Aligning the Governance Structure of the NNSA Laboratories to Meet 21st Century National Security Challenges

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ALIGNING THE GOVERNANCE STRUCTURE OF THE NNSA LABORATORIES

TO MEET 21ST CENTURY NATIONAL SECURITY CHALLENGES

Committee on Assessment of the Governance Structure of the NNSA National Security Laboratories

Division on Engineering and Physical Sciences

Laboratory Assessments Board

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Preface

In the fiscal year (FY) 2013 National Defense Authorization Act,[1] Congress directed the Administrator of the Department of Energy's (DOE's) National Nuclear Security Administration (NNSA) to "commission an independent assessment regarding the transition of the NNSA laboratories to multiagency, federally funded research and development centers (FFRDCs) with direct sustainment and sponsorship by multiple national security agencies." The NNSA laboratories are Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL). The full statement of task is discussed in Chapter 1.

The Administrator commissioned the National Academies to take on this study. In response, the National Research Council (NRC) formed the Committee on Assessment of the Governance Structure of the NNSA National Security Laboratories (for the backgrounds of committee members, see Appendix A), which began work in March 2014. The committee had the benefit of presentations from a number of individuals with knowledge and experience related to its task; the agendas of the committee's public meeting sessions are listed in Appendix B.

The committee approached its task with considerable humility, recognizing that there have been a number of blue-ribbon panels and commissions in recent years that have commented on aspects of the governance of the NNSA laboratories (see Appendixes C and E for a partial list). These

[1] Public Law 112-239, § 3148 (2013).

earlier efforts share two common characteristics: (1) they found that the governance model for the NNSA laboratories needs to change to reflect new realities; and (2) despite these consistent findings, essentially none of their recommendations have been implemented to date. The time for inaction is past.

As the committee was conducting this study, it was mindful of other ongoing studies with overlapping mandates.[2] In particular, the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, chaired by Norman Augustine and Richard Mies, was created in the same legislation that mandated this study.[3] The Congressional Advisory Panel is to provide advice for revising the governance structure, mission, and management of the nuclear security enterprise, including not just the NNSA and its laboratories but also the entire nuclear weapon production complex; the panel released an interim report in April 2014,[4] and its final report was released in December 2014.[5] At the time this study was getting under way, the panel had already held several meetings and conducted numerous site visits to NNSA facilities. To minimize duplication of effort, NRC staff remained in contact with panel staff during the course of this study. The committee appreciates the panel's generosity in sharing information.

This report has a theme that distinguishes it from other past and ongoing work. The committee focused on how non-DOE federal agencies can realistically and productively enhance their engagement with NNSA laboratories to help sustain essential national security capabilities for the United States in the coming decades. The committee used this theme as a guidepost for determining which topics to explore in depth and which to defer to other expert bodies, such as the Congressional Advisory Panel.

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[2] Three other related, congressionally mandated studies were getting under way as this study progressed: (1) the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, described in the text; (2) the Commission to Review the Effectiveness of the National Energy Laboratories, organized under the auspices of the President's Council of Advisors on Science and Technology (PCAST); and (3) the National Research Council's study "Peer Review and Design Competition Related to Nuclear Weapons." In addition, there is a Secretary of Energy Advisory Board Task Force on DOE National Laboratories (see http://energy.gov/seab/secretary-energy-advisory-board-seab-task-force-doe-national-laboratories, accessed November 26, 2014).

[3] Public Law 112-239, § 3166.

[4] Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, *Interim Report*, April 2014, available from the Institute for Defense Analysis, Alexandria, Va.

[5] Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise*, November 2014, available from the Institute for Defense Analysis, Alexandria, Va.

I wish to thank all of the committee members for their dedication in producing this report in a short period of time. I also want to thank the many individuals who made presentations to the committee or otherwise provided advice and information. The outside reviewers and NRC monitor provided insightful comments that improved the quality of the report. Sincere thanks is also due to the NRC staff: Greg Eyring, Dick Rowberg, and Eric Whitaker.

Richard A. Meserve, *Chair*
Committee on Assessment of the Governance Structure
of the NNSA National Security Laboratories

Acknowledgment of Reviewers

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

Linton Brooks, Center for Strategic and International Studies and the National Defense University,
Christine Fox, Johns Hopkins University Applied Physics Laboratory,
John Gannon, CENTRA Technology and Georgetown University,
Russell Hemley, Carnegie Institution of Washington,
Thomas O. Hunter, Sandia National Laboratories (retired),
Raymond Jeanloz, University of California, Berkeley,
Bernadette Johnson, Lincoln Laboratory, Massachusetts Institute of Technology,
Norman Jouppi, Google, Inc.,
Maxine Savitz, Honeywell, Inc. (retired),

Roger Snyder, Department of Energy, Pacific Northwest Site Office, and
Libby Turpen, Institute for Defense Analysis (consultant).

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Stephen M. Robinson, University of Wisconsin, Madison. Appointed by the National Research Council, he was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Contents

Summary

The principal Department of Energy (DOE) National Nuclear Security Administration (NNSA)[1] laboratories—Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL)—have served the nation well in assuring the reliability, safety, and security of our arsenal of nuclear weapons. In support of this core nuclear weapons mission, DOE has funded a vast infrastructure, including advanced computing facilities, state-of-the-art scientific equipment, and multidisciplinary science and engineering facilities. The diverse and exacting skills required to maintain this nuclear expertise have nurtured unique capabilities at the laboratories. These capabilities are routinely applied to other areas, including energy, environment, industrial technologies, and—important for this study—non-nuclear national security needs.

The original mission of LANL, LLNL, and SNL focused solely on nuclear weapons, but the mission has evolved over time to include a broader array of national security challenges. In response to requests starting in the late 1960s to serve various national security agency needs, and more recently motivated by the need to maintain the personnel and facilities required to sustain core capabilities, the NNSA laboratories have undertaken activities at the request of other agencies—especially

[1] The National Nuclear Security Administration (NNSA) is a separately organized agency within the Department of Energy (DOE) established under the NNSA Act (Title XXXII of the National Defense Authorization Act of Fiscal Year 2000, P.L. 106-65) and charged with the management and security of the nation's nuclear weapons, nuclear nonproliferation, and naval reactor programs.

the Department of Defense (DOD), the Intelligence Community (IC), and the Department of Homeland Security (DHS)—to serve the national security missions of those other agencies and at the same time sustain the core mission. These activities, which have historically been termed Work for Others (WFO),[2] have grown over time to be a significant portion of the laboratories' budgets, ranging from 9 percent at LANL to 36 percent at SNL. Across the entire NNSA complex, WFO totaled $1.656 billion in fiscal year (FY) 2013, or about 20 percent of the budget. The challenge now is how to meet multiple agency needs in an era of extended federal budget austerity while maintaining the performance, safety, and reliability of an aging nuclear stockpile. Several recent studies have argued that meeting this challenge will require a change in the governance of the NNSA laboratories away from sole control by DOE and toward a shared governance model in which the other national security agencies have a seat at the table.[3]

The problem of sustaining the NNSA laboratories by nurturing the engagement of the national security agencies that make use of them has received at least an initial response. In 2010, a memorandum of understanding (MOU) was signed by the Secretaries of the Departments of Energy, Defense, and Homeland Security and by the Director of National Intelligence establishing a "Governance Charter for an Interagency Council on the Strategic Capabilities of DOE National Laboratories as National Security Assets" (reprinted in Appendix F). The charter creates a mechanism for agencies other than NNSA to participate in the planning, evaluation, and maintenance of science, technology, and engineering capabilities at the NNSA laboratories. It establishes a body of high-level executives from each participating agency, called the Mission Executive Council (MEC), to define the shared national security agenda and coordinate multiagency engagement with the laboratories.

This is a period of unusual ferment and debate with regard to governance issues relating to DOE, NNSA, and all of DOE's national laboratories, including the three NNSA laboratories. As this report was being written,

[2] Work performed by the NNSA laboratories for other parts of DOE is not considered to be Work for Others (WFO). Prior to the NNSA Act (1999), the laboratories that became part of the NNSA complex were fully a part of DOE, and only work that came from outside DOE was considered WFO. This accounting system continued after the formation of NNSA.

[3] Indeed, the nuclear weapons mission could not be carried out without the active engagement and support of other agencies. This support comes in the form of both direct budget transfers and overhead paid by WFO customers. According to the *Interim Report* of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, "DOD has agreed to transfers of a total of nearly $12 billion over multiple years in budget authority to DOE" to support the nuclear weapons program (April 2014, available from the Institute for Defense Analysis, Alexandria, Va., p. 37).

no fewer than three other studies mandated by Congress were under way that are charged with considering various aspects of DOE laboratory governance issues. The focus of this study is to assess how the governance of the NNSA laboratories might be changed to align better with the evolving national security landscape and the laboratories' increasing engagement with the other national security agencies, while simultaneously encouraging the best technical solutions to national problems from the entire range of national security establishments, including but not limited to the NNSA national security laboratories. Specifically, a key question addressed here is whether the other national security agencies (DOD, the Office of the Director of National Intelligence [ODNI], and DHS) should, in effect, become co-owners with DOE of the NNSA laboratories (in the parlance of the Federal Acquisition Regulations, "co-sponsors"[4]) or whether some more evolutionary model of shared governance is appropriate.

PRINCIPLES OF ANY NEW GOVERNANCE STRUCTURE

The committee has identified six key principles that any new governance model for the NNSA laboratories should observe.

1. *The mission should be clearly defined.* The mission of the NNSA laboratories has evolved over the past five decades from an exclusive focus on designing, engineering, testing, and maintaining nuclear weapons to a more diverse and largely undefined mission of advancing "national security."
2. *Clear lines of authority and accountability are essential.* This principle constitutes a high hurdle to overcome for any new governance model in which multiple agencies (and congressional committees) are involved in setting priorities and making funding decisions at the laboratories.
3. *Recruitment and retention of a talented workforce are critical.* A primary focus must be on maintaining a world-class science and engineering base in fields related to nuclear weapons, such as materials science, modeling and simulation, plasma physics, microelectronics, and radiation chemistry. In addition, vibrant interagency engagement in the WFO programs and education programs, elimination of unnecessary bureaucratic burdens, and promotion of a sense of service to the nation are all important

[4] DOE is the sponsor of 16 national laboratories that are federally funded research and development centers (FFRDCs), including the NNSA laboratories. The responsibilities of an FFRDC sponsor are considerable and are described in the Federal Acquisition Regulations section 35.017.

for attracting the needed talent and maintaining high employee morale and productivity.

4. *Competition should exist with other science and technology (S&T) providers.* In areas not closely related to nuclear weapons, there should be the continued expectation that the NNSA laboratories compete (as legally permissible) on a level playing field with other S&T providers for national security resources.
5. *Sustained strategic engagement should exist between the national security agencies and the NNSA laboratories.* DOD, DHS, and the IC need to be aware of the laboratories' special capabilities, and the laboratories, in turn, need to be aware of the agencies' strategic challenges so the laboratories can develop the necessary capabilities to support the agencies.
6. *The governance structure and operations should be continuously evaluated for cost-effective conduct of mission.* While the national security agencies perceive that the NNSA laboratories provide unique and valuable capabilities that further their missions, they also find the laboratories to be significantly more expensive than other potential providers.

These principles are the basis of the committee's findings, conclusions, and recommendations, discussed below.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Finding 1.1. The committee found no evidence that DOD, DHS, or the IC want to take on direct sponsorship of the DOE/NNSA laboratories as federally funded research and development centers (FFRDCs).

The agencies are generally pleased with the quality of the services they receive from the NNSA laboratories, but as a general matter, they are not interested in committing their own budgets to pay for recapitalization of major NNSA laboratory facilities and equipment.

Finding 1.2. Agency representatives who presented to the committee did not report major problems in obtaining access to the DOE/NNSA laboratories.

Conclusion 1. A new governance model involving formal, multiple-agency FFRDC sponsorship of the DOE/NNSA laboratories would create more problems than it would solve and would be resisted by the other agencies.

There are no examples of successful multisponsor FFRDCs on the scale of the NNSA laboratories. One reason, no doubt, is the funding uncertainty that is inherent in such an arrangement.

Recommendation 1.1. The Department of Energy should remain the sole sponsor of the NNSA laboratories as federally funded research and development centers.

The clearest line of authority (Principle 2) for an FFRDC is via single-agency sponsorship.

Recommendation 1.2. To complement the Department of Energy's (DOE's) sponsorship of the NNSA laboratories, the other national security agencies should have a strategic partnership with DOE that should be formally recognized and should give those agencies a seat at the governance table for the laboratories.

As strategic partners,[5] the national security agencies would have the responsibility to help the laboratories and their sponsor understand the larger national security agenda and enable the laboratories to meet future national security needs beyond nuclear weapons. This strategic partnership relationship stems from the national security agencies' vested interest in the laboratories' performance and development of capabilities to support the agencies' future mission needs.

Finding 2. Although the NNSA laboratories are now by law referred to as "national security laboratories" rather than "nuclear weapons laboratories," no one has clearly articulated what this evolution means in terms of the mission of the laboratories or the proper relationships with other national security agencies and laboratories.

Consistent with Principle 1, an efficient organization requires a clear mission statement.

Recommendation 2. The Department of Energy, in collaboration with the other national security agencies, should develop a clear mission statement for the national security laboratories.

[5] The partnership envisioned here is among DOE and the other national security agencies in the execution of their national security missions through their use of the laboratories in appropriate ways.

DOE can and should use the MEC in its coordinating capability (in consultation with the laboratories) in developing a mission statement for the NNSA laboratories that reflects their evolving role. Although the laboratories should expect to be significantly involved in this process, it is essential that the new mission statement reflects the stakeholders' (i.e., the DOE sponsor's and national security agency strategic partners') buy-in and endorsement.

Finding 3.1. Essentially no strategic planning has taken place in a multiagency context to determine the future national security capabilities needed by the United States, including those that should be funded and resident within the NNSA laboratories.

The committee's review of current strategic plans at DOE, NNSA, and the laboratories found that while these organizations do strategic planning individually, there is no joint, integrated process for strategic planning that involves DOE/NNSA, the other national security agencies, and the laboratories.

Finding 3.2. The four-party Governance Charter and the MEC it established are significant beginnings to implement the national security agencies' strategic partnership role in the governance of the national security laboratories. However, the MEC's performance to date has not met the need for shared, long-term research and development (R&D) planning among the four national security agencies or addressed how the agencies would prioritize and fund the sustainment of national security laboratory capabilities. Moreover, the MEC has had limited engagement with the NNSA laboratories.

MEC-commissioned topical working groups have made progress on near-term, tactical-level issues, which demonstrates the potential for the MEC to drive a long-term strategic dialog and planning process among DOE/NNSA, the national security agencies, and the national security laboratories. The committee's vision of a revitalized "MEC 2.0" is outlined in Box 3.1.

