technical analyses that help ensure safe design and operation of nuclear facilities, and the office had no personnel at DOE sites to provide independent safety observations.[12]

Ms. SANCHEZ. 61) Do you believe the public and national security would be best served with less oversight of the nuclear labs?

Mr. ALOISE. 61) No. Given NNSA's record of weak management of its major projects, safety and security issues, and lack of basic enterprise-wide data, we believe that careful and capable Federal oversight is critical and now even more important to sustain recent improvements in security and safety performance, espe-

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[9] GAO–07–36 and GAO–08–694.

[10] GAO–12–473T.

[11] GAO–09–321.

[12] GAO, *Nuclear Safety: Department of Energy Needs to Strengthen Its Independent Oversight of Nuclear Facilities and Operations,* GAO–09–61 (Washington, D.C.: Oct. 23, 2008). GAO first developed its elements of effective independent oversight of nuclear safety in 1987 when Congress was considering legislation to establish the Defense Nuclear Facilities Safety Board. Key elements include, among other things, independence, technical expertise, and enforcement authority.

cially in light of the tens of billions of dollars that NNSA expects to spend over the next decade on modernizing the nuclear security enterprise.

Ms. SANCHEZ. 62) Should NNSA move toward more performance-based oversight? If so, how should this be done?

Mr. ALOISE. 62) Yes, GAO supports NNSA's efforts and has made a number of recommendations to support the agency's move to more effective, performance-based oversight.[13] As our testimony shows, NNSA's progress has been mixed.[14] Based on our past and ongoing work, we believe important elements of a performance-based oversight include:

- Well-trained Federal personnel, both in headquarters and in the field, with a thorough understanding of NNSA sites and programs;
- Contracts with measurable performance targets and financial incentives to meet these targets;
- Contractor assurance systems that contain detailed information on, among other things, achieving performance targets.
- Strong Federal leadership to hold NNSA contractors accountable for their performance.
- Vigorous independent oversight in the crucial areas of safety and security.

Ms. SANCHEZ. 63) How would you measure adequate nuclear safety? Note that traditionally, the quality of worker safety has been measured by the rate of accidents and injuries, where success is reflected by low rates of accidents not necessarily their absence. In contrast, nuclear safety is predicated upon the avoidance of accidents.

Dr. ANASTASIO. 63) Nuclear safety is based on an approach that encompasses many layers of defense. For any high consequence event to occur accidently there would have to be a failure of multiple layers simultaneously. Adequate nuclear safety would then consist of an adequate number of relatively independent layers (where failure in one layer does not cascade into a failure of another layer). Success would consist of a low rate of incidents in each of the layers and a low rate of coupling of incidents between layers.

Ms. SANCHEZ. 64) What indicators did you use to measure the avoidance of low-probability, high-consequence accidents at your nuclear facilities?

Dr. ANASTASIO. 64) I currently have no responsibility for any nuclear facilities (However, see Question 63).

Ms. SANCHEZ. 65) How does the Work for Others support or detract from the nuclear deterrent mission?

Dr. ANASTASIO. 65) Work for Others (WFO) activities executed across the NNSA complex supports, in many cases, our primary nuclear deterrence mission. In the case of Los Alamos, many nuclear weapons experts assist in WFO activities which provides them with additional avenues to develop and use their unique skill sets. This outlet is very important since they are doing very little new design or certification work. WFO also contributes to a strong foundation for the laboratory (See also Question 66).

Ms. SANCHEZ. 66) We have seen a significant growth in investment in the labs. In that context, what can be done to provide stability in the workforce to ensure that we retain the excellence in scientific and engineering quality at the labs?

Dr. ANASTASIO. 66) There has not been significant growth in investment in the labs, for example, the current funding of Los Alamos National Laboratory is approximately the same as it was in 2006.

Excellence in science and engineering at the labs is dependent on the quality of the workforce and on the environment in which they work. As I stated in my testimony before the U.S. Senate Committee on Armed Services Subcommittee on Nuclear Forces on March 30, 2011 the following elements form a strong foundation for the laboratories:

- A strong national commitment to compelling national security missions;
- Stable and adequate funding;
- Diverse and broad cutting-edge scientific programs, which attract the best and brightest scientific talent; and
- Tools, facilities and infrastructure to accomplish the above.

Ms. SANCHEZ. 67) I understand that recent unexpected experiment results have been a serious setback to meeting the performance milestones in the National Ignition Campaign, and that this setback has led to management decisions to postpone all other experiments on the NIF laser and to reallocate resources from other programs to an accelerated Ignition Campaign.

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[13] GAO–08–694 and GAO–09–321.

[14] GAO–12–473T.

- Can you explain to the Committee how the shift from hypothesis-driven science to milestone-driven science has NOT been detrimental to the Labs' science missions?

Dr. ANASTASIO. 67) I am not up-to-date on the status of or the challenges faced by the Ignition Campaign.

Ms. SANCHEZ. 68) GAO has criticized NNSA in a long series of reports for not having consistent management data (such as cost accounting data) across all of its sites.

- Why hasn't more progress been made in requiring consistent data and bookkeeping?

Dr. ANASTASIO. 68) This is a question best answered by the NNSA.

Ms. SANCHEZ. 69) How do the conclusions of this report comport with your experiences with DOE nuclear safety requirements (i.e., rules, orders, manuals, and standards) for the nuclear weapons complex?

- Did you find these nuclear safety requirements to be burdensome? Could you provide any specific examples of burdensome nuclear safety requirements?

Dr. ANASTASIO. 69) I do not know to which report this question is referring.

Ensuring the safety of workers, the public and the environment in a way that is balanced with mission accomplishment is essential for success of the laboratory and the complex. One way to become out of balance is when requirements are put in place that can lead to a small reduction in safety risks while significantly increasing the risk to mission accomplishment. This led to the recommendation in my testimony before this Subcommittee that "new requirements or interpretations of existing ones (by internal or external organizations) must be coupled with a cost-benefit analysis."

Ms. SANCHEZ. 70) Does the National Laboratories Directors Council, which reports directly to the Secretary of Energy, bypassing the NNSA reporting structure, disrupt oversight and contribute to a dysfunctional system where NNSA and the labs do not trust each other?

Dr. ANASTASIO. 70) During my tenure as a Laboratory Director on the Council we generally addressed DOE-wide issues with the full participation of the NNSA Administrator. This council did not contribute to any lack of my trust of NNSA.

Ms. SANCHEZ. 71) What is your perspective on the recent NNSA governance reform initiative in which the contractors assume more responsibility for oversight of compliance with nuclear safety requirements, while Federal oversight focuses on contractor systems for ensuring safety?

- What was the purpose and objectives of your contractor assurance system?
- What experience did you have with such a self-assessing contractor assurance system, and what are the specific advantages and disadvantages of this system?
- What did your contractor assurance system indicate about the need for more or less requirements, about the rigor of compliance with requirements, and about the need for more or less oversight?
- How did you ensure that you had adequately established a balance in priorities and resources between your safety programs and your missions?

Dr. ANASTASIO. 71) During my tenure as Laboratory Director at LANL, the contractor assurance system (CAS) was one of the internal tools we used to manage the laboratory. The senior management team periodically set a balanced set of internal performance goals that spanned operations (including safety), mission, and science. Progress against those goals was monitored through CAS. If progress was lacking in an area I was able to see that, to engage the responsible senior manager, to make appropriate resources available, and to enlist the entire management team as needed for corrective action and resolution.

Proper Federal oversight should be focused on outcomes and with the Laboratories held accountable for them. It should not be focused on the transactional issues of how specific safety requirements are achieved nor of the details of how CAS or any other management system works.

Ms. SANCHEZ. 72) How can the operator of facilities/Line Management, DOE as owner of the facilities, and the public have confidence that contractor assurance systems are capable of detecting a decline in the safety posture of a facility or operation?

- How mature was this capability at your laboratory?
- In the areas of worker safety and high-risk operations such as those at nuclear facilities, could you describe how you ensured that performance was maintained at least at its previous level if not improved?
- Could you describe the key measures that you relied on to ensure that you avoided nuclear or other high-hazard accidents, and explain why you believe that those measures gave you sufficient confidence that the workers and the public were and continue to be afforded adequate protection?

Dr. ANASTASIO. 72) Others should be confident in the Laboratory when established outcomes are being met. If a problem arises there should be clear indications that the seriousness of the problem is understood through prompt and appropriate actions by the Laboratory and its senior leaders.

Ms. SANCHEZ. 73) Do you believe that your site had a good safety record?

- What indicators did you use to measure your laboratory's safety performance? What did you compare those indicators against to decide the quality of that performance? And why do you believe that those measures are adequate to evaluate the quality of safety at your laboratories?
- What indicators do you use to measure the nuclear safety performance of the facilities at your lab? What do you compare those measures against?
- How did/should those measures help you avoid the occurrence of a low-probability, high-consequence accident?

Dr. ANASTASIO. 73) We measured our safety performance against annual goals set by the senior leadership team and against the performance of other large institutions with a similar mix of activities to LANL. While I do believe the LANL's safety record was trending in the right direction, I do not have the data at hand to provide a more detailed answer to this question.

