

**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

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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 competitiveness. 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 loss 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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