Recommendation 3.1. The Mission Executive Council should become the primary vehicle to define and implement the national security agencies' governance role. It should develop and pursue an agenda focused on identifying strategic priorities and critical capabilities to deal with ongoing and upcoming national security challenges, coordinate approaches for supporting needed invest-

ments in the laboratories, and provide coordinated guidance and processes. It should provide the following:

- **Authoritative, periodic, and structured strategic guidance to the Department of Energy (DOE) and the laboratories about member agencies' medium- and long-term mission challenges and thrusts.**
- **Periodic, structured assessments of the laboratories' performance and capabilities in meeting current national security mission needs and the impact of DOE's oversight on this performance (as an integral part of the laboratory overall assessment process).**
- **A strategic dialog among the agencies and the laboratories about investments that may be needed to better meet anticipated future mission needs and how those investments can be structured and funded.**
- **A strategic dialog with the Office of Science and Technology Policy, the Office of Management and Budget, and the relevant authorizing and appropriating committees of Congress to discuss future laboratory needs and funding priorities as they relate to the laboratories' broader national security mission.**
- **Periodic consideration of other (non-NNSA-laboratory) sources of science and technology to meet national security needs.**

Finding 4. The current NNSA WFO approval process has been improved but still involves costly, repetitive steps at the laboratories and is associated with unnecessary transactional oversight and lack of cooperation and advanced planning between the laboratories and NNSA field offices.

Several previous studies have cited frustrations on the part of customers with the complexity of the WFO approval process and the length of time required to initiate new projects (or add scope and funding to existing ones). NNSA has attempted to address these frustrations and to streamline the approval process; however, further improvements are necessary.

Recommendation 4.1. NNSA should generate one or more Work Scope Agreements (WSAs) with each of the other national security agencies (the Department of Defense, the Office of the Director of National Intelligence, and the Department of Homeland Security) that is considered a strategic partner. The WSA would be the bounding document for bringing in new work from the strategic

partner. Used in conjunction with a Work Boundary Agreement[6] (WBA) between NNSA and each laboratory, work that falls within the WSA/WBA envelope would require only the processing of the funding documents. Further approvals would not be needed.

The committee provides conceptual examples of a WSA and a WBA between one NNSA laboratory and one sponsoring agency in Appendix H. According to an estimate by an analyst at one laboratory (LLNL), this would reduce LLNL's approval efforts by 25 to 30 percent, as well as reducing the level of effort at the NNSA field office.

Recommendation 4.2. NNSA should conduct a comparative assessment of the Office of Science approach to Work for Others, including planning, processes, working relationships between site offices and laboratories, and all associated oversight and approval actions.

Committee interviews with the leadership of the PNNL site office and the management of Pacific Northwest National Laboratory (PNNL) and Oak Ridge National Laboratory—the two DOE Office of Science laboratories that perform a considerable amount of WFO—found less controversy and inefficiency around approval of WFO at these DOE Office of Science laboratories than at the NNSA laboratories.

Finding 5. Based on the limited experience to date with investment by other federal agencies in major equipment and facilities at the national laboratories, there is no proven, systematic approach to assure such investments are made in a timely, cost-effective way.

The committee is aware of three such capital investments at the NNSA laboratories that have been made by non-DOE agencies in the past. In each of these cases, there was no standard process for non-DOE agency investment, and in each case, the process proved to be ad hoc, tortuous, and time consuming.

Recommendation 5. The Mission Executive Council (MEC) should be directed to develop a systematic approach for multiagency investment in the laboratories that allows for Department of Energy investment, together with investment from other federal agencies when and where appropriate. This approach should enable timely enhancement of both facilities and major equip-

[6] The WBA is based on the operational constraints that would provide the envelope for WFO work at the laboratories—safety, security, facility requirements, total cost, etc.

ment to meet a range of national security needs consistent with the new mission statement of the laboratories, or to meet a specific newly identified need. The MEC should define the principles for such an approach, oversee the development of a rolling 10-year plan, approve the annual plan, coordinate agency presentations to the Office of Management and Budget and Congress, and monitor agency accountability for meeting the plan.

Recommendation 6. The governance model described in this report should encompass other laboratories and facilities that receive a significant fraction of their funding from interagency national security work, including Pacific Northwest National Laboratory, Oak Ridge National Laboratory, and the Nevada Nuclear Security Site. Moreover, as a long-term goal, Work for Others processes should be applied uniformly across these institutions, as described in Recommendations 4.1 and 4.2.

Over time, other DOE laboratories or facilities may emerge that conduct a significant amount of interagency national security work, and if this occurs, the committee sees no reason why they should be excluded from the governance considerations proposed in this report.

FINAL THOUGHTS

The DOE/NNSA laboratories will remain a critically important resource to meet U.S. national security needs for many decades to come. However, adjustments are needed now to improve the governance of the laboratories and strengthen their strategic relationship with the non-DOE national security agencies.

The implementation of a governance model involving direct sponsorship of the DOE/NNSA laboratories by multiple agencies would likely involve extensive modification of existing arrangements with these agencies and their associated congressional committees and would likely be strongly resisted by them. The more modest approach that the committee proposes would build on a governance structure with which the various agencies are already comfortable. It would more fully exploit policy mechanisms that are already in place, such as the four-party Governance Charter and its MEC. Because the recommendations in this report largely build on the current governance structure, the committee believes that they would not require new legislation, and that they are within the authority of the Secretary of Energy to implement in consultation with the other national security agencies. These recommendations are designed to create a sustainably successful collaborative relationship

among DOE, the other national security agencies, and the national security laboratories. Implementing these recommendations would increase the probability that critical NNSA laboratory capabilities to support the national security of the United States will be available when needed in the future.

1

Background and Overview

This chapter provides background on the principal National Nuclear Security Administration (NNSA) laboratories—Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL)—and their evolving mission, as well as the context and discussion of the committee's statement of task (see Box 1.1).

As described in more detail in Appendix D, the NNSA laboratories have served the United States well in assuring the reliability, safety, and security of its arsenal of nuclear weapons, promoting nuclear nonproliferation, and producing innovations in many technical areas. The exacting skills required to design, engineer, and maintain the nuclear weapon stockpile have nurtured unique capabilities at the NNSA laboratories that can be applied more broadly. The most closely related applications involve nuclear weapons intelligence, such as nuclear forensics and assessment of foreign nuclear weapons programs, and nuclear nonproliferation. Broader—but still related—areas include defense against chemical and biological weapon threats, cyber warfare, and defense innovations in energy applications and sensors.

The NNSA laboratories developed special computational capabilities to serve purposes related to stockpile stewardship. They now also apply these computational and simulation capabilities to different programs, such as sophisticated simulation of reactor physics and computational studies of combustion processes. The laboratories have also maintained an important scientific presence in many contemporary areas of nuclear

BOX 1.1
Statement of Task

The committee will address the following statement of task (SOT):

(A) Assess the principles for development of any new governance structure for the NNSA National Security laboratories in order to:
  (i) Give multiple national security agencies, including the Department of Defense, the Department of Homeland Security, the Department of Energy, and the intelligence community, direct sponsorship of the national security laboratories as federally funded research and development centers so that such agencies have more direct and rapid access to the assets available at the laboratories and the responsibility to provide sustainable support for the science and technology needs of the agencies at the laboratories;
  (ii) Reduce costs to the Federal Government for the use of the resources of the laboratories, while enhancing the stewardship of these national resources and maximizing their service to the Nation;
  (iii) Enhance the overall quality of the scientific research and engineering capability of the laboratories, including their ability to recruit and retain top scientists and engineers; and
  (iv) Maintain as paramount the capabilities required to support the nuclear stockpile stewardship and related nuclear missions.

(B) Recommend any other laboratories associated with any national security agency that should be included in the new governance structure.

(C) Discuss options for implementing the new governance structure that minimize disruption of performance and costs to the government while rapidly achieving anticipated gains.

(D) Discuss legislative changes and executive actions that would need to be made in order to implement the new governance structure.

(E) Assess the contribution and long-term impact of strategic multiagency engagement on the ability to maintain an effective peer review capability for the breadth of skills needed for the nuclear weapons missions.

physics and advanced computation, and they contribute significantly to the open scientific literature in many science and engineering fields. Work on materials, radiation detection, and sophisticated electronics similarly serve both the core nuclear weapon mission and broader societal and national security needs.[1] The conduct of this broader national security work serves not only to provide valuable and often unique new capabilities to the various national security agencies, but also to keep the labora-

[1] National Research Council (NRC), 2013, *The Quality of Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C. (Phase II report).

tories at the cutting edge of science and engineering (thus benefiting the nuclear weapons program). In addition, this challenging work aids in the recruitment and retention of the exceptional scientists and engineers who populate the laboratories who are, in turn, essential for the nuclear weapons program.

In the past, the Department of Energy (DOE or its predecessor agencies) alone funded the vast laboratory infrastructure supporting the nuclear weapons program. The challenge now is how to meet multi-agency needs in an era of extended federal budget austerity[2] when the nuclear weapons budget is focused specifically on maintenance of an aging stockpile. This situation has made it challenging to attract and retain top talent, and at least one laboratory has expressed concern that early- to mid-career personnel are leaving at increasing rates.[3]

To sustain the manpower and facilities required to maintain the core capabilities, the laboratories have undertaken activities at the request of other agencies that support the core mission, but that also serve those other agencies. These activities, which have historically been termed Work for Others (WFO),[4,5] have grown over time to be a significant portion of the laboratories' budgets, ranging from 9 percent at LANL to 36 percent at SNL (Figure 1.1). Across the entire NNSA complex, WFO totaled $1.656 billion in fiscal year (FY) 2013, or an average of about 20 percent of the budget.[6,7] SNL has been particularly successful in attracting WFO, which increased from its start in the 1960s to $907 million in FY2013, or about

[2] D. Kusnezov and W. Jones, 2013, "Beyond the Endless Frontier: A 20th Century Model Faces 21st Century Realities," *APS News*, http://www.aps.org/publications/apsnews/201203/backpage/cfm.

[3] Dori Ellis, LLNL, "Enabling Interagency Work and the National Security Laboratories," presentation to the committee on May 6, 2014.

[4] Work performed by the NNSA laboratories for other parts of DOE is not considered to be WFO. Prior to the NNSA Act (1999), the laboratories that became part of the NNSA complex were fully a part of DOE, and only work that came from outside DOE was considered WFO. This accounting system continued after the formation of NNSA.

[5] To some, the phrase "Work for Others" has acquired a somewhat xenophobic connotation, and, in the spirit of a more integrated, inclusive national security context, the phrase "Strategic Partnership Projects" is replacing it, according to Kathleen Alexander, NNSA, personal communication on May 5, 2014. However, given the standard and persistent usage of "WFO," it is used in this report. Nevertheless, the committee commends DOE leadership for making this change.

[6] Kathleen Alexander, NNSA, "Comments to The National Academies Committee on Assessment of Governance Structure of the NNSA National Security Laboratories," presentation to the committee on May 5, 2014.

[7] LANL, LLNL, and SNL performed work for other offices within DOE (primarily the Office of Science), totaling about 8 percent of their budgets in FY2014, according to S. Binkley, DOE Office of Science, "A DOE View on NNSA Labs Governance," presentation to the committee on March 12, 2014. This work is not considered as WFO.

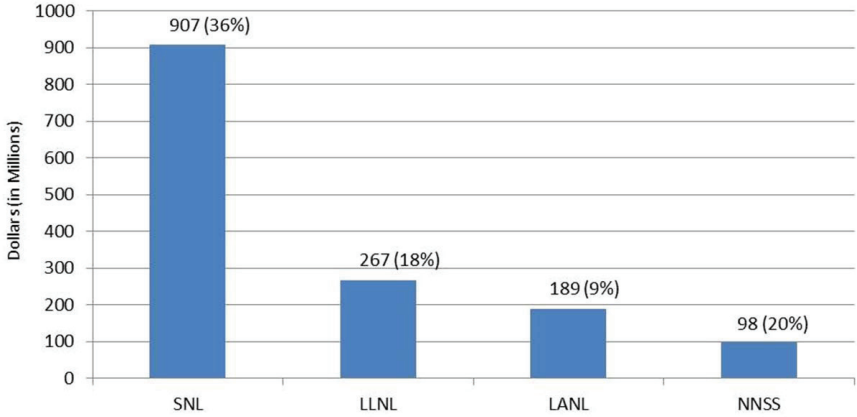

FIGURE 1.1 Work for Others funding totals and budget percentages for science and technology projects sponsored by other (non-DOE) agencies and conducted at NNSA laboratories in fiscal year (FY) 2013. Although it is not a laboratory, the Nevada Nuclear Security Site (NNSS) has historically been a partner to the laboratories and is included for reasons discussed in the text. NOTE: LANL, Los Alamos National Laboratory; LLNL, Lawrence Livermore National Laboratory; SNL, Sandia National Laboratories. SOURCE: Adapted from data supplied by Kathleen Alexander, NNSA, "Comments to the National Academies Committee on Assessment of Governance Structure of the NNSA National Security Laboratories," presentation to the committee on May 5, 2014.

36 percent of the total SNL budget. The major customers are the Department of Defense (DOD) and the Intelligence Community (IC); the DOD alone accounted for 69 percent of NNSA's WFO in FY2013, while the Department of Homeland Security (DHS) accounted for 8 percent.[8]

Several previous studies[9] have found that WFO at the NNSA laboratories helps to promote the successful execution of the core nuclear weapons mission and provides interesting and challenging problems that are essential to attract and retain top scientific talent at the laboratories; indeed, this view was repeated in briefings of the three current laboratory directors to this committee.[10] These same studies have also found,

[8] Alexander, 2014, "Comments to The National Academies Committee."

[9] See, for example, NRC, 2012, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C. (Phase I report); Stimson Center Task Force, 2009, *Leveraging Science for Security*, Henry L. Stimson Center, Washington, D.C.

[10] Briefings of directors Paul Hommert (SNL), Charles McMillan (LANL), and William Goldstein (LLNL) to the committee on April 9, 2014.

however, that the current WFO model is insufficient to sustain critical capabilities at the laboratories. One reason is that due to its ad hoc nature, WFO does not necessarily relate to any long-term strategic plan for sustainment of capabilities;[11] another is that although WFO is conducted on a "full cost recovery" basis,[12] it does not pay for the recapitalization of major equipment or facilities at the laboratories that support such work over time.[13] As a recent National Research Council (NRC) study[14] put it:

> Conducting applied program work outside the nuclear weapons program for agencies other than DOE . . . does not encourage those other sponsoring government agencies to contribute to the long-term institutional support needed to maintain the laboratories. Work for agencies other than DOE . . . is conducted under task-order contracts. The contracts specify and fund specific work and deliverables, but rarely contribute to the construction of facilities and purchase of major equipment. These other agencies are exploiting the infrastructure that has resulted from NNSA's investment, and are by and large not contributing directly to the building and maintenance of that infrastructure.

Some observers have described the approach of other agencies as "buying by the drink rather than investing in the vineyard." To address this recapitalization problem, several major recent studies have recommended that other agencies be given some shared responsibility and accountability for helping DOE/NNSA to maintain the capabilities of the laboratories on which they depend. The 2009 report of the Congressional Commission on the Strategic Posture of the United States[15] recommended that the President issue an "Executive Order formally assigning the Secretaries of Defense, Energy, State, and Homeland Security, and the Director of National Intelligence joint responsibility for the health of these laboratories." For a similar purpose, the 2009 Stimson Center Task Force recommended as follows: "Create multi-agency sponsorship of the weapons labs and NTS [the former Nevada Test Site, now called the Nevada

[11] Stimson Center Task Force, 2009, *Leveraging Science for Security*.

[12] In the current model, all funding agencies pay the same overhead and general and administrative burden as DOE for operations and maintenance of facilities, utilities, support functions, Laboratory Directed Research and Development, as well as employee salaries and benefits including retirement.