Ms. SANCHEZ. 74) The laboratories conduct some of the Nation's most sensitive activities, including designing, producing, and maintaining the Nation's nuclear weapons; supporting nonproliferation efforts; conducting efforts for other military or national security applications; and performing research and development in advanced technologies for potential defense and commercial applications.

- How do these different missions complicate oversight requirements?
- How do they support efficiencies and best use of taxpayer dollars?

Dr. ANASTASIO. 74) Oversight should not be more complicated if there is oversight of outcomes, rather than of activities, with those responsible held accountable.

A broad portfolio of national security science missions supports laboratory efficiency and is an effective use of taxpayer dollars.

For example, with the funding challenges faced by NNSA, and the Government in general, there can be shortfalls in support for scientific capabilities necessary for NNSA. As I stated in testimony before the U.S. Senate Committee on Armed Services Subcommittee on Nuclear Forces on March 30, 2011, "In order to mitigate the consequences of these shortfalls in support for our scientific capabilities, we have consciously found funding from other sponsors that utilize some of the same science as that needed by the weapons program, and in that way sustain and enrich our capabilities that reside in the more than 2,500 PhDs that are the core of our science base."

In addition, the broad portfolio of national security science programs "serve to both attract top scientists to the Laboratory, and they also build up fundamental scientific capability that can then be further leveraged and applied to our core weapons program work."

Ms. SANCHEZ. 75) How would you measure adequate nuclear safety? Note that traditionally, the quality of worker safety has been measured by the rate of accidents and injuries, where success is reflected by low rates of accidents not necessarily their absence. In contrast, nuclear safety is predicated upon the avoidance of accidents.

Dr. MILLER. 75) The principles of good safety management are universal; the formality and rigor with which they are applied changes depending on the consequences of potential safety incidents. In my view, good safety management starts with the perspective that there is no such thing as an "accident"—safety incidents are the consequence of breakdown of one or more of the safety systems: failure to properly analyze and recognize the hazards, failure to establish or follow proper procedures, failure to properly maintain or employ appropriate safety equipment, or human failure.

The adequacy of a nuclear safety system is judged by rigorous evaluation and testing of the analysis of potential hazards, the procedures, the equipment and safety systems, and the people and their training. Evaluation and testing are performed by line management, and independently by the responsible managing institution and an outside agency. These multiple systems and the multiple levels of evaluation provide assurance of the adequacy of the nuclear safety system. Ultimately, in my view, the quality of the people doing the work is the most important ingredient. They are individually and collectively responsible and in the best position to judge the adequacy of hazard analyses, the procedures, the safety systems, and their own and their colleagues' level of training and proficiency. Because nuclear safety is of paramount importance, all operations at the Laboratory's nuclear facilities—and the condition of the facilities themselves—are managed in a very formal and robust

manner with the rigor expected by all stakeholders. There are multiple layers of protection designed to preclude plausible accidents. As I describe in more detail below, the way by which we implement and maintain nuclear safety at LLNL provides key indicators and important means to gauge adequacy of nuclear safety. Three interrelated features are particularly important:

- A Documented Safety Analysis (DSA), which must be approved by DOE/NNSA before a facility can operate. The DSA describes the required safety systems, operating procedures, and personnel training, which provide multiple layers of protection against hazards and potential risks identified through thorough analysis. We are legally required to maintain these means for providing nuclear safety.
- Numerous and frequent internal and external audits and assessments, which, over the past decade, have clearly demonstrated that the safety systems and management programs in place at LLNL nuclear facilities are viable, effective, and compliant.
- Feedback from our nuclear facility workers, who would be the first personnel to be impacted by an accident. Based on their feedback, we take steps to resolve any concerns before they become potential safety issues. The workers confirm daily that overall they have strong confidence that the facility is being operated safely.

Documented Safety Analysis (DSA)—The nuclear risk management process is codified in 10 CFR 830, Subpart B. It requires the development of a detailed DSA, which must be approved by DOE/NNSA before a facility can operate. The DSA thoroughly analyzes the hazards and potential accidents associated with the facility. Based on this analysis, facility safety systems and safety management programs are designated to prevent and/or mitigate plausible accidents. NNSA's acceptance of risk for the nuclear facility and approval to operate are contingent on these safety systems and programs being in place; their functionality must be maintained at all times by the contractor operating the facility. The operator is legally bound to ensure the operability and reliability of the designated safety systems and does so through a rigorous and well-documented maintenance, testing, and inspection program. Likewise, the operator is legally bound to implement formal safety management programs that meet the intent of the approved DSA.

Audits and Assessments—LLNL nuclear facilities are subjected to numerous and frequent internal and external audits and assessments that review the effectiveness of the safety systems and management programs as well as their compliance with DOE and LLNL requirements. The results of these many assessments over the past decade clearly demonstrate that the safety systems and management programs in place at LLNL nuclear facilities are viable, effective, and compliant. These results are a good measure of the adequacy of our nuclear safety and provide high assurance that our nuclear facilities are being operated safely. Each and every worker at LLNL has STOP WORK authority if they sense an unsafe or hazardous situation or condition. Typically findings are identified in audits. If it were found that a safety management program was broken (i.e., not meeting its intent) or that a safety system was inoperable, by law LLNL would be required to shut down operation of the facility until the system or program was restored to proper function. Rather, the findings in LLNL audits have been of the type that are informative of potential weaknesses and used to continuously improve our programs. The minor nature of findings in audits and assessments—and the Laboratory's timely responsive actions to improve—provide perhaps the most reliable measure of the adequacy of our nuclear safety.

In addition to numerous nuclear-specific audits and assessments, our nuclear facilities also report data on a broader set of environmental, safety, and health (ES&H) measures employed by other hazardous facilities at the Laboratory. These "conventional" ES&H performance measures reflect the adequacy of nuclear safety because they are indicative of worker commitment to safety—a required foundation to sound nuclear safety.

Feedback from workers—We gauge the adequacy of our nuclear safety via the feedback from our nuclear facility workers. These workers are on the front line in close proximity to the hazards. They would be the first to be impacted by an accident and are invariably the first to become aware of a potential safety issue or the failure of a mitigating feature. Through frequent meetings and discussions, we gather their feedback to identify and resolve potential issues early before they evolve into more significant safety problems. And the workers confirm daily that overall they have strong confidence that the facility is being operated safely.

Ms. SANCHEZ. 76) What indicators did you use to measure the avoidance of low-probability, high-consequence accidents at your nuclear facilities?

Dr. MILLER. 76) We use a wide variety of indicators to judge the adequacy of the implementation of our nuclear safety systems—including standard ES&H measures such as injuries and first aid; information gained from informal facility walkthroughs observing general housekeeping and work practices and collecting worker feedback; and results of line management, institutional, and independent oversight evaluations and audits.

A high-consequence accident is clearly something that must be avoided, and LLNL takes very seriously its obligation to the U.S. Government, its employees, and neighboring communities to ensure the safe and secure operation of its nuclear facilities. Unlike nuclear reactors, our facilities are not prone to major failure in the event of a loss of supporting utilities such as cooling water or facility power. As such, the potential accidents at LLNL are more bounded and can be more clearly defined than is the case for reactors. These potential accidents are thoroughly analyzed by safety professionals. Based on their results, limitations to allowed operations and mitigating engineered design features (to prevent operational missteps from leading to accidents) are established as a set of controls. Safety professionals ensure that these controls are consistent with national standards and DOE/NNSA orders. The controls are layered so that no single failure significantly raises the probability of an accident. Altogether, the set of controls ensure accidents do not occur.

LLNL staff, as well as Federal oversight personnel, routinely assess the implementation of these controls to ensure robustness. The assessment results inform facility managers of any weaknesses in the implementation of the controls, who use the data to ensure that the facility remains far from any risk of a high-consequence accident. Any findings are characterized by level of importance or potential safety impact, which drives the urgency of resolving the issue and whether or not the operation should continue until the issue is resolved. All assessment findings, observations, and identified opportunities for improvement are captured as actionable items that are tracked to closure in a database that is part of our Contractor Assurance System. The adequacy of the closure in addressing the perceived need is also reviewed.

Ms. SANCHEZ. 77) How does the Work for Others support or detract from the nuclear deterrent mission?

Dr. MILLER. 77) LLNL's engagement in programs and activities across the broad range of national security challenges strongly supports our nuclear deterrent mission and vice versa. Because of the core scientific, technical, and engineering capabilities required for our nuclear deterrent mission, the Laboratory can both synergistically and cost effectively support and make key contributions to a broad spectrum of projects and programs sponsored by other Federal agencies. These broader national security activities provide additional scientific and technical vitality and help to maintain the key capabilities required in our nuclear deterrent mission. Particularly in times of great fiscal constraint the synergism between all of the Laboratory's projects and programs is key to maintaining a world-class workforce and an institution able to address the Nation's most serious national security challenges.

