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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 through 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 Garberson³ 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”

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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.

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).

The government does not normally contract out inherently governmental functions such as managing the armed services, conducting international relations, or the 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, then 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 given 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 piecemeal 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 are 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.