[13] Because federal and DOE rules do not allow for amortization of capital equipment, at least under the DOE interpretation of cost accounting standards, the laboratories feel significant constraint on use of indirect dollars for even the smallest capital equipment replacement.

[14] NRC, 2012, *Managing for High-Quality Science and Engineering*.

[15] Congressional Commission on the Strategic Posture of the United States, 2009, "America's Strategic Posture."

Nuclear Security Site, or NNSS] to ensure that the S&T capabilities will continue to be nurtured regardless of the level of the nuclear weapons budget. Alternatively, explore means to achieve strategic planning and long-term investment by other national security agencies."[16] Appendix E summarizes the recommendations of several previous reports calling for other federal agencies to support the DOE/NNSA laboratories and have some role in their governance.

The problem of sustaining the NNSA laboratories by nurturing the engagement of the national security agencies that make use of them has received at least an initial response. In 2010, a memorandum of understanding (MOU) was signed by the Secretaries of DOD, DHS, and the Director of National Intelligence establishing a "Governance Charter for an Interagency Council on the Strategic Capabilities of DOE National Laboratories as National Security Assets," reprinted in Appendix F. As described in a recent NRC report,[17]

> [The Governance Charter] creates a mechanism for agencies other than NNSA to participate in the planning, evaluation, and maintenance of ST&E (science, technology, and engineering) at the laboratories. This does not supplant the role of DOE/NNSA as the owner of the laboratories, but it brings organizations that had heretofore been users of the capabilities at the laboratories into a more active role of sustaining the ST&E capabilities. The charter provides for the creation of a mission executive council (MEC) consisting of two senior executives from each of the signatory agencies (DOE, DOD, DHS, and DNI). Among other things, the executive council will: (1) review and assess the adequacy of ST&E in areas of cross-cutting interest; (2) identify areas of ST&E needing attention; (3) consider recommendations to close identified gaps; and (4) take actions as necessary and appropriate. This charter does not replace NNSA's authority, and it does not void or replace any contractual obligations. However, it does provide another, broader, government forum within which to evaluate scientific quality at the laboratories and the relevance of that scientific quality to a broad range of national security missions. It also provides a basis for major government agencies beyond DOE/NNSA to develop a stake in—and therefore a basis for investing in—ST&E at the labs.

The origins of the 2010 four-party MOU, whose initial impetus came from the IC, are described in Appendix G.

As discussed in Chapter 3, however, the full promise of the Governance Charter and the MEC has not been achieved. Mission clarity is at the heart of any governance model. The important interrelationships

[16] Stimson Center Task Force, 2009, *Leveraging Science for Security*, p. 35.
[17] NRC, 2012, *Managing for High-Quality Science and Engineering*.

between the capabilities necessary to sustain the weapons mission of these laboratories as well as the essential work assigned by security agencies need to be clearly defined and recognized. They involve both the recruitment and retention of extraordinary scientific and engineering talent as well as the sustainability of viable physical facilities and instrumentation. It is essential that the desired governance model for these laboratories is capable of recognizing and supporting these important interrelationships in the interest of improving research outcomes, cost effectiveness, and timely decision making and implementation.

APPROACH TO THE STATEMENT OF TASK

The legislation that mandated this study specifically references the Stimson Center Task Force report,[18] which is the report that has been most explicit in calling for multiagency sponsorship of the NNSA laboratories as federally funded research and development centers (FFRDCs).[19] Indeed, this approach is a key theme underlying the committee's statement of task, shown in Box 1.1.

The responsibilities of an FFRDC sponsor are considerable and are described in the Federal Acquisition Regulations, section 35.017. DOE is the sponsor of 16 national laboratories that are FFRDCs, including the NNSA laboratories.[20]

In approaching its work, the committee heard from current and former officials of DOE, NNSA, and the national security customer agencies mentioned in the statement of task (DOD, DHS, and the IC; see Appendix B). It also heard from the three current NNSA laboratory directors as well as senior managers at headquarters and field offices associated with the WFO operations of both the DOE/NNSA and DOE/Office of Science laboratories. Consistent with the statement of task, the committee's focus was on the issue of multiagency engagement with the NNSA laboratories, rather than on DOE/NNSA internal organizational and operational processes. Those internal issues are important and bear on the implementation of this committee's recommendations but are beyond the scope of this study. The committee was mindful in this conviction that such matters

[18] Stimson Center Task Force, 2009, *Leveraging Science for Security*.

[19] As described in more detail in the Federal Acquisition Regulation section 35.017, an FFRDC is a unique nonprofit entity sponsored and funded by the U.S. government to meet some special long-term research or development need which cannot be met as effectively by existing in-house or contractor resources. It is common for agencies to establish long-term relationships with their FFRDCs in order to provide continuity.

[20] The National Science Foundation maintains a master list of FFRDCs; see http://www.nsf.gov/statistics/ffrdclist/#agency.

were being examined by the Congressional Advisory Panel as described in the Preface.

The committee chose to include the NNSS in its scope, along with the three NNSA laboratories. Although the NNSS is not a laboratory or an FFRDC, it is a partner in the laboratories' work and has a shared history with the NNSA laboratories. Moreover, the committee understands that the business case for NNSS is transitioning toward a business model featuring multiagency use.[21] In FY2013, approximately 20 percent of NNSS funding was from WFO that came from non-DOE federal agencies and other sources.[22] The committee also notes that certain non-NNSA DOE laboratories do substantial work on national security matters (e.g., Oak Ridge National Laboratory and Pacific Northwest National Laboratory), and these are discussed further in Chapter 3.

The committee's statement of task directs, among other elements, that the study focus on "the principles for development of any new governance structure for the NNSA National Security laboratories" to meet the needs of the national security agencies. These principles are central and are outlined in Chapter 2. Chapter 3 provides a discussion of the committee's findings, conclusions, and recommendations, keyed to the elements of the statement of task.

[21] Dimitri Kusnezov, DOE, personal communication to the study director, February 4, 2014.
[22] James Holt, NNSS, personal communication with the study director, June 2, 2014.

2

Governance Principles

Several major recent studies have found that changes in the governance of the National Nuclear Security Administration (NNSA) laboratories are necessary for their continued success (Appendixes C and E). For purposes of this study, "governance" of the NNSA laboratories is considered to be the policies and practices of the following entities: the Department of Energy (DOE) headquarters, NNSA headquarters, NNSA field offices, and the Defense Nuclear Facilities Safety Board (DNFSB).

The three nuclear weapons laboratories, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL), are federally funded research and development centers (FFRDCs) operated under management and operating (M&O) contracts agreed to between DOE/NNSA and Los Alamos National Security, LLC, Lawrence Livermore National Security, LLC, and the Sandia Corporation, respectively.

NNSA science and engineering programs conducted by these laboratories are formulated, funded, and overseen by the NNSA. Work for Others (WFO) programs are formulated, funded, and overseen by other national security agencies and overseen and approved by NNSA. Laboratory operations are managed by a laboratory director under policies specific to each laboratory, which are informed by laws, nationally accepted standards, NNSA rules and regulations, DOE rules and regulations, contractor policies and guidance, and input from the DNFSB. Each laboratory-specific set of policies is interpreted by the local NNSA field office, which also oversees their implementation. The local field office

also functions as the administrative manager for WFO conducted at the laboratory, including review of all projects for acceptance, conduct, and closure, as well as operational oversight.

The DNFSB has a congressionally mandated, independent advisory function to the Secretary of Energy on safety aspects of the laboratories' nuclear facilities and operations. DOE's interpretation of the observations and recommendations of the DNFSB are a significant element of the NNSA governance model and cost of operation.

The committee did not pursue changes to the internal DOE/NNSA organization, particularly given that such internal governance issues will be treated in depth by the Congressional Advisory Panel (see the Preface). Rather, the committee's statement of task directs, among other elements, that the study focus on "the principles for development of any new governance structure for the NNSA National Security Laboratories" to meet the needs of the national security agencies (DOE, Department of Defense, Department of Homeland Security, and the Intelligence Community). The committee recognizes that the application of the principles will need to be tailored to the overall structure of the DOE organization.

PRINCIPLE 1: THE MISSION SHOULD BE CLEARLY DEFINED AND ARTICULATED

Appendix D describes how the mission of the NNSA laboratories and the Nevada Nuclear Security Site has evolved over many decades from an exclusive focus on designing, engineering, testing, and maintaining nuclear weapons to a more diverse and largely undefined mission of advancing national security.[1] Up to now, this evolution has occurred in an ad hoc fashion, largely in response to the laboratories' search for resources (often encouraged by NNSA as budgets have become more constrained), although the laboratories have remained true to their national service orientation as FFRDCs. There has not been any agreed upon definition of the mission boundaries or technical capabilities required, nor are the laboratories funded as national security laboratories; that is, DOE funds are not available for projects or facilities that primarily benefit other national security agencies. Several previous studies have commented on the need for a more clearly defined mission.[2]

[1] This vision of a broader national security role for the NNSA laboratories was formally articulated by Secretary of Energy Samuel Bodman in a letter entitled "Transforming the Nuclear Weapons Complex into a National Security Enterprise," signed on June 19, 2008.

[2] Secretary of Energy Advisory Board, 1995, Task Force on Alternative Futures for the Department of Energy National Laboratories ("Galvin report"); Stimson Center Task Force, 2009, *Leveraging Science for Security*, Henry L. Stimson Center, Washington, D.C.; Congressional Commission on the Strategic Posture of the United States, 2009; National Research

National security challenges will continue to evolve, and for the laboratories to continue to be valuable national assets, their mission must evolve with these challenges. The nuclear weapons mission is certain to remain critical to U.S. security for the foreseeable future, but broader national security threats will continue to arise. Thus, appropriate mid- to long-term strategic planning to define the capabilities that the laboratories must sustain to meet evolving national security challenges will be an important aspect of defining the laboratories' mission in the future. Such planning should be done by DOE in partnership with the other national security agencies and should include consultation with the laboratories.[3]

PRINCIPLE 2: CLEAR LINES OF AUTHORITY AND ACCOUNTABILITY ARE ESSENTIAL

Clear lines of authority and accountability are essential for efficient, cost-effective operation. Lack of clear lines of authority has been cited as a cause of excessive oversight and unclear roles within DOE/NNSA.[4] Given that these problems already exist within DOE/NNSA, this principle constitutes a high hurdle to overcome for any new governance model in which multiple agencies (and congressional committees) are involved in setting priorities and making funding decisions at the laboratories. Responsibility should be clearly defined for implementation of an overall strategy in order to assure the establishment of appropriate priorities and to assure appropriate coordination. The inevitable consequence of any division of responsibility is that no one entity has true responsibility, with the result that decisive strategic management is unlikely.

PRINCIPLE 3: RECRUITMENT AND RETENTION OF A TALENTED WORKFORCE ARE CRITICAL[5]

The need to recruit and retain top-notch people applies to bench scientists, innovative engineers, and effective management and support

Council (NRC), 2012, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C.

[3] The DOE Office of Science's planning process, described in http://science.energy.gov/lp/laboratory-planning-process, accessed November 26, 2014, provides a useful example.

[4] Commission on Maintaining United States Nuclear Weapons Expertise ("Chiles Commission"), March 1, 1999; Center for Strategic and International Studies, Commission on Science and Security, 2002, *Science and Security in the 21st Century*; Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, 2014, *Interim Report,* Washington, D.C., April, available from the Institute for Defense Analysis, Alexandria, Va.

[5] This principle was also a key finding of the study NRC, 2013, *The Quality of Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C. (Phase II report).

personnel. The laboratories need to remain attractive places to work, especially in light of the increased competition for talent from industry and academia. A primary focus must be on maintaining a world-class science and engineering base in fields related to nuclear weapons, such as materials science, modeling and simulation, plasma physics, microelectronics, and radiation chemistry. In addition, vibrant interagency engagement in the form of WFO programs, enhanced recruiting programs, education programs, summer internships, postdoctoral positions, competitive compensation, an enterprising culture, elimination of unnecessary bureaucratic burdens, and promotion of a sense of service to the nation are all important for attracting the needed talent and maintaining high employee morale and productivity. Indeed, the national security focus—including WFO—provides an integrated and professionally challenging foundation for recruiting and retaining a talented workforce.

PRINCIPLE 4: COMPETITION SHOULD EXIST WITH OTHER SCIENCE AND TECHNOLOGY PROVIDERS

The NNSA laboratories are clearly the "go-to" institutions for a variety of customers for nuclear-weapons-related science and technology (S&T), as well as closely related areas such as the technical issues associated with nonproliferation or the assessment of foreign nuclear weapons programs. However, they are not necessarily the best or cheapest providers of S&T in other national security areas. In areas not closely related to nuclear weapons, there should be the continued expectation that the NNSA laboratories compete (as legally permissible within their status as FFRDCs) on a level playing field with other S&T providers for national security resources. This not only ensures the most cost-effective use of U.S. tax dollars, but also benefits the laboratories in the long run by providing healthy incentives for cost reduction to both the laboratories and to DOE/NNSA, discouraging the development of a culture of entitlement and encouraging the best technical solutions.

PRINCIPLE 5: SUSTAINED STRATEGIC ENGAGEMENT SHOULD EXIST BETWEEN THE NATIONAL SECURITY AGENCIES AND THE NNSA LABORATORIES

The national security agencies and the NNSA laboratories need to have a sustained strategic engagement and dialog if the laboratories are to truly function as national security laboratories. This engagement should include participation of the national security agencies in the strategic planning of each laboratory. The agencies need to be aware of the laboratories' special capabilities, their views on the strategic implications

of S&T developments, and the need to sustain capabilities or develop new ones. DOE/NNSA and the laboratories, in turn, need to be aware of the national security agencies' views of their own strategic challenges so the laboratories can develop the necessary capabilities to support them.

PRINCIPLE 6: THE GOVERNANCE STRUCTURE AND OPERATIONS SHOULD BE CONTINUOUSLY EVALUATED FOR COST-EFFECTIVE CONDUCT OF MISSION

Organizations that perform well continuously evaluate their cost structures. The national security agencies perceive that the NNSA laboratories provide unique and valuable capabilities that further their missions, but they also find the NNSA laboratories to be significantly more expensive than other potential providers. Some of this cost is no doubt due to the nature of the work that the NNSA laboratories perform and the expense associated with the establishment and maintenance of specialized nuclear facilities. But some of the expense and delay are related to security, safety, environmental, and fiscal requirements that are imposed broadly by DOE/NNSA's approach to self-regulation, which promotes risk avoidance or elimination, not risk management.[6] The committee was told during briefings that these self-imposed requirements (and the arbitrary DOE interpretation of their requirements) are excessive.[7] These costs are borne by all customers.

ADDITIONAL THOUGHTS

The committee recognizes that the current governance structure of the NNSA laboratories could change as a result of the various ongoing studies but believes that the six key principles articulated here should be reflected in whatever new governance structure may emerge. The principles also provide the foundation for the committee's findings, conclusions, and recommendations, which are discussed in the next chapter.

[6] Congressional Advisory Panel, 2014, *Interim Report*.

[7] Statement of Richard Mies to the committee on March 12, 2014; statement of the three current NNSA laboratory directors to the committee on April 9, 2014.