These projects (in my view, misnamed "Work for Others") that are part of our broad Nation security mission are a key component of our strategy for helping solve the country's most important problems and sustaining science and technology excellence and intellectual vitality at the Laboratory. Pursuit of a broad national security mission by the laboratories is a component of NNSA's Strategic Plan. Support of the strategy was also one of the top-level recommendations in the report issued by the National Academy of Sciences committee studying the quality of science and engineering and management of the NNSA national laboratories.

Nuclear security is and will remain the core responsibility of the NNSA laboratories. Because of the Stockpile Stewardship Program, Livermore has unique capabilities and facilities that can be brought to bear on the Nation's most important challenges. We have long worked with other agencies (in cases, private industry) in the areas of defense and international security, energy and environmental security, and economic competitiveness. With the many challenges facing the U.S., expansion of these efforts serves the national interest and makes effective use of taxpayer dollars invested in the laboratories. A broader base of national security programs complements the Stockpile Stewardship Program—it is neither a distraction from nor a substitute for our principal mission.

Ms. SANCHEZ. 78) We have seen a significant growth in investment in the labs. In that context, what can be done to provide stability in the workforce to ensure that we retain the excellence in scientific and engineering quality at the labs?

Dr. MILLER. 78) For the record, LLNL has not seen significant growth; in fact, the Laboratory has declined in size from 8846 heads in FY 2004 to 7832 heads in FY 2008 to 6670 heads in FY 2012 (beginning of third quarter). The recent growth

in NNSA's budget has roughly stabilized the size of the Laboratory—we currently are slightly larger than our nadir in FY 2010 at 6430 heads.

In my view, the NNSA laboratories are at their best when they are focused on very challenging and important mission driven problems whose solution requires sustained efforts over time. Having a set of recognized national security missions that are focused on our country's most challenging problems—together with program and financial stability—are the keys to attracting and retaining a high-quality scientific, technical, and engineering workforce.

The Laboratory's most important asset is its people, and the most important factor in sustaining scientific and engineering excellence is attracting and retaining top-notch talent, which requires vigilance and sustained management attention. Over the years, we have been able to do so because the Laboratory offers the opportunity to work on problems of national importance and to apply cutting-edge science and technology to solve them. Hence, continued investment in the scientific and technical capabilities (e.g., high-performance computing) and facilities at the Laboratory is absolutely crucial. Without the cutting-edge facilities and capabilities, we will not be able to attract and retain talent; without the talent, we cannot sustain scientific and engineering excellence and unaddressed national security challenges will increase our collective peril.

Another key factor in attracting and retaining top-notch talent is program stability. Vagaries about future budgets impact people's thinking about long term careers at an institution. The laboratories would greatly benefit from a clear and consistent message from successive administrations and Congresses that the work at the laboratories is important, together with stable funding. Dedicated to national service, our people and their families deserve a commitment of support!

The presence of modern facilities, laboratories, and infrastructure is also important. We need to continually reinvest in facilities and infrastructure. Recapitalization has suffered in recent years. Readiness in Technical Base and Facilities (RTBF) funding to LLNL is the lowest in the NNSA complex and we are falling behind in basic upkeep of the infrastructure and its related services. At some point a recapitalization shortfall will affect our ability to do cutting-edge science and engineering.

Finally, the ability to draw top talent to the Laboratory and sustain scientific and engineering excellence depends on sustaining a positive, productive work environment. In my testimony I emphasized that the NNSA laboratories are under severe stress in their ability to perform their vital missions because they are substantially and increasingly constrained by the manner in which Federal management and oversight is implemented. I concluded my testimony with the remark, "If the government continues down the path of treating the NNSA laboratories as contractors rather than trusted partners, engaging in excessive oversight, and treating the workforce as replaceable employees rather than exceptional people dedicated to public service, I wonder how much longer the national security laboratories will be able to sustain their greatness." The time for leadership and action is now!

Ms. SANCHEZ. 79) I understand that recent unexpected experiment results have been a serious setback to meeting the performance milestones in the National Ignition Campaign, and that this setback has led to management decisions to postpone all other experiments on the NIF laser and to reallocate resources from other programs to an accelerated Ignition Campaign.

- Can you explain to the Committee how the shift from hypothesis-driven science to milestone-driven science has NOT been detrimental to the Labs' science missions?

Dr. MILLER. 79) As I explain in greater detail below, the National Ignition Campaign continues to make excellent progress on the grand challenge of achieving fusion ignition and burn. There have been no "recent unexpected experimental results" that we characterize as "a serious setback" and I (and recent review committees) see no showstoppers to prevent the team from achieving ignition. Accordingly, there has been no decision to reallocate resources to accelerate the campaign. As the question recognizes, there is growing appreciation that the setting of calendar-specific milestones in a scientific discovery project as complex as achieving ignition can be detrimental.

The National Ignition Facility (NIF)/National Ignition Campaign (NIC) is a mission- driven program that was established to meet important national security needs. NIF's capabilities are required in order to perform experiments to gather data about the performance of nuclear weapons as they begin to explode. The data is vitally important to validate the computer simulations that we use to assess the performance of aging weapons, make changes when necessary, and certify the performance of the those changes. Other types of NIF experiments gather key data about material properties at extreme conditions that are input into weapon simulation codes. Finally, data gathered at NIF also answers key questions scientists have

about the universe, and the achievement of ignition at NIF is a necessary step toward developing fusion power as an essentially inexhaustible source of clean energy.

Basically, we are working to three inter-related sets of milestones. NIC milestones are of two types: those associated with construction and performance of the NIF laser system and experimental diagnostics and those associated with experiments to achieve ignition. A third set of milestones pertains to experiments in support of stockpile stewardship and high-energy-density science. Many types of experiments in this third category do not require ignition and these types have figured into experimental plans to date. Achieving ignition is important, because it will enable the fielding of a wider range of stockpile stewardship and science experiments to gather important data.

Construction of NIF and bringing it online with its supportive diagnostics and target fabrication capabilities have been spectacular successes. The laser, diagnostics systems, target fabrication, and operations are world class and are producing remarkable data of unparalleled quality. The laser system has proved to be remarkably reliable and precise in energy delivery, and this summer, NIF achieved record setting levels of power (500 trillion watts) and energy (nearly 1.9 million joules)—exceeding design specifications.

As researchers work toward achieving ignition, NIF is providing spectacular data in support of the Stockpile Stewardship Program. Most notably, NIF experiments provided data that allowed scientists to resolve a previously unexplained anomaly in nuclear weapons performance that was one of the factors driving the need for nuclear testing. Successful Stockpile Stewardship-supportive experimental campaigns in 2012 focused on gathering data about material properties and the interaction of materials with intense radiation at nearly star-like conditions.

Experiments at NIF continue to make extraordinary progress toward the goal of fusion ignition. The work, which is breaking new ground in understanding physical processes at conditions never studied in a laboratory before, is very challenging—requiring successive steps of conducting experiments, comparing results with simulations, and using the results to improve both the simulation models and the design of targets and next experiments. This is the process by which science progresses. In the last year of experiments, NIC experiments have successfully resolved most of the major physics concerns necessary to achieve ignition. Current work is focusing on resolving the remaining issues and integrating all of the pieces together.

Recently two groups reviewed NIF/NIC progress in achieving ignition and announced their findings. Both reports praised NIF and its National Ignition Campaign's "outstanding progress" to date. As to the specific milestones in the NIC, one group expressed concern about achieving alpha heating (a key step toward ignition) in FY 2012; the other group wrote, "These are not simple experiments. They involve investigating phenomena well beyond contemporary experience. A deadline imposed on an experimental discovery science program to achieve a particular result by a particular time at a particular cost is often unrealistic." Both committees reviewed plans for future experiments examining key aspects of implosion performance, and the path forward was praised in both reports. NNSA and the NIF team have agreed on plans for FY 2013 (subject to funding). They include both non- ignition Stockpile Stewardship/science experiments and ignition experiments—bearing in mind that this is a mission-driven program but that milestones need to respect uncertainties in the pace of scientific discovery.

Ms. SANCHEZ. 80) GAO has criticized NNSA in a long series of reports for not having consistent management data (such as cost accounting data) across all of its sites.

- Why hasn't more progress been made in requiring consistent data and bookkeeping?

Dr. MILLER. 80) For questions regarding NNSA's standards and procedures, I would refer you to NNSA for an appropriate answer. Let me simply note that consistent management data across all of the sites is a laudable objective, NNSA has collected considerable information on the matter, and working groups are addressing issues.

I do have a concern and a caution that speak to one of the themes of my testimony: roles and responsibilities. It is clear that NNSA needs clear and consistent management data. There is a strong tendency in any bureaucracy to collect reams of detailed data and use that data to increase the level of "micromanagement." NNSA needs to collect the data they need to do their job while avoiding the tendency to collect excessive data to increase their level of detailed project and activity oversight and management. It is also important to remember that each site faces a different set of issues and constraints so that a "one-size-fits-all solution" to data management may be difficult to implement (i.e., costly and time-consuming) and turn out to be impractical for some sites.

Ms. SANCHEZ. 81) How do the conclusions of this report comport with your experiences with DOE nuclear safety requirements (i.e., rules, orders, manuals, and standards) for the nuclear weapons complex?

- Did you find these nuclear safety requirements to be burdensome? Could you provide any specific examples of burdensome nuclear safety requirements?

Dr. MILLER. 81) Quite frankly, one of the largest burdens of the nuclear safety requirements is their impact on the workload of the safety professionals at our Laboratory. It is critically important for facility operators and managers to spend more time managing hands-on by walking around rather than managing through paperwork that adds little to assurance of real line safety. At LLNL, the number of oversight personnel is nearly equal to the number of facility staff available to respond to their issues. Consequently, the bulk of the work being performed by the facility staff centers on responding to issues raised by these oversight personnel instead of their being able to work on issues the facility management and those with hands-on operating experience believe to be important. The facility is forced into a non-value-adding, overly strict regulatory compliance approach instead of focusing on those issues that will actually increase the margin of safety. This is an example of a focus of my testimony—the problem of excessive "transactional oversight" focused on detailed compliance rather than "process oversight" directed at critiquing our systems for identifying and cost-effectively enhancing nuclear safety performance.

For the most part, DOE nuclear safety rules, standards and orders are not necessarily problematic in and of themselves. They simply define what must be done to operate a nuclear facility safely. In most cases, the orders are reasonable and represent what most operators believe is necessary for safe operations. However, many safety rules, standards, and order have become burdensome for one of two principal reasons: excessive documentation and/or onerous interpretation. In both cases, the result is reduced effort working on issues that the experienced nuclear safety experts within the Laboratory and nuclear facility managers consider to be most important. A prime example of the former case is NQA–1, which is burdensome because it requires, in my view, inordinately extensive documentation.

Onerous interpretation is the source of the highest level of concern voiced by nuclear facility managers and operators. This arises from several interacting factors: loose interpretation of guidelines, oversight by many different personnel with differing agendas and (in many cases) without relevant operating experience, and an overly risk-adverse interpretation of how to comply with the order. Those making the interpretation are not responsible for executing program work, nor do they have the responsibility to pay for the cost of implementation. As such, the resulting decisions are often extremely costly and require excessive manpower to implement. In too many cases, the net value to safety is negligible while the costs are significant.

I have learned from personal experience the negative impact of excessive oversight that initiates excessive documentation. Documentation of processes and procedures and responses to audits and evaluations are best performed by the most knowledgeable senior workers and line managers. However, when these critical employees spend the majority of their time in their offices writing, they are not in the laboratory or the facility observing work, finding issues, and correcting them before they become problems.

The impact of overly risk-averse interpretation is cumulative, invariably increasing over time. When reviewing the purpose and rationale behind nuclear safety orders, standards, and rules, one finds that the original intent has often been displaced by increasingly onerous interpretation. An example is the Unreviewed Safety Question (USQ) process. With the loss of both original intent and an established approach based on precedence, new and constantly-changing interpretations are effectively adding requirement across the complex and diverting USQ from the original intent of the process.

Ms. SANCHEZ. 82) Does the National Laboratories Directors Council, which reports directly to the Secretary of Energy, bypassing the NNSA reporting structure, disrupt oversight and contribute to a dysfunctional system where NNSA and the labs do not trust each other?

Dr. MILLER. 82) The question engages two distinct issues: dysfunctionality within NNSA and engagement of NNSA/DOE with senior management of the laboratories. In my view, they are largely decoupled, e.g., the National Laboratories Directors Council has essentially nothing to do with dysfunctionality within NNSA. Almost the opposite, greater engagement of NNSA/DOE with laboratory managers would likely lead to a far more functional governance and oversight system.

The main point I made in my testimony is that the core issue in governance and oversight is the loss of the sense of partnership and mutuality between NNSA/DOE and the national security laboratories. There is a lack of trust that prevents the Federally Funded Research and Development Center (FFRDC) model from func-

tioning the way it should. The laboratories and NNSA are engaged in wide-ranging activities to address the problem.

The situation at another FFRDC laboratory is quite different. The Jet Propulsion Laboratory (JPL) has a $1.5 billion budget and is managed by the California Institute of Technology for the National Aeronautics and Space Administration (NASA). NASA's governance structure consists of three management councils: an Executive Council, a Mission Support Council, and a Program Management Council. Each council includes JPL and NASA's other nine space/research centers as members (with 20 to 25 total membership). Moreover, NASA laboratories and research centers are fully integrated into NASA's organizational structure, directly providing input into decisionmaking, and work as valued partners in achieving mission success. Discussions with NASA and JPL personnel have made clear that the working relationship was constructive, without major concerns about governance, and providing effective oversight of the laboratories in a much simpler, less costly manner.

Ms. SANCHEZ. 83) What is your perspective on the recent NNSA governance reform initiative in which the contractors assume more responsibility for oversight of compliance with nuclear safety requirements, while Federal oversight focuses on contractor systems for ensuring safety?

- What was the purpose and objectives of your contractor assurance system?
- What experience did you have with such a self-assessing contractor assurance system, and what are the specific advantages and disadvantages of this system?
- What did your contractor assurance system indicate about the need for more or less requirements, about the rigor of compliance with requirements, and about the need for more or less oversight?
- How did you ensure that you had adequately established a balance in priorities and resources between your safety programs and your missions?

Dr. MILLER. 83) I concluded my written statement to the committee with three "Ts": restore TRUST, eliminate TRANSACTIONAL oversight; and TURN OVER management to the people you hired to manage (the directors of the laboratories). Reform of NNSA governance of the laboratories must be based on mutual trust—that we are truly partners in successfully pursuing our national security mission. Without increased trust, it will be very difficult to make substantial improvements in NNSA governance of the laboratories and move to more efficient and effective oversight.

There is much to be gained in cost efficiency by eliminating DOE/NNSA transactional oversight in areas such as non-nuclear ES&H, where existing external regulations, regulatory bodies and certification to meeting recognized international standards should apply. Nuclear safety is both extremely important and different with regard to the existence of external regulations. In spite of this difference, there are marked advantages to transform the preponderance of external transactional oversight to self-assessment processes and striving for NNSA/DOE and Defense Nuclear Facilities Safety Board oversight to be more process-oriented (e.g., largely directed at providing a critique of the Laboratory's self-assessment process). To the extent that the ongoing NNSA governance reform initiative succeeds in moving in this direction, I think it is a very positive step.

In the highly specialized area of nuclear operations, we have found that self-assessments by the people closest to the work to be the most effective means for identifying weaknesses and suggesting areas for improvement. Such self-assessment activities can be planned (e.g., appropriately scoped and focused) and executed by personnel who are familiar with the nuclear facility, the nuances of nuclear operations and nuclear safety, and the detailed attributes of the site's safety programs. Assessments performed by less informed third parties not familiar with facility specifics often miss the mark and identify issues not pertinent to making changes that would tangibly improve nuclear safety.

The role of the Contractor Assurance System (and/or a nuclear safety adjunct to it) is to track findings and the status of responsive actions; it also provides a framework for ensuring that an appropriate variety of processes are being looked at on some regular interval. More process-oriented oversight activities conducted by NNSA and/or the DNFSB to augment and complement rigorous self-assessment system would constitute an efficient, effective approach to assuring nuclear safety.

Assessments and oversight of our nuclear facilities over the past decade have clearly demonstrated that the safety systems and management programs in place at LLNL nuclear facilities are viable, effective, and compliant. They are vital to assuring nuclear safety at LLNL to NNSA/DOE, other stakeholders, and the public; changes should strive to make assessment and oversight processes more efficient while increasing their quality.

Ms. SANCHEZ. 84) How can the operator of facilities/Line Management, DOE as owner of the facilities, and the public have confidence that contractor assurance sys-

tems are capable of detecting a decline in the safety posture of a facility or operation?

- How mature was this capability at your laboratory?
- In the areas of worker safety and high-risk operations such as those at nuclear facilities, could you describe how you ensured that performance was maintained at least at its previous level if not improved?
- Could you describe the key measures that you relied on to ensure that you avoided nuclear or other high-hazard accidents, and explain why you believe that those measures gave you sufficient confidence that the workers and the public were and continue to be afforded adequate protection?

Dr. MILLER. 84) As I answered to Question 75, three interrelated features in the way nuclear safety is implemented at LLNL provide the basis for having confidence in the quality of nuclear safety at LLNL: implementation of safety systems and management processes in accordance with a Documented Safety Analysis; frequent internal and external assessments and audits to assure that those systems and processes are working; and feedback from the experienced nuclear facility workers at the Laboratory. Laboratory and NNSA/DOE managers and their staffs fully engage in and interact through the many processes that implementation of nuclear safety entails. We need to work in partnership as a trusted team. Such teamwork would provide a much stronger basis for assurance that safety systems and safety management programs are effective and compliant than reliance on a large system to generate and manage compliance data.