3

Findings, Conclusions, and Recommendations

The committee's findings, conclusions, and recommendations are presented in this chapter and correspond to elements of the committee's statement of task (Box 1.1), beginning with task A:

(A) Assess the principles for development of any new governance structure for the NNSA [National Nuclear Security Administration] National Security laboratories in order to:
  (i) Give multiple national security agencies, including the Department of Defense [DOD], the Department of Homeland Security [DHS], the Department of Energy [DOE], and the Intelligence Community [IC], direct sponsorship of the national security laboratories as federally funded research and development centers [FFRDCs] so that such agencies have more direct and rapid access to the assets available at the laboratories and the responsibility to provide sustainable support for the science and technology needs of the agencies at the laboratories;
  (ii) Reduce costs to the Federal Government for the use of the resources of the laboratories, while enhancing the stewardship of these national resources and maximizing their service to the Nation;
  (iii) Enhance the overall quality of the scientific research and engineering capability of the laboratories, including their ability to recruit and retain top scientists and engineers; and
  (iv) Maintain as paramount the capabilities required to support the nuclear stockpile stewardship and related nuclear missions.

The principles for development of any new governance structure, determined by the committee for item A, are discussed in Chapter 2.

THE ISSUE OF MULTIAGENCY SPONSORSHIP OF THE LABORATORIES

The committee addresses item A(i), multiagency sponsorship of the laboratories, below.

Finding 1.1. The committee found no evidence that DOD, DHS, or the IC want to take on direct sponsorship of the DOE/NNSA laboratories as FFRDCs.

Rather, these agencies reported difficulties obtaining adequate funding to support their own facilities, infrastructure, and laboratories. These agencies are eager to use the DOE/NNSA laboratories in areas that are critical to their own missions, but as a general matter are not interested in committing their own budgets to pay for recapitalization of major NNSA laboratory facilities and equipment. They are generally pleased with the quality of the services they receive from the NNSA laboratories, although they uniformly perceive the laboratories to be expensive in comparison to other research providers.

Finding 1.2. Agency representatives who presented to the committee did not report major problems in obtaining access to the DOE/NNSA laboratories.

Perhaps the most satisfied customer is DHS, which enjoys a unique status as a result of specific legislation[1] passed in the aftermath of the events of September 11, 2001. It guarantees DHS access to DOE/NNSA laboratories on an equal basis with DOE.[2] The committee was told, however, that while this legislation may have "greased the wheels" of access early in the history of DHS,[3] it does not currently accelerate the approval process for DHS Work for Others (WFO) projects compared with other agencies.[4]

[1] The Homeland Security Act of 2002 (P.L. 107-296, Title III, Section 309 (a) November 25, 2002).

[2] Memorandum of Agreement (MOA), dated February 28, 2003, provides guidance enabling DHS to gain efficient access to specific DOE capabilities. DHS has the same access to the DOE labs as DOE does.

[3] Parney Albright, former Assistant Secretary, DHS, in comments to the committee on March 12, 2014.

[4] Kathleen Alexander, NNSA, comments to the committee on March 12, 2014.

Several previous studies have cited frustrations on the part of customers with the complexity of the WFO approval process and the length of time required to initiate new projects (or add scope and funding to existing ones).[5] NNSA has attempted to address these frustrations and to streamline the approval process,[6] but further improvements are necessary, such as those highlighted below in Recommendation 4.1.

Conclusion 1. A new governance model involving formal, multiple-agency FFRDC sponsorship of the DOE/NNSA laboratories would create more problems than it would solve and would be resisted by the other agencies.

Researchers at Sandia National Laboratories (SNL) presented an analysis to the committee[7] in which they qualitatively matched a series of key NNSA laboratory values with a range of possible governance models and concluded that the best fit would be an arrangement in which DOE remained the primary sponsor of the laboratories while DOD and the Office of the Director of National Intelligence (ODNI) became co-sponsors. The committee appreciates the value of analysis of radical changes that would promote greater involvement of the national security agencies in the governance of the NNSA laboratories. But it notes that there are no examples of successful multi-sponsor FFRDCs on the scale of the NNSA laboratories. One reason, no doubt, is the funding uncertainty inherent in such an arrangement; for example, jointly funded multiyear investment programs are vulnerable to reprogramming of funds by participating sponsors or Congress in response to changing priorities, and the processes for appealing and resolving such decisions are not obvious. Further, the large number of congressional oversight and appropriations committees with jurisdiction on national security issues makes it highly impractical to have multiagency sponsorship of the NNSA laboratories; overlapping committee jurisdictions would inevitably result in blurring the lines of authority and funding. DOE's mix of national security and domestic responsibilities produces a complex web of congressional oversight and appropriations that already complicates funding DOE's national security mission. Adding other agencies and their oversight and appropriations committees to the mix would be a recipe for further problems and complexities, not success.

[5] Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, 2014, *Interim Report,* April, available from the Institute for Defense Analysis, Alexandria, Va.

[6] Kathleen Alexander, NNSA, "Comments to The National Academies Committee on Assessment of Governance Structure of the NNSA National Security Laboratories," presentation to the committee on May 5, 2014.

[7] Jill Hruby, SNL, "Perspectives on Governance of 21st Century National Security FFRDCs," presentation to the committee on April 8, 2014.

The clearest line of authority (Principle 2) for an FFRDC is via single-agency sponsorship. Given DOE's responsibility for the nuclear stockpile and the centrality of the laboratories in fulfilling that responsibility, DOE is now, and is likely to remain for the foreseeable future, the most appropriate sponsor for the national security laboratories. DOE thus must continue to assume both the authority and the responsibility to assure the success of the laboratories.

Recommendation 1.1. The Department of Energy should remain the sole sponsor of the NNSA laboratories as federally funded research and development centers.

NNSA, representing the sole sponsor (DOE), should provide strategic-level oversight of the laboratories and should, for example, negotiate the umbrella contract for the laboratories' operations and assess performance under those contracts. DOE should also provide much of the federal funding for the laboratories' programs and operations.

Recommendation 1.2. To complement the Department of Energy's (DOE's) sponsorship of the NNSA laboratories, the other national security agencies should have a strategic partnership with DOE that should be formally recognized and should give those agencies a seat at the governance table for the laboratories.

It is short-sighted to think of multiagency sponsorship as the only alternative model to the current governance approach of DOE as the sole sponsor (and sole source of governance) of the laboratories. Because the current system is not working well, most recent studies have proposed shared governance, not multiple sponsors (see Appendix E). The national security agencies should have roles in the laboratories' governance that complement DOE's role as sponsor and promote sustained strategic engagement, as described in Principle 5.

As sponsor of the national security laboratories, DOE/NNSA has overall responsibility for managerial oversight and funding for the laboratories' core operations and investments, which are focused on nuclear weapons. As strategic partners,[8] the national security agencies would have the responsibility to help the laboratories, and their DOE sponsor, to understand the larger national security agenda and enable the laboratories and sponsor to meet future national security needs beyond those of

[8] The partnership envisioned here is among DOE and the other national security agencies in the execution of their national security missions through their use of the laboratories in appropriate ways.

nuclear weapons. This strategic partnership relationship stems from the national security agencies' vested interest in the laboratories' performance and development of capabilities to support the agencies' future mission needs.

As part of this strategic partnership function, it is essential that the national security agencies have a strategic dialog and relationship with the national security laboratories. The agencies need to be aware of the capabilities of the DOE laboratories that have relevance to their own respective missions and also need to provide the laboratories with assessments of their own future challenges and science and technology (S&T) needs. This will allow them to call on the laboratories' special capabilities when needed, and, in turn, allow DOE and its laboratories to plan for and develop the necessary capabilities to meet the agencies' future needs. Each strategic partner would, as now, obtain the benefit of the laboratories' skills through the WFO process and, as appropriate, would invest or advocate for the investment in facilities or major equipment that serve its national security needs.

There are benefits for the laboratories, for DOE/NNSA, and for the other national security agencies in reinforcing this strategic partnership role. The work for other agencies helps to sustain key nuclear weapons capabilities, helps to attract and retain the best scientific talent, and provides value to the nation from its investment. Although an enterprising culture among the scientists and engineers in the laboratories is essential, the work undertaken by the laboratories should not dilute or distract from the achievement of the core weapons mission. Moreover, in line with Principle 4, the efficient use of national resources means that funds should go to the most capable and cost-effective performers; work should not be directed to the laboratories merely because they exist and have available staff.

This strategic partnership concept depends on three foundational ideas: (1) clarity of the national security mission, (2) a shared vision of the future, and (3) a collaborative approach to meeting future financial and capability needs. The national security agencies' strategic partnership function should be pursued by way of an enhanced role for the Mission Executive Council (MEC; see below).

THE NEED TO DEFINE THE MISSION OF THE NATIONAL SECURITY LABORATORIES

Finding 2. Although the NNSA laboratories are now by law referred to as "national security laboratories" rather than "nuclear weapons laboratories," no one has clearly articulated what this evolution means in terms of the mission of the laboratories or the

proper relationships with other national security agencies and laboratories.

Consistent with Principle 1, an efficient organization requires a clear mission statement.

Recommendation 2. The Department of Energy, in collaboration with the other national security agencies, should develop a clear mission statement for the national security laboratories.

The foundation for strategic planning should be a crisp and clear mission statement that articulates the role that the national security laboratories should play in supporting the national security agencies. Indeed, according to the Federal Acquisition Regulation section 35.017-1, one of the responsibilities of the sponsor of an FFRDC is to define the scope of its mission in the sponsor agreement. The mission statement of the FFRDC is to be reviewed by the sponsor no less than every 5 years.

The core mission is assuring the reliability, safety, and security of the arsenal of nuclear weapons. Ancillary elements clearly should encompass capabilities that flow directly from that mission, such as weapons-related intelligence and assessments, nuclear forensics, radiation-hardened microelectronics, radiation detection capabilities, and the like. The challenge is in defining the appropriate role for the national security laboratories with regard to S&T matters that are more distant from the core weapons mission. DOE can and should use the MEC in its coordinating capability (in consultation with the laboratories) in developing a mission statement for the laboratories that reflects their evolving role. Although the laboratories should expect to be significantly involved in this process, it is essential that the new mission statement reflects the stakeholders' (i.e., the DOE sponsor's and national security agency partners') buy-in and endorsement.

THE NEED FOR JOINT MULTIAGENCY STRATEGIC PLANNING THROUGH THE MISSION EXECUTIVE COUNCIL

Finding 3.1. Essentially no strategic planning has taken place in a multiagency context to determine the future national security capabilities needed by the United States, including those that should be funded and resident within the NNSA laboratories.

The committee's review of current strategic plans at DOE, NNSA, and the laboratories found that while these organizations do strategic planning individually, there is no joint, integrated process for strategic planning that

involves DOE/NNSA, the other national security agencies, and the laboratories. The planning should include not only the articulation of current capabilities and future thrusts and directions, but also governance-related issues, such as assessments of human and physical capital and strategies, to assure that capabilities for the future are funded and developed to meet the national security agencies' needs. Such strategic planning could reasonably be accomplished through an expanded role for the MEC.

Although not members of the MEC, the laboratories need to be regular participants in order to provide insights both as to existing capabilities and as to future capabilities that could advance achievement of the national security mission.

THE ROLE OF THE MISSION EXECUTIVE COUNCIL

Finding 3.2. The four-party Governance Charter and the MEC it established are significant beginnings to implement the national security agencies' strategic partnership role in the governance of the national security laboratories. However, the MEC's performance to date has not met the need for shared, long-term research and development (R&D) planning among the four national security agencies or addressed how the agencies would prioritize and fund the sustainment of national security laboratory capabilities. Moreover, the MEC has had limited engagement with the NNSA laboratories.

The process of interaction among the MEC member agencies is not yet mature, perhaps because turnover has been relatively high among MEC-related officials, and there have been relatively few meetings of the full MEC. MEC-commissioned topical working groups have made progress on near-term, tactical-level issues, which demonstrates the potential for the MEC to drive a long-term strategic dialog and planning process among DOE/NNSA, the national security agencies, and the national security laboratories.

The committee notes that senior-level agency commitment is important for the success of the four-party Governance Charter and for an enduring strategic partnership relationship between the national security agencies and DOE/NNSA. Such a relationship will enhance the laboratories' ability to support the national security agencies in the future. This means an active strategic dialog, not only on which current laboratory capabilities need to be sustained, but also for identifying capabilities that are appropriate to be developed at the NNSA laboratories to deal with future national security challenges. This will require the national security agencies to share with other MEC agencies and the national security laboratories their strategic priorities and over-the-horizon challenges that

they need S&T help to address.[9] The laboratories, in turn, will need to share with MEC agencies their assessment of the impact of S&T developments on potential national security issues, as well as the status of their current and planned capabilities to address these issues. Participation of high-level agency leadership in the MEC—at the Under Secretary or key Assistant Secretary level[10]—is necessary for the MEC to successfully negotiate the requisite coordination of strategic planning, priority setting, and funding of laboratory capabilities to meet current and emerging national security challenges. Periodic cabinet-level interaction is also essential.

Recommendation 3.1. The Mission Executive Council should become the primary vehicle to define and implement the national security agencies' governance role. It should develop and pursue an agenda focused on identifying strategic priorities and critical capabilities to deal with ongoing and upcoming national security challenges, coordinate approaches for supporting needed investments in the laboratories, and provide coordinated guidance and processes. It should provide the following:

- **Authoritative, periodic, and structured strategic guidance to the Department of Energy (DOE) and the laboratories about member agencies' medium- and long-term mission challenges and thrusts.**
- **Periodic, structured assessments of the laboratories' performance and capabilities in meeting current national security mission needs and the impact of DOE's oversight on this performance (as an integral part of the laboratory overall assessment process).**
- **A strategic dialog among the agencies and the laboratories about investments that may be needed to better meet anticipated future mission needs and how those investments can be structured and funded.**
- **A strategic dialog with the Office of Science and Technology Policy, the Office of Management and Budget, and the relevant authorizing and appropriating committees of Congress to discuss future laboratory needs and funding priorities as they relate to the laboratories' broader national security mission.**
- **Periodic consideration of other (non-NNSA-laboratory) sources of science and technology to meet national security needs.**

[9] The MEC may conclude that it should involve other agencies in its deliberations. For example, the Department of State has an important role in nuclear nonproliferation policy and it might be invited to participate in MEC deliberations on that subject.

[10] The level of the appropriate person may vary among individual agencies.

Recommendation 3.2. The high-level Mission Executive Council meetings should be complemented by biannual meetings (or more frequent as necessary) at the cabinet level that would be chaired by the Secretary of Energy.

Such periodic meetings would ensure that the capability and funding priorities identified by the MEC are raised to the attention of senior policymakers.

A description of the activities of a more expansive, effective MEC, as envisioned by this committee, is presented in Box 3.1.

THE ISSUE OF COST

With respect to item A(ii) of the statement of task, an NNSA laboratory analyst[11] stated in a briefing to the committee that the costs to non-DOE agencies for contracting with the NNSA laboratories for S&T work through the WFO process are in the middle of the range of such costs for contracting with other potential research providers. However, at least in the perception of customer agency representatives who briefed the committee, the NNSA laboratories are considered to be relatively expensive compared with other potential research providers, and the high cost of the laboratories is a significant factor in their decision about where to conduct R&D work.[12] An apples-to-apples comparison of the fully burdened rates of different research institutions is not a simple analysis, and the committee did not attempt to conduct an independent assessment. However, it is plausible that the laboratories' responsibilities for safeguarding and working with special nuclear materials, as well as the layers of oversight currently employed to ensure compliance with DOE's and NNSA's risk-averse approach to environmental, safety, and health issues at the laboratories would make their overall costs comparatively high.