The Contractor Assurance System (CAS) at LLNL is a formal and mature program. CAS provides tracking data to substantiate (and provide assurance) to Laboratory and DOE/NNSA management with a high level of confidence that the nuclear facilities are being operated safely, securely, and in accordance with requirements. The CAS provides information about important safety-system elements such as assessments, notifications and reporting, issues tracking and resolution, feedback, and continuous process improvement.

Consider, for example, audits and assessments of nuclear facilities, which range from less formal management observations and inspections to more rigorous management self- assessments to formal audits by external organizations. Each year, the Lab develops a detailed Institutional Assessment Plan (IAP) that identifies the number and type of assessments that will be performed and which safety management programs and functional areas will be assessed. Each safety management program is assessed no less frequently than once every three years. The breadth and depth of these assessments, coupled with the fact that formal planning ensures that all safety programs are assessed periodically, provides LLNL management and DOE with the confidence that a decline in safety posture will be detected. As I discussed in more detail in answer to Question 75, the results of the many assessments conducted over the past decade clearly demonstrate that the systems and processes in place at LLNL nuclear facilities are viable, effective, and compliant. These results are a good measure and provide assurance of nuclear safety quality.

Ms. SANCHEZ. 85) Do you believe that your site had a good safety record?

- What indicators did you use to measure your laboratory's safety performance? What did you compare those indicators against to decide the quality of that performance? And why do you believe that those measures are adequate to evaluate the quality of safety at your laboratories?
- What indicators do you use to measure the nuclear safety performance of the facilities at your lab? What do you compare those measures against?
- How did/should those measures help you avoid the occurrence of a low-probability, high-consequence accident?

Dr. MILLER. 85) I believe that safety and quality are critical ingredients in everything we do; it is a continuous focus and is as important as breathing. Even one injury is too many because it means that a friend or colleague has been hurt.

While I served as LLNL Director, one of my top priorities was to reorient the safety culture at the Laboratory and focus first on why safety is so important to us and then on how to improve it: we focus on safety because we care deeply about the health and welfare of our family, friends, and colleagues. Among many steps, my actions included emphasizing safety in my interactions with employees, promoting safety through Laboratory-wide communications campaigns, encouraging employee input on best safety practices, and setting high expectations that all senior managers exhibit leadership in safety. I am pleased that Parney Albright, my successor, carries forward this emphasis on safety.

As an example, I instituted (and Parney continues to hold) Monthly Performance Reviews, which are attended by Laboratory senior managers and representatives from the NNSA Livermore Site Office. We review progress in all aspects of Laboratory performance, including frank discussion of problems, setbacks, and pending

issues—with action items assigned. The discussions benefit from high-level statistics and trends (including data gathered through the Contractor Assurance System). In particular, discussion of safety trends and issues are part of the fixed agenda that deals with problems and concerns.

The leading indicators of safety performance are very positive. The number of Total Recordable Cases (TRC) and the number of Days Away, Restricted, or Transferred (DART) are the lowest they have been over the past decade. Since the contract transition at the end of Fiscal Year 2007, both indicators are nearly 100 percent reduced: TRC from 2.59 to 1.31 and DART from 1.00 to 0.52. (In 2010, the average for private industry was 3.5 and 1.8, respectively.)

Another indicator of a strengthening safety culture is external certification. In 2011, LLNL received Occupational Health and Safety Assessment Series (OHSAS) 18001 accreditation for its safety management system for integrating safety considerations into work planning and controls. Achieving and maintaining OHSAS 18001 standards is recognized as an industry best practice. Of course, the Laboratory's strengthened safety culture—marked by improvements in conventional ES&H performance measures and external certification of our safety systems—encompasses the workers in LLNL nuclear facilities.

Ms. SANCHEZ. 86) The laboratories conduct some of the Nation's most sensitive activities, including designing, producing, and maintaining the Nation's nuclear weapons; supporting nonproliferation efforts; conducting efforts for other military or national security applications; and performing research and development in advanced technologies for potential defense and commercial applications.

- How do these different missions complicate oversight requirements?
- How do they support efficiencies and best use of taxpayer dollars?

Dr. MILLER. 86) The preponderance of issues related to burdensome oversight relate to operational aspects of the Laboratory—not mission-related aspects. In addition to daily oversight by the NNSA site office personnel, more than 1,000 audits and inspections have been conducted in FY 2012 by the site office, NNSA Headquarters, and DOE. Internally, LLNL performed nearly 300 self-assessments in FY 2012, of which about 70 percent were driven by requirements. By far, the majority of these audits and inspections were in the area of ES&H, followed by security. The work performed as part of our NNSA nuclear security mission (stockpile stewardship and nuclear nonproliferation) is the most complex from an operational viewpoint. Much of our work for other federal agencies makes use of operational capabilities and facilities that we have because of the nuclear security mission.

As I explained in my answer to Question 77, the outstanding capabilities of LLNL and the other NNSA laboratories are being and should be used to address a broader set of national security issues. We apply our cutting-edge science and technology to develop innovative solutions to problems in the areas of defense and international security, energy and environmental security, and economic competitiveness. This strategy is good for the country and makes best use of taxpayer dollars invested in these centers of scientific and technical excellence.

Ms. SANCHEZ. 87) How would you measure adequate nuclear safety? Note that traditionally, the quality of worker safety has been measured by the rate of accidents and injuries, where success is reflected by low rates of accidents not necessarily their absence. In contrast, nuclear safety is predicated upon the avoidance of accidents.

Dr. ROBINSON. 87) Throughout my time at Sandia, the primary methodology for focusing on what was important with respect to ensuring nuclear safety was through applying Probabilistic Risk Assessments, which was originally a Sandia Lab creation, although it is now applied worldwide for this and other purposes. It allows one to think through the risks and consequences and to determine actions that provide the maximum mitigation for such low probability, but high consequence, risks. However, as I am certainly out of date as to current practices at Sandia in metrics for nuclear safety, having retired 6 years ago, I have requested help from Sandia in answering this and several other questions.

I will submit these more fulsome answers at a later date.

Ms. SANCHEZ. 88) What indicators did you use to measure the avoidance of low-probability, high-consequence accidents at your nuclear facilities?

Dr. ROBINSON. 88) The common tool used is to conduct probabilistic risk assessments (PRA) of various possibilities. This tool was originally developed at Sandia National Laboratories—for the evaluation of relative risks to safety of the design, construction, storage, transport, and operation of nuclear weapons, and has been subsequently applied worldwide for a variety of other safety-related analysis problems. In particular, it has been employed for safety analyses by the U.S. Nuclear Regulatory Commission to ensure that the operation of nuclear power-generating

plants pose no undue risks to public health and safety. Sandia, in particular, and other national laboratories, assist the NRC in the further enhancement and uses of the PRA tools.

Over the past five decades, PRA has become a well-established field and is now used by many organizations, to ensure that risks are properly prioritized, in order to identify which risks/hazards can have the most impacts on safety of complex systems worldwide. Since in nuclear weapons matters, information related to the identification of any such vulnerabilities are automatically deemed "classified," these will not be discussed here. Sandia would be pleased to provide experts to discuss those matters further within an appropriate venue.

Ms. SANCHEZ. 89) How does the Work for Others support or detract from the nuclear deterrent mission?

Dr. ROBINSON. 89) I believe this question has nearly a complete overlap with previous Question 55 [Now Question 45], where I have written a long and complete answer. I urge you to review that answer.

Ms. SANCHEZ. 90) We have seen a significant growth in investment in the labs. In that context, what can be done to provide stability in the workforce to ensure that we retain the excellence in scientific and engineering quality at the labs?

Dr. ROBINSON. 90) Diversity in funding sources that have resulted from the efforts within Sandia and the other two Labs to become true National Security labs rather than only nuclear weapons labs, have had a remarkable set of outcomes for the institutions.

First, and directly apropos to this Question, is the increase in the independent sources of funds and independent management of now a larger multiplicity of Federal, military, intelligence, homeland security (and even some private) entities have provided a greater ability for the Lab managers to "guide their own organizations futures" and expand their overall service to the Nation. Of course the greater breadth of technical assignments and efforts is making the Labs *far more interesting research institutions,* and due largely to the synergism and the expansion of overall capabilities with the growth of "Work for Others" Federal entities (WFO). For example, the level of major breakthroughs and innovations have never been higher. (These have very often still provided the critical factors to secure the Nation's security, and greater reduce the loss of lives in wartime. I would recommend that the HASC might task the "HSCI" to review and validate my report (here) on the number and quality of major national security contributions.

Ms. SANCHEZ. 91) I understand that recent unexpected experiment results have been a serious setback to meeting the performance milestones in the National Ignition Campaign, and that this setback has led to management decisions to postpone all other experiments on the NIF laser and to reallocate resources from other programs to an accelerated Ignition Campaign.

- Can you explain to the Committee how the shift from hypothesis-driven science to milestone-driven science has NOT been detrimental to the Labs' science missions?

Dr. ROBINSON. 91) I am unaware of any decision to change the direction of the National Ignition Campaign as of today. There has been "a lot of water under the bridge" since the NIF was first proposed, and admittedly some strong "overselling" of the concept, and I was a frequent critic of the effort, almost exclusively on the basis that the costs it would require were too great a burden on the nuclear weapons program—the highest priority of all programs—which was already seeing a decrease in funding, higher inflations, and many more unanticipated needs within the Stockpile Stewardship Program. For those reasons I have mostly avoided further contact with the NIF program since I retired.

However, the NIF device was completed 3 years ago, and is currently firing laser pulses at implosion targets and diagnosing them. I am told by independent reviewers of the NIF and the NIC that the laser engineering and optical train have proved to be amazing accomplishments, and the device appears to have met the desired specifications on energy per pulse, energy uniformity, spot sizes, and timing. Reviewers have also begun examining the first ignition experiments and report excellent performance of the unique new diagnostics designed and built for the NIF experiments. The experiments are generating fusion neutrons, which are of major importance step to bring up any large physics machine (like large particle accelerators); as when you have a desired signal for the parameter you want to maximize, successive variations can often then lead you to maximize the level of that parameter. That is the current stage, and doubtless the careful analysis of the current experiments will shed light on some of the missing physics, and lead to both progress toward their September milestone and to elucidation of its prospects for ignition.

Let me include here a report from a recent review by Dr. Steve Koonin of the NIC:

"It has long been recognized that achieving thermonuclear ignition in the laboratory is a technical grand challenge undertaking, 50 years in the making. It is first, and foremost, a research project, and we all recognize that the goal is not necessarily compatible with near-term NIC project milestones and schedules as currently driven by programmatic considerations."

Those statements indicate to me that neither the senior NNSA management nor the Lab involved have lost their way. LLNL is truly at the threshold of learning new physics that could not have been known prior to actually undertaking the current experimental campaign. While I cannot, nor could anyone (in my opinion), predict where it will yet lead; but after the enormous commitments of funds to get to this point, I believe it would make little sense to curtail the funding at this point, just because an important milestone has not yet met, regardless of the past histories I mentioned above.

My understanding is that the milestone definition and the September 2012 deadline originated from a review of the program which NNSA/DOE requested be performed by the JASONs (a think-tank of talented university scientists supported through a DOD FFRDC (MITRE).) However, the September date arose from making predictions that no one could have made with any clarity, as it is the case that important physics is still missing, and that "Mother Nature will control the process" in any case. The NIT experimenters are on a good path to elucidate the physical processes that are now preventing ignition, and may yet be able to overcome these difficulties in future experiments. But I believe the statements of former Under Secretary Koonin (above) are pretty much "right on" in realizing that ultimately ignition in the laboratory is a research goal as well as a programmatic goal, and that they understand that, while the milestone was undoubtedly important in getting to this point, there is no better plan now than continuing to perform more good experiments!

Ms. SANCHEZ. 92) GAO has criticized NNSA in a long series of reports for not having consistent management data (such as cost accounting data) across all of its sites.

- Why hasn't more progress been made in requiring consistent data and bookkeeping?

Dr. ROBINSON. 92) The GAO is swimming upstream against the accepted and successful practices of private institutions across the Nation when attempts to force "Government-like" accounting systems on these institutions were made. Government accounting, in general, is exceptionally bureaucratic, and with the great diversity of financial issues for the extant variety of organizations: "One size does not fit all."

I believe there is one overarching principle for having successful alignment of accounting and work functions, that does apply to all enterprises, businesses, or even Laboratories: "You should organize your bookkeeping the way you need to run (i.e. manage and operate) your business, and never vice versa. When I began my tenure as Sandia's President and Laboratories Director, one condition that was crystal clear then was that the home-built software system—which had originated more than 35 years earlier, had far outrun its usefulness in managing such a large and complex enterprise. The symptoms were clear: It was very difficult for anyone to easily find out the real costs for almost any function, or even purchased items, because of the proliferation of overheads and other "institutional taxes." After analyzing and discussing the situation with Sandia's managers at all levels, we learned that the staff's trust in the central accounting had waned to the point that a great many organizations ran their own "spheres of interest" using commercial project management software; so that in reality we had many hundreds of "independent" data systems. After making a decision to turn to commercial Enterprise Management software, we had to choose whether to purchase such software either "tailored for Government use" or "tailored for business use." A thorough examination of these alternatives showed that the latter was designed to make decisions based on costs for a great diversity of work activities, and that still the system was capable of "rolling up costs" in any way that one needed to in order to feed into larger/inflexible cost accounting budget categories. The choice of the (Oracle®) business option product allowed us to also perform much wider benchmarking with many large private laboratories, and to help us identify whether our costs in particular areas were competitive or not. We have used this system for nearly 20 years now with excellent success. This commercial software gave our staff easier systems to learn and to apply, and to tailor the operating systems to fit the individual systems to better manage each of our functions.

Lastly, I would appoint that the world's largest single Government accounting organization DCAS (for Defense Contracts Administration Services) does not, repeat not, attempt to dictate a "one size fits all" accounting system for its contractors, but rather it conducts an examination of a firm's books in "a pre-award audit", to determine whether or not the company's financial bookkeeping meets "Federal Cost Ac-

counting Standards", and DCAS is available to follow the procurement as it progresses to be sure the declared processes are used. This would be a far superior intellectual approach for dealing with cost accounting within DOE organizations and its suppliers, taking note that DOE "contracts out" the vast majority of its budgeted funds. If I could, I would suggest that this latter DCAS model does fit the model most of the reviews have suggested be the simplifying basis for GOCOs, *with the Government specifying "What?", but not trying to dictate "How?"*

Ms. SANCHEZ. 93) How do the conclusions of this report comport with your experiences with DOE nuclear safety requirements (i.e., rules, orders, manuals, and standards) for the nuclear weapons complex?

- Did you find these nuclear safety requirements to be burdensome? Could you provide any specific examples of burdensome nuclear safety requirements?

Dr. ROBINSON. 93) As I stated above for Question 77 [Now Question 87], I am certainly out of date as to current practices at Sandia in *metrics for nuclear safety,* having retired 6 years earlier. I have requested help from Sandia in answering this question, who replied with this response: For DOE nuclear facilities, the safety requirements are based on *10CFR830 Nuclear Safety Management* (primarily *Subpart B—Safety Basis Requirements*). There are numerous DOE orders, standards, and guidance documents used by nuclear facilities, which allow for fairly consistent management data. We all use the same threshold quantities, develop safety documents based on the same approved safe harbors and development guidance, use analysis tools in the approved DOE "tool box", use the same general process for managing changes (i.e. unreviewed safety questions), and are periodically assessed by the same DOE HQ entity (Chief of Defense Nuclear Safety). If a "burdensome" requirement is defined as a requirement providing no or minimal value-added benefit; then we would be hesitant to identify specific examples of burdensome nuclear safety requirements. There are specific safety benefits for all these nuclear safety requirements. The rigor and scrutiny for a nuclear facility should be higher than the average nonnuclear facility since the potential consequences can be significantly greater. What we find can be burdensome is the overly conservative interpretation (often by external organizations) of what are essentially good requirements.

Examples:

- Not being able to use the latest dose conversion factors for initial hazard categorization without doing additional significant analysis.
- Different interpretations about what is meant by challenging the evaluation guidelines.
- What is the appropriate deposition velocity.
- Interpretation of the appropriate level of detail for analysis and documentation.

Ms. SANCHEZ. 94) Does the National Laboratories Directors Council, which reports directly to the Secretary of Energy, bypassing the NNSA reporting structure, disrupt oversight and contribute to a dysfunctional system where NNSA and the labs do not trust each other?

Dr. ROBINSON. 94) This question is, I believe chasing a "red herring." There has been the practice, ever since I can remember, of past Secretaries of Energy establishing a forum of multiple Laboratory Directors to meet with him/her to discuss major issues. These have only occurred quite infrequently, i.e. never on a schedule that would even allow these to either substitute for, replace, or even supplement, regular meetings of responsible Department officials with the Secretary of Energy. Usually, the Lab Directors invited are chosen in order to help prepare for joint briefings (e.g. the Secretary and the Lab Directors) to the Congress, such as the Hearings to discuss the Annual Assessment Memoranda prepared by the Directors and transmitted by the Secretary of Energy and the Secretary of Defense to the President and to both houses of the Congress. In my experience, there never were such meetings without the head of the NNSA (and usually one or two others senior NNSA officials) present.

I found the comment from the NAS Review Committee regarding "a lack of trust" to be profound and justified, but I do not think any meetings involving the Secretary are in any way a factor affecting trust. Rather, I would ascribe the lack of trust to: (1) the lack of effective communications across the NNSA and the DOE and its Laboratories, (2) the many overlapping responsibilities of NNSA Program Managers and Laboratory officials, and (3) the dysfunctional arrangement of some DOE components who still have absolute rule over some functions within the Laboratories, without involvement of the NNSA, and (4) a failure of management and leadership of DOE and NNSA to organize and manage the burgeoning oversight offices at Headquarters or in the field.

Ms. SANCHEZ. 95) What is your perspective on the recent NNSA governance reform initiative in which the contractors assume more responsibility for oversight of

compliance with nuclear safety requirements, while Federal oversight focuses on contractor systems for ensuring safety?