At least a small part of the cost problem at DOE/NNSA laboratories may be alleviated through changes in culture and attitude. The DOE Office of Science laboratories have to operate under the same DOE orders as DOE/NNSA laboratories, but appear to do so more smoothly and cost-effectively. The committee received briefings from the DOE Office of Science,[13] a site

[11] Dori Ellis, LLNL, "Enabling Interagency Work at the NNSA National Security Laboratories," presentation to the committee on May 6, 2014.

[12] Al Shaffer, DOD, "DOD Perspectives," presentation to the committee on March 12, 2014; John Phillips, CIA (retired), "NAS DOE Governance Input," presentation to the committee on March 13, 2014.

[13] Steve Binkley, DOE, "A DOE View on NNSA Labs Governance," presentation to the committee on March 12, 2014.

BOX 3.1
Mission Executive Council 2.0 Vision

The Mission Executive Council (MEC) has been slow to develop and is not yet effective in either establishing an appropriate governance role for the national security agencies with the DOE/NNSA laboratories or serving as a strategic science and technology (S&T) forum among the national security agencies and between the national security agencies and the laboratories. The committee's vision of what the MEC should become—a new and improved MEC 2.0—is described below.

MEC 2.0 would provide a forum for two-way strategic communication between the laboratories and the national security agencies. In one direction, the specific science and engineering capabilities of the individual laboratories would be identified and promulgated among the participating national security agencies, as well as the laboratories' views of strategic S&T trends and the national security challenges that may flow from them. In the other, the strategic S&T priorities and research and development needs of the participating agencies that are appropriate to be addressed by the laboratories would be identified and promulgated to the laboratories. MEC 2.0 would utilize this exchange of information to formulate a mission statement for the national security laboratories and generate an integrated, strategic S&T plan that would inform individual agency and laboratory planning.

MEC 2.0 would provide a forum for strategic dialog between the participating agencies and the laboratories with regard to investments that may be needed to sustain capabilities at the laboratories or develop new ones that the agencies consider crucial to their national security missions. As appropriate, MEC 2.0 would engage with the Office of Management and Budget, the Office of Science and Technology Policy, and relevant committees of Congress to help ensure that the identified priorities are funded.

MEC 2.0 would feature regular meetings of senior leaders of the participating agencies and include dialog as appropriate with the directors of the DOE/NNSA laboratories. The Secretary of Energy would chair periodic meetings of his/her counterparts from the participating agencies to review the MEC's strategic direction and ensure that issues that arise are addressed in a timely and integrated fashion. No changes to the original charter of the MEC would be required to realize this vision.[a]

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[a] The 2010 four-party memorandum of understanding (MOU) entitled "Governance Charter for an Interagency Council on the Strategic Capability of DOE National Laboratories as National Security Assets," which includes the original charter of the MEC, is reprinted in Appendix F. In the fiscal year (FY) 2013 National Defense Authorization Act (P.L. 112-239, Sec 1040 (a)), Congress authorized the establishment of the Interagency Council on the Strategic Capability of the National Laboratories and then detailed the council's membership (the Secretaries of Energy, Defense, and Homeland Security, the Director of National Intelligence, and the Administrator of the NNSA) and its responsibilities. The legislation does not specifically mention the MEC but mandates that "the President may determine the chair, structure, staff, and procedures of the Council." The legislation calls for a report from the Council assessing, among other items, the implementation of the 2010 four-party MOU. As of this writing, that report had not yet been delivered to Congress.

office at one of the Office of Science laboratories,[14] and two senior managers of the Office of Science laboratories currently conducting substantial work for other national security agencies.[15] The committee found that the Office of Science's approach to governance of its national laboratories and their WFO projects achieves a more cost-effective operation, along with higher customer agency satisfaction.

The DOE Office of Science's governance relationship with its laboratories is characterized by partnership, strong mission-delivery focus, and a positive approach to enabling work for other federal agencies. Planning is a joint effort between the laboratories and the Office of Science, and the laboratories' plans are reviewed annually. Other federal agencies provide feedback to the laboratories annually. Aligned with this mission-focused partnership, the site offices of the Office of Science laboratories are nominal in size in comparison to those of the DOE/NNSA laboratories. The committee received comments that this approach, culture, and attitude about governance in the Office of Science contributes to less complexity, reduced cost, and greater productivity at the Office of Science laboratories. It could serve as a model for change in the DOE/NNSA (see Recommendation 4.2).

STREAMLINING THE WORK FOR OTHERS PROCESS

The committee looked at the processes and procedures for the NNSA laboratories and the Nevada National Security Site (NNSS) to obtain approval to conduct work for other U.S. government agencies. The committee received oral briefings from NNSA headquarters, the laboratory directors of Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), SNL, and the president of NSTec, LLC (the management entity of NNSS). In addition, substantive information was provided by laboratory personnel in response to several committee questions.[16]

Considerable frustration exists between the laboratories and the sponsoring agencies around the current DOE approval process for WFO. DOE Order (O) 481.1C describes the requirements for the contracting officer to approve WFO (Section 4.c of the order). The major concern expressed by the laboratories, and to some degree the sponsoring agencies, is the

[14] Roger Snyder, DOE, "Site Office Perspectives," presentation to the committee on May 5, 2014.

[15] Thomas Mason, ORNL, and Tony Peurrung, PNNL, untitled presentations to the committee on April 9, 2014.

[16] Material was provided by Dori Ellis and William Goldstein of LLNL, Charles McMillan of LANL, Paul Hommert, Jill Hruby, and Matt Riley of SNL, and Raymond Juzaitis and James Holt of NNSS.

substantial time it takes on the part of the laboratory and the sponsoring agency to package the request for WFO to meet the field office contracting officer's interpretation of the DOE order (and there are multiple contracting officers at each NNSA field office). This can be a major problem when a project is time sensitive. The committee did not find any DOE- or NNSA-wide standards for risk assessment or broad agreement for WFO projects that would be acceptable at an NNSA laboratory. Thus, the decision to approve is largely up to the contracting officer, who is generally not a domain expert, but becomes the risk acceptance official in cases where there is no clear benefit to DOE in allowing the laboratory to conduct the work. Briefings received by the committee indicated that the processing time—from the point that the non-DOE agency first contacts a laboratory to the point that the WFO proposal is in a form that the field office contracting officer will approve it—can take 2 to 12 months. This process requires many iteration cycles and much effort on the part of the other agency and the laboratory personnel.

Table 3.1 shows the large number of WFO projects that were active in FY 2013 at each of the NNSA laboratories and the NNSS.

Not only are the totals in Table 3.1 large, the project values can be quite small, with a substantial fraction costing less than $100,000. Indeed, the numbers in Table 3.1 do not reflect the true number of approval requests that must be processed by the laboratories for a given project. Each funding increment, each new phase, and each addition of work scope for the same customer and the same project requires a new approval package that has to be submitted to the contracting officer. Both SNL and LLNL told the committee that the number of WFO packages that they may have to process each year can be three to four times the number of new projects initiated for any given year, requiring potentially thousands of transactions each year.

TABLE 3.1 Number of Active Work for Others Projects at the NNSA Laboratories and NNSS in Fiscal Year (FY) 2013

	FY 2013 Project Value in $ Millions				
	<0.1	0.1-0.5	0.501-1.0	>1.0	Total
LANL	179	202	53	43	477
LLNL	532	204	65	63	864
NNSS	39	60	21	17	137
SNL	327	197	50	83	657

SOURCE: Compiled from discussions with various laboratory personnel.

LLNL has tracked the nominal number of days to get a WFO package through the process to approval; the in-laboratory time is typically double that in the field office. Both have been reduced over the years, but the total was about 32 work days in FY2013. This in-laboratory expense is typically covered in laboratory overhead, which contributes to overall costs for both DOE and the WFO clients.

Committee interviews with the leadership of the Pacific Northwest National Laboratory (PNNL) site office and the management of PNNL and Oak Ridge National Laboratory (ORNL)—two DOE Office of Science laboratories that perform a considerable amount of national security WFO—found that achieving approval of WFO projects at these laboratories was less difficult. One apparent difference is that the Office of Science headquarters takes an active role with the laboratories and site offices in annual planning for WFO, with the intention of approving a broad scope of work within which each laboratory may accept WFO projects.

In recognition of the above, NNSA has communicated with the DOE Office of Science to better understand its WFO process. NNSA recently established the position of NNSA Director of Interagency Work to "enable rather than control" WFO work at NNSA laboratories. This has resulted in a reduction in the approval time at NNSA headquarters and at the field offices. However, the processing times still vary widely from site to site. In conclusion, the NNSA WFO approval process is a costly and burdensome transactional oversight process, particularly as conducted by the field offices.

Finding 4. The current NNSA WFO approval process has been improved but still involves costly, repetitive steps at the laboratories and is associated with unnecessary transactional oversight and lack of cooperation and advanced planning between the laboratories and NNSA field offices.

DOE/NNSA has made progress in reducing the time required to approve WFO proposals, and on their side, customer agencies such as DHS[17] and the Defense Threat Reduction Agency[18] have streamlined the process by developing standard forms for requesting work from NNSA laboratories. However, the individual laboratories process on the order of 1,000 WFO-related actions each year, including very small projects and

[17] DHS Form UA201208, supplied by James Johnson, Director, DHS Office of National Laboratories.

[18] Defense Threat Reduction Agency Blanket Determination and Findings (D&F), AIC No. BAP119922631, September 13, 2011.

renewal of previously approved projects.[19] Because the review process for a small award is the same as for a large award, efficiencies can be gained by consolidating the review processes under umbrella agreements previously negotiated between DOE/NNSA and the sponsoring agencies. A clear mission statement (see Recommendation 2) would also facilitate the WFO approval process by making it clear what kinds of WFO the laboratories should take on and what kinds they should not.

Recommendation 4.1. NNSA should generate one or more Work Scope Agreements (WSAs) with each of the other national security agencies (the Department of Defense, the Office of the Director of National Intelligence, and the Department of Homeland Security) that is considered a strategic partner. The WSA would be the bounding document for bringing in new work from the strategic partner. Used in conjunction with a Work Boundary Agreement[20] (WBA) between NNSA and each laboratory, work that falls within the WSA/WBA envelope would require only the processing of the funding documents. Further approvals would not be needed.

The laboratories would then be held accountable for their WFO decisions in their next evaluation period. The committee provides conceptual examples of a WSA and a WBA between one NNSA laboratory and one sponsoring agency in Appendix H. Initially, Recommendation 4.1 could be implemented as a pilot project with one or more laboratories and one partner agency. If successful, the template could be replicated by the other laboratories and agencies. According to an estimate by an analyst at one laboratory (LLNL), this would reduce LLNL's approval efforts by 25 to 30 percent, as well as reducing the level of effort at the NNSA field office. The NNSA Administrator should set an outcome-oriented cost reduction goal of, say, 30 percent in WFO administration costs, and monitor progress against this metric.

The committee is not suggesting that there should be one set of WFO procedures for all non-DOE national security agencies, but rather one set for each partner (one for DHS, one for DOD, one for the IC, etc.) This would accommodate unique requirements while still expediting and simplifying the process. Once proven to be cost-effective, the committee does believe that there are efficiencies to be gained if the proposed WFO processes were standardized DOE-wide, including DOE/Office of Intelligence, DOE/Office of Science, NNSA, etc.

[19] Dori Ellis, LLNL, in comments to the committee on May 6, 2014.

[20] The WBA is based on the operational constraints that would provide the envelope for WFO work at the laboratories—safety, security, facility requirements, total cost, etc.

Recommendation 4.2. NNSA should conduct a comparative assessment of the Office of Science approach to Work for Others, including planning, processes, working relationships between site offices and laboratories, and all associated oversight and approval actions.

Committee interviews with the leadership of the PNNL site office and the management of PNNL and ORNL—the two DOE Office of Science laboratories that perform a considerable amount of WFO—found less controversy and inefficiency around approval of WFO at these DOE Office of Science laboratories than at the NNSA laboratories. One apparent difference is that the Office of Science headquarters takes an active role with the laboratories and site offices in annual planning to include WFO, with the intention to approve a broad scope of work and core competencies within which each laboratory may pursue WFO projects.[21]

MAJOR EQUIPMENT AND FACILITIES INVESTMENTS AT THE NNSA LABORATORIES BY OTHER AGENCIES

Other national security agencies have, from time to time, provided funding for new facilities and major capital equipment at the NNSA laboratories in support of their missions. The committee is aware of three such capital investments that have been made by non-DOE agencies in the past: DHS funding for the National Infrastructure Simulation and Analysis Center at SNL; IC funding for part of the refurbishment of an older facility at SNL; and joint funding from DOE/Office of Science, DOE/NNSA, and DHS for a facility at PNNL.

Finding 5. Based on the limited experience to date with investment by other federal agencies in major equipment and facilities at the national laboratories, there is no proven, systematic approach to assure such investments are made in a timely, cost-effective way.

In each case the committee is aware of, there was no standard process for non-DOE investment, and in each case, the process proved to be ad hoc, tortuous, and time consuming. Success depended on sustained attention and effort of all parties involved, particularly of the host laboratory.

Recommendation 5. The Mission Executive Council (MEC) should be directed to develop a systematic approach for multiagency

[21] See U.S. Department of Energy, Office of Science, "Laboratory Planning Process," last modified October 22, 2014, http://science.energy.gov/lp/laboratory-planning-process/.

investment in the laboratories that allows for Department of Energy investment, together with investment from other federal agencies when and where appropriate. This approach should enable timely enhancement of both facilities and major equipment to meet a range of national security needs consistent with the new mission statement of the laboratories, or to meet a specific newly identified need. The MEC should define the principles for such an approach, oversee the development of a rolling 10-year plan, approve the annual plan, coordinate agency presentations to the Office of Management and Budget and Congress, and monitor agency accountability for meeting the plan.

THE NEED TO ATTRACT A TALENTED WORKFORCE AND MAINTAIN KEY CAPABILITIES

With regard to items A(iii) and A(iv) of the statement of task, the committee believes that the continued ability of the NNSA laboratories to attract and retain top scientific and technological talent is a critically important metric by which any new governance structure should be judged (Principle 3). In two recent studies,[22] the National Research Council (NRC) reviewed and commented on the quality of science and engineering at the NNSA laboratories, and emphasized the important role of interagency engagement, including WFO, in helping both to sustain the critical nuclear weapons capabilities and to attract and retain top talent. This committee agrees with the previous committee's findings on the value of WFO and believes that its recommendations on recognizing and operationalizing the strategic partnership responsibilities of other national security agencies (Recommendation 1.2), clear definition of the mission (Recommendation 2), improved strategic planning (Recommendation 3.1), streamlined approval of WFO (Recommendation 4.1), and simplified recapitalization processes (Recommendation 5) will help to maintain critical capabilities at the laboratories and to attract and retain top talent.

Any assessment of the quality of science and engineering at a laboratory must include not only the technical people but also the management and leadership team as well. There is an aspect of the leadership within NNSA that deserves mention. It is important for sustainment of employee

[22] National Research Council (NRC), 2012, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C. (Phase I report), and NRC, 2013, *The Quality of Science and Engineering at the NNSA National Security Laboratories*, The National Academies Press, Washington, D.C. (Phase II report).

morale that NNSA leadership include individuals respected by the technical community in the laboratories. While the most important qualification of the overall leader is the ability to run a complex organization efficiently, the leadership team should include individuals who have significant competence in relevant technical disciplines in order to foster a sense of partnership and teamwork between NNSA management and laboratory personnel. The success of the DOE Office of Science laboratories may be attributed in part to a leadership team that includes individuals who are part of the relevant scientific community and who are seen to identify fully with and be part of any technical success.[23] In order to establish such leadership, managers with respected technical competence should be strongly considered as part of the NNSA management team in order to build the appropriate linkage between NNSA management and its laboratories. Increased use of detailees with technical backgrounds from other agencies could help fill this need.

OTHER LABORATORIES THAT SHOULD BE INCLUDED

The committee addresses item B from the statement of task below:

(B) Recommend any other laboratories associated with any national security agency that should be included in the new governance structure.

The committee did not have the time or resources to evaluate all of the many laboratories (DOD laboratories, various FFRDCs associated with national security agencies, or even all of the DOE national laboratories) that do national security work for others. Nevertheless, as discussed below, the committee sees no reason why laboratories that conduct a large volume of interagency national security work should be excluded from the governance considerations outlined in this report. The committee found that in FY2012, two DOE/Office of Science laboratories, ORNL and PNNL, received major funding from other U.S. government national security agencies, largely for the purpose of performing national security research and development (approximately 24 percent of PNNL's funding and approximately 16 percent of ORNL's funding). Both laboratories have been successful in increasing their non-DOE national security work over the past 20 years. In addition, both ORNL and PNNL reported that they had succeeded in obtaining long-term, non-DOE investment in facilities for future use in support of the non-DOE federal agency work. Based on its discussions with ORNL, PNNL, and representatives of other govern-

[23] Victor Reis, DOE, presentation to the committee on April 8, 2014.

ment agencies, the committee concludes that these laboratories can and do readily respond to the non-DOE national security needs within the current DOE Office of Science administrative and governance guidelines.

The important role of NNSS, which receives approximately 19 percent of its funding from other agencies, has already been discussed. Hence, the committee makes the following recommendation.

Recommendation 6. The governance model described in this report should encompass other laboratories and facilities that receive a significant fraction of their funding from interagency national security work, including Pacific Northwest National Laboratory, Oak Ridge National Laboratory, and the Nevada Nuclear Security Site. Moreover, as a long-term goal, Work for Others processes should be applied uniformly across these institutions, as described in Recommendations 4.1 and 4.2.

Over time, other DOE laboratories or facilities may emerge that conduct a significant amount of interagency national security work, and if this occurs, the committee sees no reason why they should be excluded from the governance considerations proposed in this report. For example, the Government Accountability Office reported that at the Idaho National Laboratory in FY2012, 17.5 percent of work performed was WFO.[24]

IMPLEMENTATION OF THE RECOMMENDED GOVERNANCE STRUCTURE

The committee addresses items C and D from the statement of task below:

(C) Discuss options for implementing the new governance structure that minimize disruption of performance and costs to the government while rapidly achieving anticipated gains.
(D) Discuss legislative changes and executive actions that would need to be made in order to implement the new governance structure.

The committee concludes that the optimal course is to build on and improve the existing governance structure. The implementation of a multiagency FFRDC governance structure such as that implied in item A of the statement of task would likely involve extensive modification of existing arrangements with multiple agencies. This would be resisted

[24] Government Accountability Office, 2013, *National Laboratories: DOE Needs To Improve Oversight of Work Performed for Non-DOE Entities,* GAO-14-78, Washington, D.C.

by the various national security agencies. The more modest approach proposed by the committee could be put into place by the Secretary of Energy in consultation with the affected agencies, building on a structure the national security agencies have already initiated.

Because the recommendations in this report largely build on the current governance structure, the committee believes they would not require new legislation. For example, the MEC has already been created, and the expanded role envisioned here is clearly within the scope of the MEC, as articulated in the four-party memorandum of understanding (reprinted in Appendix F), although DOE and the other national security agencies will need to enhance their commitment to—and participation in—the MEC.

THE IMPACT OF MULTIAGENCY ENGAGEMENT ON PEER REVIEW

The committee addresses item E from the statement of task below:

(E) Assess the contribution and long-term impact of strategic multiagency engagement on the ability to maintain an effective peer review capability for the breadth of skills needed for the nuclear weapons missions.

The NNSA laboratories currently have a variety of mechanisms for peer review of their S&T activities; this is especially true of the unclassified activities. Because much of the work done by NNSA laboratories in carrying out their mission of stewardship of the nuclear weapons stockpile is classified, it is not subject to the normal peer review processes and evaluations that are common in the unclassified world. It is therefore critical that the laboratories maintain the breadth of internal expertise and the capacity for independent assessment within the classified environment to ensure that proposed solutions are robust and resources are spent efficiently. With respect to item E of the statement of task, the committee believes that the pool of qualified personnel available to the NNSA laboratories for peer review would be enhanced by the multidisciplinary challenges required for an expanded mission scope involving both nuclear weapons and national-security-related research. The committee also believes that such an expanded mission would enhance the attraction and retention of top talent to carry out such a

broad and challenging scope of research. The NRC has an ongoing study evaluating peer review at the NNSA laboratories.[25]

FINAL THOUGHTS

DOE's national security laboratories have long played a critical role in U.S. national security. Given the rapid evolution of S&T generally, the globalization of enhanced S&T capabilities in particular, and the impact of S&T developments on the U.S. national security agenda, DOE/NNSA's laboratories will remain a critically important resource for U.S. national security agencies for many decades to come. To ensure that the laboratories can meet national security needs in the future, adjustments are needed now to improve their governance and strengthen their strategic relationship with the non-DOE national security agencies. The recommendations in this report are designed to create a sustainably successful collaborative relationship among DOE, the other national security agencies, and the national security laboratories. Furthermore, the committee believes that everything recommended here is within the authority of the Secretary of Energy to implement. Implementing these recommendations would increase the probability that critical NNSA laboratory capabilities to support the national security of the United States will be available when needed in the future.

[25] The cited NRC study was requested in Public Law 112-239, the National Defense Authorization Act for Fiscal Year 2013, Section 3144. It is sponsored by the National Nuclear Security Administration. According to the statement of task, the study will assess the following:

- The quality and effectiveness of peer review of designs, development plans, engineering and scientific activities, and priorities related to both nuclear and non-nuclear aspects of nuclear weapons;
- Incentives for effective peer review;
- The potential effectiveness, efficiency, and cost of alternative methods of conducting peer review and design competition related to both nuclear and non-nuclear aspects of nuclear weapons, as compared to current methods;
- The known instances where current peer review practices and design competition succeeded or failed to find problems or potential problems; and how peer review practices related to both nuclear and non-nuclear aspects of nuclear weapons should be adjusted as the three NNSA laboratories transition to a broader national security mission.

Appendixes

A

Committee Member Biographical Information

RICHARD A. MESERVE, *Chair*, is president emeritus of the Carnegie Institution for Science, having served from 2003 to 2014. He previously served as chairman of the U.S. Nuclear Regulatory Commission (NRC) under both Presidents Clinton and Bush and led the NRC in responding to the terrorism threat that came to the fore after the 9/11 attacks. Before joining the NRC, Dr. Meserve was a partner in the Washington, D.C., law firm of Covington & Burling LLP, and he now serves as senior of counsel to the firm. He served as a law clerk to Supreme Court Justice Harry A. Blackmun and as legal counsel to the president's science adviser. With a Harvard Law School degree and a Ph.D. in applied physics from Stanford University, he has devoted his legal practice to technical issues arising at the intersection of science, law, and public policy. Dr. Meserve has served on numerous legal and scientific committees over the years, including many established by the National Academies. He is a member of the National Academy of Engineering (NAE) and the American Philosophical Society. He is a foreign member of the Russian Academy of Sciences, and he is a fellow of the American Academy of Arts and Sciences, the American Physical Society (APS), and the American Association for the Advancement of Science (AAAS).

EVERETT H. BECKNER is an independent consultant. He is the former Deputy Administrator of the Department of Energy's (DOE's) National Nuclear Security Administration (NNSA) where he directed the Stockpile Stewardship Program responsible for maintaining the safety, security, and

reliability of the U.S. nuclear weapons stockpile. Prior to being confirmed as Deputy Administrator, Dr. Beckner was a vice president of Lockheed Martin Corporation, where he was deputy chief executive at the Atomic Weapons Establishment in Aldermaston, United Kingdom, and vice president of technical operations. Before joining Lockheed Martin, he was the DOE's Principal Deputy Assistant Secretary for Defense Programs. For more than 28 years—from 1961 to 1990, he held senior leadership positions at Sandia National Laboratories, including vice president, Defense Programs; vice president, Energy Programs; and director, Waste Management Programs. Dr. Beckner is a fellow of the APS and a member of AAAS. He received his Ph.D. and M.A. in physics from Rice University and his B.S. in physics from Baylor University.

ARDEN L. BEMENT, JR., is the Emeritus David A. Ross Distinguished Professor of Nuclear Engineering and director of the Global Policy Research Institute at Purdue University. Prior to his current position, he was the director of the National Science Foundation from 2004 to 2010. He was director of the National Institute of Standards and Technology (NIST) from 2001 to 2004. He joined NIST from Purdue University, where he was the David A. Ross Distinguished Professor of Nuclear Engineering and head of the School of Nuclear Engineering. Dr. Bement joined Purdue in 1992 after a 39-year career in industry, government, and academia. His positions included the following: vice president of technical resources and of science and technology for TRW, Inc. (1980-1992); Deputy Undersecretary of Defense for Research and Engineering (1979-1980); director, Office of Materials Science, Defense Advanced Research Projects Agency (1976-1979); professor of nuclear materials, Massachusetts Institute of Technology (MIT; 1970-1976); manager, Fuels and Materials Department and the Metallurgy Research Department, Battelle Northwest Laboratories (1965-1970); and senior research associate, General Electric Company (1954-1965).

KENNETH C. BRILL is an independent consultant. He retired from the Department of State in 2010 after a 35-year career in the U.S. Foreign Service and became president of the Fund for Peace, a nonpartisan nongovernmental organization (NGO), a position he left in late 2011. He is a member of the board of a nonpartisan think tank in Washington, D.C., and is active with several nonpartisan NGOs. In his final foreign service assignment, he was the founding director of the U.S. National Counterproliferation Center (NCPC), which is part of the Office of the Director of National Intelligence. As director of NCPC, he initiated the process that resulted in the four-party Governance Charter memorandum of understanding between DOE, the Department of Homeland Security,

the Department of Defense (DOD), and the Intelligence Community. Mr. Brill's overseas assignments with the Department of State included serving as Ambassador to the IAEA and the United Nations Office in Vienna; Ambassador to the Republic of Cyprus; Acting Ambassador and Deputy Chief of Mission at the U.S. Embassy in New Delhi, India; and political counselor at the U.S. Embassy in Amman, Jordan. His domestic assignments included service as Acting Assistant Secretary of State and Principal Deputy Assistant Secretary of State for the Bureau of Oceans and International Environmental and Scientific Affairs; Executive Secretary of the Department of State and Special Assistant to the Secretary of State; Chief of Staff for the Under Secretary of State for Political Affairs; and director of the Office of Egyptian Affairs. Mr. Brill is a graduate of Ohio University and received his M.B.A. from the University of California, Berkeley.

T. MARK HARRISON is a distinguished professor of geochemistry at the University of California, Los Angeles (UCLA). He received his B.Sc. (hons.) from University of British Columbia and his Ph.D. from the Australian National University. After a postdoctoral fellowship at the Carnegie Institution of Washington, he spent 8 years at the State University of New York at Albany rising to full professor. In 1989, he moved to UCLA where he taught and from 1997 to 2000 and served as chair of the Department of Earth and Space Sciences. He was then appointed as a university professor and director of the Research School of Earth Sciences at the Australian National University from 2001 to 2006. He returned to UCLA in 2006 to take up the position of director of the Institute of Geophysics and Planetary Physics. Dr. Harrison has published more than 200 papers and books that have been cited more than 27,000 times on a range of research topics, including but not limited to the evolution of the Tibet-Himalaya orogenic system, geochemical kinetics, the origin and transport of crustal magmas, the development of geoscience applications of secondary ion mass spectrometry, and investigations of early Earth.

ROBERT KUCKUCK is retired from the University of California and is currently consulting and serving on advisory boards for the national nuclear weapons research laboratories. He is currently a member of the Nuclear Weapons External Advisory Board for Sandia National Laboratories and serves on ad hoc review panels for nuclear weapons issues. Immediately prior to his retirement, Dr. Kuckuck served as the director of the Los Alamos National Laboratory (LANL) in 2005 and 2006. He held research and management positions at the Lawrence Livermore National Laboratory (LLNL) for more than 37 years, culminating in his serving as deputy director from 1994 to 2001. He left LLNL in 2001 to become the

first Principal Deputy Administrator of the newly created NNSA in DOE. In 2003, he received the Secretary of Energy's Gold Award, DOE's highest honor. From 1992 to 1994, Dr. Kuckuck served as special assistant to the president of the University of California and established the university's office for overseeing the three national laboratories the university managed for the DOE—Lawrence Berkeley National Laboratory, LLNL, and LANL. He received his Ph.D. in applied science from the University of California, Davis, and his M.Sc. degree in physics from Ohio State University. He did his undergraduate work in physics at West Liberty State College in West Virginia.

WARREN F. (PETE) MILLER, JR., is the TEES Distinguished Research Professor at the Texas A&M University System. He recently served as Assistant Secretary for Nuclear Energy for DOE. Prior to that, Dr. Miller served as associate director of the Nuclear Security Science and Policy Institute at Texas A&M University as well as adjunct professor. Dr. Miller retired from LANL in 2001, where he served for 27 years as a computational physics researcher and senior administrator. His administrative positions at LANL included associate laboratory director for energy programs, associate laboratory director for physics and mathematics, and deputy laboratory director for science and technology. Dr. Miller holds a B.S. from the United States Military Academy at West Point and a Ph.D. in engineering sciences from Northwestern University. Concurrent with his LANL career, he served on numerous national committees and held appointments at various universities, including the University of Michigan and the University of California, Berkeley. He was elected a fellow of the American Nuclear Society in 1982 and was elected to membership in the NAE in 1996.

DAVID OVERSKEI is the president and founder of Decision Factors, Inc., a consulting firm providing strategic and management consulting on complex problems since 2004. Dr. Overskei has led internationally recognized fundamental and applied research teams in academia and private industry. He has research and solution delivery experience (from concept development to operation of boutique commercial production and sales) in diverse areas spanning defense, national security, energy technologies, medical systems, optical and wireless communications, and advanced software for command and control applications for DOD and civilian first responders. Dr. Overskei has successfully led the transition of research results and technologies into intellectual property and subsequent commercial product/service businesses. He has more than 30 years of experience leading for-profit business units, providing strategic planning, and leading merger and acquisition deals up to $750 million deal

size. He has experience as a partner, client, and/or technology provider to international commercial industries, national and international laboratories, academic institutions, and government agencies. He is experienced in dealing with U.S. and foreign government organizations, government and private funding entities, and has testified to the U.S. Congress on numerous occasions. Dr. Overskei led the future oriented analysis of the Nuclear Weapons Complex Infrastructure, reporting to the Secretary of Energy Advisory Board in 2005. He has performed numerous studies for DOE on problems managing new technology programs, routinely advises DOD and U.S. allies on logic and credibility of approaches to meet nuclear warhead maintenance and supply needs. He develops strategic plans and subsequent implementation plans for technology companies and government entities.