- What was the purpose and objectives of your contractor assurance system?
- What experience did you have with such a self-assessing contractor assurance system, and what are the specific advantages and disadvantages of this system?
- What did your contractor assurance system indicate about the need for more or less requirements, about the rigor of compliance with requirements, and about the need for more or less oversight?
- How did you ensure that you had adequately established a balance in priorities and resources between your safety programs and your missions?

Dr. ROBINSON. 95) At the time I retired from Sandia in January, 2006, the NNSA governance initiative was just in its earliest stages. I requested from Sandia their views on this subject and they provided the following status comments:

This new NNSA governance reform initiative has some promise, but would need to go much further to create the change needed. This effort is still embryonic; it is fair to be skeptical until it is fully implemented. There are still hundreds of detailed milestones in the current performance measuring system used by NNSA and hundreds of Federal employees overseeing these. As long as that is the case, the focus will be on each small action and transaction that makes a strategic focus almost impossible. As long as there are an excessive number of employees in multiple offices conducting oversight (which is the case now) the flexibility to balance safety and mission in the most effective way becomes extremely difficult.

The history at the labs is that their own internal audits and reviews of their systems identify the areas that need improvement. The multiple external audits by multiple agencies that often follow the internal audits and reviews seldom add much value. In fact, they distract and absorb the time of people who should spend time addressing the internal findings.

There is a clear need for the Government to provide oversight. It needs to be strategic. Right now it is still largely down in the weeds.

Ms. SANCHEZ. 96) How can the operator of facilities/Line Management, DOE as owner of the facilities, and the public have confidence that contractor assurance systems are capable of detecting a decline in the safety posture of a facility or operation?

- How mature was this capability at your laboratory?
- In the areas of worker safety and high-risk operations such as those at nuclear facilities, could you describe how you ensured that performance was maintained at least at its previous level if not improved?
- Could you describe the key measures that you relied on to ensure that you avoided nuclear or other high-hazard accidents, and explain why you believe that those measures gave you sufficient confidence that the workers and the public were and continue to be afforded adequate protection?

Dr. ROBINSON. 96) I have requested help from Sandia in answering these questions since the contractor assurance system was in its earliest stages when I retired in January, 2006. I am certainly out of date as to current practices for contractor assurance at Sandia, and I have requested help from Sandia in answering this and several other questions.

Sandia empowers every employee to stop any activity or duty they believe is dangerous. There are no repercussions for protecting themselves and fellow workers. In fact, safety is a priority at Sandia because our unique nuclear weapons mission is "always/never." A nuclear weapon must always work if authorized by the President of the United States. A nuclear weapons must never work at all other times. For the "never" part of the analogy, Sandia designs and qualifies unique components that are specifically tailored to serve in the role of "never" devices. These strong-links or weak-links are key to safety, in order to ensure that the respective protections remain in place and functioning, beyond the point at which the ability of the system to detonate disappears. Sandia thinks about safety every day because it their job.

Sandia also conducts mandatory training based on the job criteria. Not only does Sandia remind their employees to use common sense safety tools like protective glasses and ear protectors, but constantly training and retraining on other safety concerns is included on such less obvious safety concerns as static electricity or trips and falls.

Let me here cite a few approaches that we developed for dealing with worker safety in the high-risk operations within nuclear facilities.

The highest combined risk for worker safety and nuclear safety risks were in the Pulsed Power facilities: Z Machine, Atlas, etc. The variety of hazards and the seriousness of the risks all ranked very high in Probabilistic Risk Assessments. Line responsibility was assigned the responsibility along with their technical program re-

sponsibilities, noting how essential it was for close integration of all experiments and operations for maximizing employee safety against the very diverse set of hazards: extremely high radiation levels during pulses, energetic system explosion hazards, extremely high voltages and currents, falling hazards from highly, elevated experimental location, drowning hazards from vessels filled with oil or deionized-water, and huge magnetic forces during tests of some components.

Yet, the safety performances—even with this variety of high hazard activities—always scored at the top or near to the top of all Sandia facilities. The risk-informed safety rules that were in use proved exceptionally successful at the pulsed power sites. The quality process structure in place with the key employee and managers closed the loop between the employees, whose Health and Safety would be at risk (including their very lives), and guaranteed that there was full and first-hand knowledge of those risks and the means and controls (structural and controls) that were in place to mitigate these hazards. Risk-informed safety regulations were continuously stressed to all employees within these facilities and were shown to improve the already high performance levels of these activities.

Ms. SANCHEZ. 97) • Do you believe that your site had a good safety record?

- What indicators did you use to measure your laboratory's safety performance? What did you compare those indicators against to decide the quality of that performance? And why do you believe that those measures are adequate to evaluate the quality of safety at your laboratories?
- What indicators do you use to measure the nuclear safety performance of the facilities at your lab? What do you compare those measures against?
- How did/should those measures help you avoid the occurrence of a low-probability, high-consequence accident?

Dr. ROBINSON. 97) Yes, and provably so. The first written question asked by Chairman Michael Turner, which I answered on Feb. 22, 2012, was very similar. In my answer I cited that *"when the DOE was formed, the safety performance of the DOE laboratories in total was very sound (with the nuclear weapons labs being top performers in that set). Yet, the DOE continued to require that even more spending be devoted to Safety efforts, even though the statistics on workplace injuries, lost workday incidents, and accidental deaths was superior—and by substantial rates—to those of U.S. industry in general."* Further, I cited the relative performance levels for the DOE Labs against appropriate industry-wide levels for:

(1) lost workday case incidences and lost workday incidences (per se) for comparison to Bureau of Labor Statistics of U.S. Industry;
(2) fatalities per 100,000 workers for comparison to National Safety Council for U.S. Industry;
(3) motor vehicle accidents per 1 million miles for comparison to National Safety Council for U.S. Industry; and
(4) worker radiation exposures per 100,000 workers for comparison to NRC Commercial statistics.

In all cases the relative performance levels of the DOE Labs were substantially better.

For more recent data, I requested help from Sandia on current data comparisons on similar statistics. Sandia National Laboratories analyzed the data available from 2006–2011, and these data are shown in the histogram below:

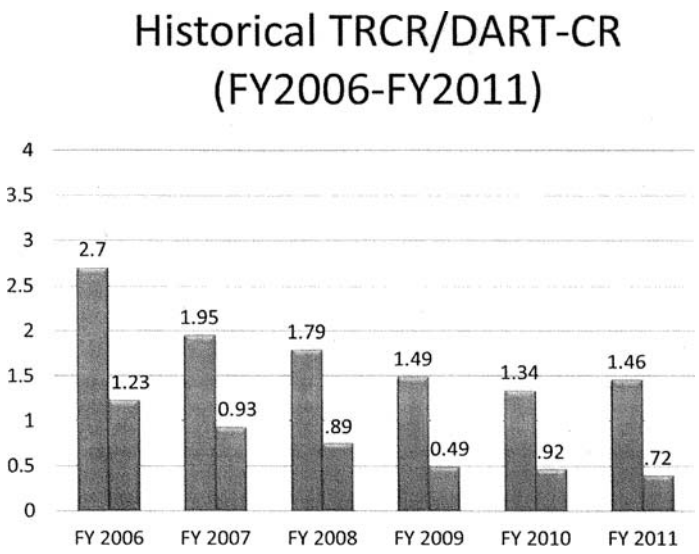
Analysis of injury and illness rates from the calendar years of 2006–2011 led to the following results:

- Total Recordable Case Rate shows Sandia's average over the 5 years to be 1.755 compared to the Industry rate of 3.92 from 2006 through 2010.
- Sandia's average Days Away Restricted, Transferred Case Rate was 0.68 compared to 2 for the Industry.
- The average Days Away Case Rate for Sandia was 0.29 compared to 1.16 for the Industry.

Sandia's average fatality rate (fatalities per 100,000 workers) from 2006–2011 was 2.8. The industry average for those 5 years was 3.8.

Sandia's motor vehicle accident rate (motor vehicle accidents per one million miles) measures injuries from motor vehicle accidents per one million miles. The average rate for the 5-year period is 0.5. The injury rate for the entire population is 0.8.

The total effective dose (TED) in rem at Sandia National Laboratories averaged .05 for 2006–2011. The average TED at NRC Licensed facilities was 0.1.



Ms. SANCHEZ. 98) The laboratories conduct some of the Nation's most sensitive activities, including designing, producing, and maintaining the Nation's nuclear weapons; supporting nonproliferation efforts; conducting efforts for other military or national security applications; and performing research and development in advanced technologies for potential defense and commercial applications.

- How do these different missions complicate oversight requirements?
- How do they support efficiencies and best use of taxpayer dollars?