CHARLES S. (TYLER) PRZYBYLEK is an independent consultant who formerly served as chief operating officer and general counsel of DOE's NNSA. In this role, Mr. Przybylek served as the headquarters interface for integration of field and headquarters operations. He also served as NNSA's chief legal officer and served as the Source Evaluation Board chairman for the LANL contract competition and as the Source Selection Authority for the LLNL contract competition. Prior to his positions in Washington, D.C., Mr. Przybylek was the chief counsel for NNSA's Albuquerque Operations Office. There, he twice served as the deputy manager and also served as site manager for the Los Alamos Site Office. Before 1994, Mr. Przybylek served as chief counsel for the Oak Ridge Operations Office. His first mission with the DOE was as senior counsel for the Strategic Petroleum Reserve Project Management Office in New Orleans. Mr. Przybylek received his juris doctor degree with honors from the National Law Center at George Washington University. He is a member of the bar associations of both West Virginia and the District of Columbia.

BURTON RICHTER is the Paul Pigott Professor in the Physical Sciences at Stanford University and director emeritus at the Stanford Linear Accelerator Center (SLAC). His research has centered on experimental particle physics with high-energy electrons and electron-positron colliding beams. He began with a postdoctoral position at Stanford University in 1956, became a professor in 1967, and was director of SLAC from 1984 through 1999. Dr. Richter received the Nobel Prize in Physics (1976) and the E.O. Lawrence Medal of the Department of Energy (1976). He is a member of the National Academy of Sciences and the American Philosophical Society; a fellow of the American Academy of Arts and Sciences, the AAAS, and the APS (president, 1994). He has served on many advisory commit-

tees to governments, laboratories, and universities, including the Secretary of Energy Advisory Board, Laboratory Operations Board, Nuclear Energy Task Force (2000-2006) and chaired the NRC's Board on Physics and Astronomy. He is a member of the French Commissaire a l'Energie Atomique Visiting Group and the Jasons. He received his B.S. and Ph.D. degrees from MIT.

ROBERT SELDEN is a private consultant in defense science and research management. He retired in 1993 as an associate director at LANL. His career in the DOE national laboratories began at LLNL in the 1960s when he was one of the two participants in the Nth Country Experiment to design a nuclear explosive from unclassified information. After moving to LANL in 1979, he served as the division leader of the Applied Theoretical Physics Division, as associate director for Theoretical and Computational Physics, and as the first director of the Los Alamos Center for National Security Studies. Dr. Selden served as the chief scientist of the U.S. Air Force from 1988 to 1991 where he received the Air Force Association's Theodore von Karman Award for outstanding contributions to defense science and technology. He has been a member of the Strategic Advisory Group to the Commander of the U.S. Strategic Command since 1995. Since 2003, he has served as chairman of the Advisory Group's Stockpile Assessment Team, which has the responsibility to conduct a detailed annual review of the U.S. nuclear weapon stockpile. He also is currently a member of the Joint Advisory Committee on Nuclear Surety to the Secretaries of Defense and Energy. He was a member of the Air Force Scientific Advisory Board from 1984 to 2005. Dr. Selden received his B.A. degree from Pomona College, Claremont, California, and his Ph.D. degree in physics from the University of Wisconsin.

JOHN C. SOMMERER retired as senior fellow in the Director's Office of the Johns Hopkins Applied Physics Laboratory (APL), the largest of DOD's University Affiliated Research Centers. He also held a permanent appointment as Daniel Coit Gilman Scholar at Johns Hopkins University. Until January 1, 2014, he was director of the APL Space Sector, with responsibility for all APL contributions to military, intelligence community, and civil space programs. Prior to 2008, he held a number of other senior executive positions at APL, including director of science & technology, chief technology officer, and director of the Milton S. Eisenhower Research Center, and he led a number of enterprise-level task forces, strategic plans, and other initiatives. Dr. Sommerer received bachelor's and master's degrees in systems science and mathematics from Washington University in St. Louis, a master's degree in applied physics from Johns Hopkins University, and a Ph.D. in physics from the University of

Maryland. Dr. Sommerer has served on a number of advisory bodies for the U.S. government, including terms as chair and vice chair of the Naval Research Advisory Committee, senior technical advisory committee to the Secretary of the Navy, Chief of Naval Operations, and Commandant of the Marine Corps. He has also served on numerous NRC boards and committees. He is a full member of the International Academy of Astronautics.

JAMES M. TIEN became the dean of the College of Engineering at the University of Miami in 2007. An internationally renowned researcher, he formerly served as the Yamada Corporation Professor at Rensselaer Polytechnic Institute, was founding chair of its Department of Decision Sciences and Engineering Systems, and professor in its Department of Electrical, Computer and Systems Engineering. Tien joined the Rensselaer faculty in 1977 and twice served as its acting dean of engineering. In 2001 he was elected to the NAE, one of the highest honors accorded an engineer. His research interests include systems modeling, public policy, decision analysis, and information systems. He has served on the Institute of Electrical and Electronics Engineers Board of Directors (2000-2004) and was its vice president in charge of the Publication Services and Products Board and the Educational Activities Board. Dr. Tien earned his bachelor's degree in electrical engineering from Rensselaer and his Ph.D. in systems engineering and operations research from MIT.

JOAN B. WOODARD is an independent consultant. Dr. Woodard retired in 2010 from Sandia National Laboratories as executive vice president and deputy director. She served as the chief operating officer from 1999 to 2005. During her 36-year career at Sandia, she led the energy technology development programs as well as the national security programs and was the executive with oversight for human resources and compensation as well as budget and finance. She oversaw Sandia's Defense, Homeland Security, and Energy programs. She led several strategic initiatives, including strategies for energy, cyber security, and the future of science and technology. Dr. Woodard served as deputy lab director of nuclear weapons at Sandia Corporation. Dr. Woodard earned her doctorate degree in mechanical engineering from the University of California, Berkley, and a master's degree in engineering economics from Stanford University.

B

Meeting Agendas

The Committee on Assessment of the Governance Structure of the NNSA National Security Laboratories held three open meetings, starting in March 2014. These meetings included information-gathering sessions open to the public as well as closed segments for committee deliberation. The committee heard from numerous presenters at these meetings. They include the following by meeting date and session.

MEETING 1
WASHINGTON, D.C.

March 12, 2014

10:30 a.m.	Context of the NNSA Lab Governance Discussion *Elizabeth "Libby" Turpen, Octant Associates, LLC*
11:15	Current White House Perspectives *Patricia Falcone, Office of Science and Technology Policy*
12:00 p.m.	Lunch
1:05	NNSA Sponsor Expectations and Discussion *Dimitri Kusnezov, U.S. Department of Energy*

1:45	DOE Perspectives *Stephen Binkley, U.S. Department of Energy*
2:45	DHS Perspectives *Penrose "Parney" Albright, formerly U.S. Department of Homeland Security*
3:30	DOD Perspectives *Frank Kendall, U.S. Department of Defense*
4:15	General Discussion
5:00	Adjourn

March 13, 2014

9:00 a.m.	Congressional Intent in Mandating This Study *Rep. Ben Ray Luján, U.S. House of Representatives (D, New Mexico)*
9:30	Other Congressional Perspectives
10:15	Intelligence Community Perspectives *John Phillips, Central Intelligence Agency (retired)*
11:00	Nevada Nuclear Security Site Perspectives *Raymond Juzaitis, National Security Technologies, LLC*
11:45	Comments from the Public
12:00 p.m.	Adjourn

MEETING 2
WASHINGTON, D.C.

April 8, 2014

9:00 a.m.	Perspectives on 21st Century National Security FFRDCs *Jill Hruby, Sandia National Laboratories*
10:45	Legal and Practical Issues with Changes in NNSA Lab Governance *Mary Egger, Universities Research Association*

11:45	Perspectives of the DHS Office of National Laboratories (continued from first meeting) *James Johnson, U.S. Department of Homeland Security*
12:15 p.m.	Lunch
1:00	MIT/Lincoln Labs Governance Model *Marc Bernstein, Massachusetts Institute of Technology/Lincoln Laboratory*
2:00	DOE Perspectives *Dan Poneman, U.S. Department of Energy*
3:15	Further DOE Perspectives *Victor Reis, U.S. Department of Energy*
4:15	Adjourn

April 9, 2014

9:00 a.m.	NNSA Laboratory Director's Panel *Paul Hommert, Sandia National Laboratories* *Charles McMillan, Los Alamos National Laboratory* *William Goldstein, Lawrence Livermore National Laboratory*
11:15	NNSA Perspectives *Bruce Held, National Nuclear Security Administration*
12:00 p.m.	Lunch
1:00	DOE Science Laboratory Director Panel *Thomas Mason, Oak Ridge National Laboratory* *Tony Peurrung, Pacific Northwest National Laboratory*
2:45	DOD Perspectives *John Harvey, U.S. Department of Defense*
3:45	Adjourn

MEETING 3
WASHINGTON, D.C.

May 5, 2014

10:45 a.m.	Essential Characteristics of a National Security Laboratory *Thomas Hunter, Sandia National Laboratories (formerly)*
12:00 p.m.	Lunch
1:00	Perspectives on the MEC and Current Governance Model *Kathleen Alexander, National Nuclear Security Administration*
2:00	Perspectives on the DOE Office of Science Model *L. Devon Streit, U.S. Department of Energy*
3:15	Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories *Charles Shank, Lawrence Berkeley National Laboratory*
4:15	Adjourn

May 6, 2014

9:00 a.m.	The WFO Approval Process *Dori Ellis, Lawrence Livermore National Laboratory*
11:00	DOE and DHS Perspectives *Tara O'Toole, U.S. Department of Homeland Security (formerly)*
12:00 p.m.	Lunch
1:00	Site Office Perspectives *Roger Snyder, Pacific Northwest Site Office, U.S. Department of Energy*
2:30	Closed Session
3:45	ODNI Perspectives *David Honey, Office of the Director of National Intelligence*
5:00	Adjourn

C

Previous Studies Relevant to NNSA Laboratory Governance

1995 Task Force on Alternative Futures for the Department of Energy National Laboratories ("Galvin Report"). Prepared by the Secretary of Energy Advisory Board. February.

1999 Commission on Maintaining United States Nuclear Weapons Expertise ("Chiles Commission"). March 1.

2006 Report of the Defense Science Board on Nuclear Capabilities. December.

2008 Report of the Defense Science Board Task Force on Nuclear Deterrence Skills. September.

2009 Stimson Center Task Force. *Leveraging Science for Security*.

Congressional Commission on the Strategic Posture of the United States. *America's Strategic Posture,* United States Institute for Peace.

2012 National Research Council. *Managing for High Quality Science and Engineering at the NNSA National Security Laboratories* (Phase I report).

2013 Institute for Defense Analyses. *Federal Security Laboratory Governance Panels: Observations and Recommendations.* January.

National Academy of Public Administration. *Positioning DOE's Labs for the Future: A Review of DOE's Management and Oversight of the National Laboratories*.

National Research Council. *The Quality of Science and Engineering at the NNSA Laboratories* (Phase II report).

Information Technology and Innovation Foundation, the Center for American Progress, and the Heritage Foundation. *Turning the Page: Reimagining the National Labs in the 21st Century Innovation Economy.* June.

Government Accountability Office. *National Laboratories: DOE Needs to Improve Oversight of Work Performed for Non-DOE Entities.* October.

2014 Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise. *Interim Report.* April.

Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise. *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise.* November.

D

Evolving Mission of the NNSA Laboratories

Los Alamos National Laboratory (LANL) grew out of the Manhattan Project in the early 1940s to develop the first nuclear weapons. Sandia National Laboratories (SNL) were spun out of LANL in 1949 to focus on the engineering development of non-nuclear components of nuclear weapons. The Nevada National Security Site (NNSS) was established in 1951 as a site to test/validate nuclear weapon performance in a controlled, remote location. Lawrence Livermore National Laboratory (LLNL) was established in 1952 to spur innovation in nuclear design and provide competition to LANL.

In 1946, the Atomic Energy Commission (AEC) was established to provide civilian oversight of the nuclear weapons capability and warhead production for the Department of Defense (DOD). LANL, LLNL, NNSS, SNL, and other facilities were all under the purview of the AEC. In 1974 the government dissolved the AEC, transferring the nuclear (power and warhead) research, development, and production responsibilities to the newly formed Energy Research and Development Agency (ERDA) and the regulatory/oversight functions to the Nuclear Regulatory Commission (NRC). ERDA transitioned to the Department of Energy (DOE) in 1977. In 1999, the U.S. Congress legislated into existence the National Nuclear Security Administration (NNSA), a separately organized sub-agency within DOE. This was to address a perceived lack of DOE administrative control of the nuclear weapon capability and national security information. The nuclear weapon design laboratories, as well as the

weapon production and dismantlement facilities, were put under the NNSA along with nuclear propulsion programs for the U.S. Navy.

The first Work for Others (WFO) work in the laboratories dates from the 1960s when DOD asked one of the laboratories to develop sensors for a specific application in the Vietnam War. With the growth of nuclear power in this country, the laboratories were asked to apply their expertise to reliability and severe accident analysis. In the early 1970s, the oil embargo crisis led to the creation of ERDA and later DOE. With this came expansion of the laboratories work into energy for DOE and other agencies.

With the end of the Cold War and the self-imposed moratorium on nuclear testing that began in 1992, the nuclear mission of the laboratories transitioned from designing and testing of new nuclear warheads into one of science-based stewardship of the existing nuclear warhead stockpile. The diverse and exacting skills required to maintain the nuclear expertise has nurtured unique capabilities at the laboratories. These capabilities are routinely applied to other national security needs—that is, promoting nuclear nonproliferation and analyzing and understanding nuclear weapon developments of other nations and non-state actors. In addition, the materials science, physics, chemistry, computing, and engineering expertise developed for nuclear weapons have been applied to a broad spectrum of national security needs. In 2008, Secretary of Energy Samuel Bodman formally articulated a vision for the future of the NNSA laboratories as national security laboratories charged with conducting research and development to address a range of national security threats facing the nation.

We are now in a prolonged period of budgetary austerity. In response to funding uncertainty, many laboratories have worked to build their non-sponsor (outside of DOE) funding base to support their core capability to perform their primary nuclear weapon maintenance mission. In fiscal year (FY) 2013, for instance, the NNSA weapons complex laboratories received $1.656 billion in research funding from other federal agencies, including the Department of Homeland Security, the National Institute of Standards and Technology, the Food and Drug Administration, the Centers for Disease Control and Prevention, the Intelligence Community, DOD, and the National Aeronautics and Space Administration. National security laboratory scientists also contributed to such diverse environmental problems as ameliorating the impacts of the Deepwater Horizon oil spill in the Gulf of Mexico and the release of nuclear materials from the tsunami-damaged nuclear reactors in Fukushima, Japan.