Dr. ROBINSON. 98) Let me add to the list of diverse missions "highly compartmented programs," where very strict access controls must be in place. Although such programs have existed within the three Laboratories for at least 50 years or more, they have increased in numbers and size over the past decade. Different arrangements were required for the conduct of these programs, because their accesses are so strictly restricted by the parent agencies (including those owned by the DOE). All it is clearly recognized that the extremely high importance of many of these programs meant there could be no compromises of the existence or nature of these programs due to serious injuries or death resulting from them. Once again our placing the responsibility for safety and security as a strict line management function for such programs has required greater commitment from managers at all levels to carry the responsibility for technical/mission success of these programs simultaneously with responsibility for the environmental and safety and health performances. An exceptional record of success in all aspects of these programs attests to the fact, that it is feasible to achieve sound safety and security performances in these unique circumstances with a philosophy of strict limitations on the number of support staff who can have access. Agreements have been forged at the highest levels of DOE and NNSA of how oversight will be carried out, and these represent the best of the past practice of a deep, trusting partnership between the Government and the Labs. Compartmented programs within the Labs have demonstrated high levels of cost effectiveness as well. The unique requirements to accomplish these important programs while greatly limiting the number of staff (because of obvious security concerns) should be the proof that large staffs are not necessary to achieve effective results and protect both workers, the public, and the environment.

There are many other examples, where the capabilities created within the laboratories for one national security program, can instantly be put into use for solving unique and critical problems that arise on very short timescales. The emergency request last year by the Department of Defense for Sandia Laboratories to adapt an existing launch vehicle and to tailor a ballistic missile defense missile interceptor vehicle to intercept and destroy a failed Russian satellite with a large inventory of liquid hydrazine on-board (for propulsion gas), before the satellites orbit had decayed to the point of reentering the earth's atmosphere and crashing into the earth, is a recent example of what is possible by harvesting past investment in the Labs by many agencies to address other national needs. That mission was a splendid suc-

cess, and demonstrated what can be uniquely accomplished by the concentration of multidisciplined scientists and technicians with a diversity of fully-functional facilities within such institutions.

QUESTIONS SUBMITTED BY MR. HEINRICH

Mr. HEINRICH. 99) The NAS study committee says the loss of trust has resulted in an increased "aversion to risk," and that "a major byproduct of this has been to create a bias against experimental work, because of the onerous processes sometimes required before running an experiment. The bias is problematic because experimental science is at the very heart of the scientific method."

How does the NAS study committee think the "trust" that it says has been lost could be restored? Please explain how this aversion to risk impacts the ability of the labs to conduct high-quality science and engineering and perform their mission.

Dr. SHANK. 99) To address this question I think it is instructive to understand how we have come to the current situation. The response of Congress and the DOE to a series of single point failures at Laboratories and production facilities has been to create new structures, orders, and organizations to provide enhanced oversight at all DOE FFRDCs. The increase in compartmentalized oversight entities has led to an extraordinary burden for the Laboratories. The issue of trust arises because the Laboratories are treated as distrusted entities requiring large teams of people overseeing all transactions. This approach is costly, inefficient, and discourages the Science and Engineering Staff.

There is a small fraction of the work at the Laboratories where a failure would have a high consequence and therefore require a high degree of operational formality. The rest of the work looks like work done in a typical industrial environment. I believe that necessary oversight could be done in a manner accomplished by other similar institutions. There are widely accepted systems and standards for overseeing safety, finance, human resources, and facility operations. A straightforward approach would be for the Laboratories to qualify systems in each of the operational areas. Then, a vastly reduced number of people could audit the systems. A major barrier to accomplishing something like this is to realize that maintaining the current oversight apparatus in place, which has been sized for transactional oversight, will prevent any of the advantages to ensue. Another concern is that a new approach needs to be created with the idea there will be failures in the future and that whatever system in place must be resilient to single point failures.

Mr. HEINRICH. 100) In 2009, the Strategic Posture Commission said the President, "should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the Laboratories."

Do you agree? How would such a structure operate—how should it be designed?

Dr. SHANK. 100) This is not a topic that our committee examined. I do believe all of these entities have a stake in the success of the Laboratories. Lowering the barrier for all of the entities to make investments and create facilities in the Laboratories would be a positive step.

Mr. HEINRICH. 101) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" with a broader mission set is well under way. The report says that expansion of the labs' missions to new arenas "offers the prospect of increasing the Laboratories' appeal to top-quality scientists and engineers while also serving important national security missions. Thus, the quality of science and engineering, being preconditioned on attracting high-quality people, depends in the long run on successfully making this transition to National Security Laboratories."

Does the NAS believe the governance and management structure for the labs is set up to facilitate this expansion into new, nonnuclear work? If so, how should it be changed to better enable this broader mission?

Dr. CURTIS. 101) We do believe that the governance and management structure of the laboratories is set up to facilitate the expansion into new, nonnuclear work. NNSA has done a good job reaching out to the Department of Defense and the Department of Homeland Security and the intelligence community to help coordinate this broader national security agency. This enriched suite of activities at the laboratories has contributed significantly to laboratory recruitment and to the execution of the laboratories' core nuclear weapons responsibilities.

Mr. HEINRICH. 102) Technology transfer remains a critical tool that can help businesses create jobs and strengthen their competitiveness. I was pleased to see the President recently direct our national laboratories to increase the rate of technology transfer to the commercial marketplace. Has the increased "aversion to risk" that

the NAS study committee found also impacted tech transfer? What steps can Congress take to foster growth in the area of tech transfer?

Dr. CURTIS. 102) The Committee did not focus specifically on impediments to technology transfer to help business create jobs and strengthen their competitiveness. The subject, however, is very important and a matter that the laboratories in the past devoted a great deal of attention to. This clearly may be a matter that the Subcommittee would wish to take up with NNSA.

Mr. HEINRICH. 103) In 2009, the Strategic Posture Commission said the President, "should assign formal responsibility to the Secretaries of Energy, Defense, and Homeland Security and the Director of National Intelligence for the programmatic and budgetary health of the laboratories."

Do you agree? How would such a structure operate—how should it be designed?

Dr. ANASTASIO. 103) The Commission recommended making organizational changes regarding the NNSA—that the NNSA be established "as an independent agency reporting to the President through the Secretary of Energy"; "the NNSA, as an independent agency, should have a budget separate from any other entity" and "this budget be reviewed by the Defense Appropriations Subcommittees of the House and Senate"; and that a formal mechanism be established "for the Secretaries of Energy, Defense, State, and Homeland Security and the Director of National Intelligence to approve the NNSA strategic plan and to comment on its budget in broad detail before it is submitted to the Office of Management and Budget."

Given the challenges to date of implementing the NNSA act, an end state that results in NNSA as an independent agency is very appealing. As the Commission makes clear there are many issues associated with making that model a success, such as to whom does this new independent agency report? How is its budget developed within the Administration? How is its budget established by the Congress? How is a broad national security mission for NNSA implemented? The Commission developed answers to these questions that they could agree with and that they thought could be implemented at the time. The answers to these questions are very important, but it is essential that the national security leadership, Administration and Congress all agree on the answers and they successfully implement all of them.

Mr. HEINRICH. 104) The NAS report notes that the "evolution" of the labs from nuclear weapons labs to "national security labs" is well under way, and that this will enable an expansion of the labs' work solving national security problems for many different Federal agencies. Within NNSA, this is called "Work for Others," or "WFO." The NAS notes, and I agree, that this evolution is critical to the future vitality of the labs.

What steps could Congress take to make WFO work easier, more efficient, and more effective?

Dr. ROBINSON. 104) I am very pleased to address this question, as I openly professed for many years that the nuclear weapons labs, as one of the last bastions of defense science and technology, must apply their knowledge to counter any and every threat to our Nation's security. We at Sandia outlined this view as a quest to become "true national security labs." This has now become a reality at Sandia, and is progressing at the other two Labs.

I must be constrained in my discussion of how we have achieved this (due to classification and compartmentation rules). Without breaching security, I can unabashedly say that, just as the technology created by, and at, the Labs did in fact lead to ending World War II, our recent technology advances have similarly been *so significant as to end modern, recent conflicts.* The details of these facts cannot yet be revealed today, but I invite you to ask those in command for Lab contributions to recent U.S. conflicts, if they believe that our latest contributions, as we had achieved with our partners at Los Alamos made the breakthrough which "won" World War II, recent technology advances, by one or more of the nuclear weapons labs, have been the keys to winning other recent major conflicts.

I urge you to pursue this issue with vigor, for nothing will convince you more readily of the importance of these Labs in protecting America's future, and cause you to award us the autonomy from the Federal bureaucracy to which we have been subjected for more than 40 years! I already stressed in my written HASC Statement that the DOE has long since lost the recipe for being wise custodians of science and technology "for the national interest." It is that basis that drove my recommendation that only major actions by the Congress have a chance to "save the Labs" before it is too late.

The recommendations of the Strategic Commission, the DSB on Nuclear Capabilities, and my own recommendation (in my written statement) to recreate the labs (and a modified NNSA) within the Department of Defense—all of these have merit to recover these "national treasures" from their current state of mismanagement. In

further defense of my own proposal, may I point out that the Department of Defense and the Military Services are more committed to the success of the nuclear weapons/national security labs than any other entity is likely to ever achieve. It thus belongs there!

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