Nuclear weapons continue to be a major element of our national deterrence posture; however, new non-nuclear national security threats

are constantly emerging. The national security laboratories historically have been able to respond to these non-nuclear threats by drawing upon the capability in personnel and facilities that were funded by a robust nuclear weapons research program. As a byproduct of this national security mission, technology developed in the laboratories has also seeded new U.S. industries and products. Some observers have argued that the laboratories should be re-imagined as engines of technical innovation and commercialization.[1] Others have argued that the laboratories risk losing focus on their traditional primary mission as they seek to develop technologies for other national security missions that the private sector or U.S. academia may be equally capable of providing.[2]

While the exact dimensions of the laboratories' missions in the future continue to be the subject of active debate, it is clear that they have evolved significantly from the original sole focus on nuclear weapons to meet a broader national security mission.

[1] Information Technology and Innovation Foundation, the Center for American Progress, and the Heritage Foundation, 2013, *Turning the Page: Reimagining the National Labs in the 21st Century Innovation Economy*, June, http://energyinnovation.us/portfolio-items/turning-the-page/.

[2] Secretary of Energy Advisory Board, 1995, Task Force on Alternative Futures for the Department of Energy National Laboratories.

E

A Brief History of Proposals for Shared Governance of the Department of Energy's National Laboratories

The Department of Energy's (DOE's) national laboratories have long served agencies and missions other than DOE's. The laboratories' broad mandate is implicit in the name "national laboratories;" that is, they serve the national interests in a variety of ways and for a variety of partners. It is not surprising, therefore, that there is a long history of recommendations for laboratory governance that differ from the current model, which vests all governance in DOE. The following are the most relevant examples for this governance study. Full references to the reports are given in Appendix C.

THE GALVIN REPORT (1995)

The Galvin Report, *Task Force on Alternative Futures for the Department of Energy National Laboratories*, looked at all DOE laboratories and recommended a "corporatized" approach to laboratories governance. The recommended structure would have DOE as the government sponsor of the corporation that would be "governed" by a board of trustees, appointed by the President, consisting principally of distinguished scientists, engineers, and private sector executives. The board would select a chief executive officer and other principal officers of the corporation, and each laboratory would have an advisory board elected by the parent board. Funding would flow directly to the corporation from Congress, not via DOE, which would be a customer of the corporation.

The corporatized model suggested by the Galvin Report makes clear that while DOE would be the laboratories' sponsor, strategic partnership for them would be vested in the board, which would be composed of people outside DOE. The Galvin task force acknowledged it may not be appropriate to have the weapons laboratories be part of this corporatized approach, but it left the issue unresolved.

DEFENSE SCIENCE BOARD (2006)

The 2006 Defense Science Board study *Report of the Defense Science Board on Nuclear Capabilities* examined the issue of governance of the NNSA laboratories in some detail and weighed a variety of alternatives. It concluded that the current DOE/NNSA model does not (and cannot) work, nor is it appropriate to have DOD run the weapons laboratories for a variety of reasons. It recommended a government corporation (the National Nuclear Weapons Agency) overseen by a board of directors chaired by the Secretary of Defense and consisting of the Secretaries of Energy and Homeland Security and the Director of National Intelligence.

This proposal clearly gives the other agencies a seat at the governance table and puts the Secretary of Defense, not the Secretary of Energy, at the head of the table.

DEFENSE SCIENCE BOARD (2008)

The 2008 Defense Science Board study *Report of the Defense Science Board Task Force on Nuclear Deterrence Skills* did not focus on governance issues, but some of its recommendations called on DOE (or NNSA) to work with other cabinet agencies (principally DOD and the Office of the Director of National Intelligence, ODNI) on governance-related issues. The issues are largely related to the strategic partnership of the laboratories; that is, assessing human capital needs and strategies in the laboratories and how to sustain fundamental nuclear capabilities and competencies.

The Defense Science Board did not call on the other agencies to provide funding for these activities or to assume them, but rather to collaborate to assess what was needed so that DOE as sponsor, and the Congress as funder, could do what was needed. This is a clear example of how strategic partnership complements the sponsor's responsibilities.

STRATEGIC POSTURE COMMISSION (2009)

The 2009 report of the Strategic Posture Commission, *America's Strategic Posture,* recommended establishing NNSA as an independent agency

reporting to the President through a board of directors composed of the Secretaries of State, Defense, Energy, and Homeland Security and the Director of National Intelligence. A presidential executive order would make this board responsible "for the programmatic and budgetary health of the laboratories." The Commission further recommended that the board approve NNSA's strategic plan and provide comments on its budget proposals before they are submitted to the Office of Management and Budget.

This is another shared governance model for the laboratories that involves the laboratories as principal clients/partners in the model. It also makes clear that the President would be the sponsor for the new agency, and the board would be its stewards.

STIMSON CENTER TASK FORCE (2009)

The 2009 Stimson Center study, *Leveraging Science for Security,* assessed the current governance model and concluded it was not working. The study recommended creating an independent agency to replace NNSA overseen by a board of directors consisting of the Vice President, Secretaries of State, Defense, Energy, and Homeland Security, the Attorney General, the Director of National Intelligence, and the head of the new agency. The laboratories and the Nevada Test Site (now known as Nevada National Security Site) would be part of this new structure. This is another example of the sponsor being the President with a board of directors providing strategic partnership to the laboratories as part of the overall organization.

NATIONAL RESEARCH COUNCIL (2012)

In its 2012 report, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories,* the National Research Council (NRC) examined the framework for managing science and engineering research at the laboratories and provided an analysis of the relationships among the several players in the management of the laboratories—the NNSA, the site offices (now called field offices), the contractors, and the laboratory managers—and the effect of that relationship on the laboratories' ability to carry out science and engineering research. The NRC stated that there is "an erosion of trust between NNSA and its National Security Laboratories to an extent that very seriously affects the labs' capability to manage for quality S&E." It recommended "rebalancing the managerial and governance relationship to build in a higher level of trust in program execution and laboratory operations in general."

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION (2013)

The 2013 National Academy of Public Administration report *Positioning DOE's Labs for the Future: A Review of DOE's Management and Oversight of the National Laboratories* concluded that the laboratories need a government-wide strategic approach to meet their responsibilities to serve the national security agencies and supported the work of the Mission Executive Council interagency group.

F

Governance Charter for an Interagency Council on the Strategic Capability of DOE National Laboratories as National Security Assets

GOVERNANCE CHARTER FOR AN INTERAGENCY COUNCIL ON THE STRATEGIC CAPABILITY OF DOE NATIONAL LABORATORIES AS NATIONAL SECURITY ASSETS

1) PURPOSE
The purpose of this Charter is to provide a framework for the participating agencies to coordinate shared, long-term planning for the science, technology, and engineering (ST&E) capabilities resident in the U.S. Department of Energy's (DOE's) National Laboratories and other DOE sites (hereinafter, National Laboratories), and other ST&E capabilities of the Parties, that are of cross-cutting strategic national security interest.

2) BACKGROUND
The National Laboratories have the requisite expertise and facilities that uniquely position them to provide a wide range of ST&E capabilities critical to meeting a rapidly expanding and evolving array of national security challenges. Given an uncertain future and the increasing pull on the same resources by many Federal agencies, an executive-level forum is needed to ensure integrated planning for the utilization, through DOE, of the National Laboratory capabilities, encouraging optimal alignment with the highest priority national security needs. This Governance Charter is intended to provide a mechanism for the Parties to engage in interagency long-term strategic planning for capabilities that are unique to the National Laboratories. This will ensure that certain national security priorities can be supported by these unique capabilities in a coordinated, effective, and efficient manner.

3) OBJECTIVES
The objectives of this Governance Charter are to:

- Provide a forum for the Parties' leadership to identify and plan strategic ST&E collaboration of common interest in the area of national security;
- Examine critical strategic mission needs requiring the ST&E capabilities unique to the National Laboratories;
- Develop a mechanism for two or more of the Parties to undertake long-term strategic planning of common interest to develop and sustain strategic capabilities of inter-agency interest at the National Laboratories; and
- Create an interagency framework for two or more Parties to consider making collaborative national security investment decisions.

4) PARTIES
The initial signatories to this Charter are DOE, the U.S. Department of Homeland Security (DHS), the Office of the Director of National Intelligence (ODNI), and the U.S. Department of Defense (DoD), collectively referred to (together with any future participants in this Charter) as the "Parties." Additional government agencies may become Parties to this Charter.

5) AUTHORITY
This Charter is authorized under the provisions of the following authorities:

- For DOE, including NNSA, Section 646 of the Department of Energy Organization Act (Pub. L. 95-91, as amended; 42 U.S.C. § 7256); Title XXXII of the National Defense Authorization Act for Fiscal Year 2000, Public Law 106-65.
- For DoD, 10 U.S.C. 113, "Secretary of Defense."
- For DHS, 6 U.S.C. § 112, "Secretary; functions."
- For ODNI, the Intelligence Reform and Terrorism Prevention Act of 2004, Public Law 108-458.

6) ORGANIZATION

a) Mission Executive Council
The Parties each agree to appoint two senior executives to serve as members of the Mission Executive Council (hereinafter "Council"). The Council will be led by two Co-Chairs, the Mission Co-Chair and the Capabilities Co-Chair. The Director, National Counterproliferation Center, representing the DNI, will serve as the Mission Co-Chair, with the understanding that the role may rotate among the parties each year, as the Council decides. The DOE Under Secretary for Nuclear Security (NNSA Administrator), representing DOE as the sponsor and contracting authority for the National Laboratories, will serve as the Capabilities Co-Chair. Council meetings will be scheduled at least quarterly, with reports of Council meetings being provided to all Parties by the Staff Secretary.

The Council will serve as an inter-agency forum for discussion and coordination on developing priorities among the Parties regarding long-term strategic ST&E capabilities at the National Laboratories. On at least an annual basis, and more often as may be deemed necessary, the Council will: (1) review and assess the adequacy of national security ST&E capabilities at the National Laboratories in identified crosscutting areas; (2) identify and consider candidate ST&E capabilities needing interagency attention; (3) consider the Subcommittee's recommendations on the development or sustainment of capabilities required to close identified gaps; and (4) take such actions as may be necessary and appropriate. Each Party will bring to the discussions of the Council those ST&E requirements that might impact the execution of the mission of any of the Parties.

The primary responsibility of the Mission Co-Chair is to coordinate and document the strategic capability ST&E needs brought by the Parties for consideration. The Capabilities Co-Chair has the primary responsibility to ensure that relevant National Laboratories are engaged for each strategic capability need identified and to coordinate, as determined appropriate, with the National Laboratory Directors regarding the work of the Council. Subcommittee members are responsible for considering the resulting gaps and opportunities and recommending steps in collaboration with other member agencies to address them.

b) Staff Secretary
The Council will appoint a Staff Secretary from one of the Parties who will facilitate communications among the members of the Council. The position of Staff Secretary will rotate annually among the Parties.

The Staff Secretary will work under the oversight of the Co-Chairs, and undertake all administrative functions necessary to operate the Council.

c) National Laboratories
When the capabilities of strategic interest to the Parties are compiled by the Council, the Capabilities Co-Chair will engage the directors of the relevant National Laboratories. The specific laboratories included in the strategic capabilities assessment process will evolve based on the stated needs of the Council members.

The National Laboratories' Directors engaged by the Capabilities Co-Chair will be responsible for providing the long-term planning status for the ST&E capabilities identified by the Council. This input will be coordinated through the Capabilities Co-Chair.

d) Mission Executive Council Subcommittees
The council may establish Government-only subcommittees.
Subcommittees may be used to perform one or more of the following activities: (1) identify mission needs that may require the development or enhancement of an ST&E capability need for consideration by the Council; (2) develop specific proposed plans to address ST&E capability gaps agreed to by the Council, and (3) foster coordination of individual investments at the National Laboratories that are the products of strategies agreed to by the Council.

7) FUNDING
This Charter creates no financial or operational commitment or obligation for any of the participating agencies. Any financial transactions that may be undertaken by one or more of the signatories will be under the auspices of an agreement independent of this Charter and reflect the interests of the agencies involved.

8) MODIFICATION
This Charter will be reviewed annually and may be modified in writing with the

consent of the Parties at any time. The Parties intend this partnership to expand, as appropriate.

9) EFFECTIVE DATE
The terms of this Charter will become effective upon signature of the initial Parties and will remain in effect until rescinded.

Steven Chu
Secretary of Energy

Dennis Blair
Director of National Intelligence

Jane Holl Lute
Deputy Secretary
Department of Homeland Security

Robert Gates
Secretary of Defense
JUL 6 2010

G

Origins of the 2010 Four-Party Governance Charter Memorandum of Understanding

The Governance Charter for an Interagency Council on the Strategic Capability of the Department of Energy (DOE) National Laboratories as National Security Assets[1] had its origins in two main components: (1) internal NNSA and DOE transformation and (2) intelligence community (IC) pull for greater alignment and coordination. Within the NNSA, the decadal view of science, technology, and engineering (ST&E) started officially in early 2007 with NNSA's Special Focus Area 4. This effort was the first internal step toward understanding post-Cold War ST&E needs at NNSA laboratories and shed light on the interdependencies that had developed over the years with other agencies. By late 2007, NNSA's laboratory directors agreed to these concepts of transformation and signed the NNSA-developed white paper together with DOE Under Secretaries for Nuclear Security and for Science.[2] By June 2008, Energy Secretary Samuel Bodman signed the Focus Area 4 statement for transformation from a nuclear weapons complex to a "national security enterprise."[3] At the same time, there was a growing dissatisfaction of key IC members with the way DOE sought to manage the IC engagement with the NNSA laboratories.

[1] Established in a 2010 memorandum of understanding signed by the Secretaries of the Departments of Energy, Defense, Homeland Security, and the Director of National Intelligence; reprinted in Appendix F.

[2] NNSA, "A Future Vision for NNSA's National Security Laboratories," NNSA Focus Area 4 Whitepaper, December 2007.

[3] DOE, "Transforming the Nuclear Weapons Complex into a National Security Enterprise," Secretary of Energy Samuel Bodman, June 2008.

The IC also had concerns related to the NNSA laboratories' performance: (1) the ever-increasing cost of doing work at the laboratories and (2) concern that long-term laboratory capabilities to meet IC mission needs were not being maintained. This latter point reflected, inter alia, an Office of the Director of National Intelligence (ODNI)-led study (which included input from the laboratories) in early 2009 that highlighted several areas where the DOE national laboratories had lost critical expertise and the ability to provide the support the IC required.[4]

As the ODNI pursued the concerns on behalf of the IC, the following key governance issues emerged:

- DOE generally took a proprietary view of the laboratories when dealing with the IC. As a result, DOE/Office of Intelligence and NNSA were viewed as impediments, not facilitators, in the IC attempts to work with the laboratories. In particular, the business processes that the DOE/NNSA had instituted for handling Work for Others (WFO) were onerous and counterproductive, resulting in delay, rather than value added. The NNSA laboratories had the same perspective.
- DOE's efforts to mediate the relationship between the IC and the laboratories contributed to the laboratories being increasingly seen as contractors for the IC, rather than mission partners. It was clear to some in the IC that the laboratories were straining to meet some IC mission needs, including some that were traditional and others that were new or anticipated. This raised questions of how to support capabilities in organizations where DOE had a singular proprietary and controlling role.
- The ODNI found DOD shared many of the IC's concerns about the NNSA laboratory future capabilities as well as willingness to engage with DOE and the NNSA laboratories in a more sustained and coordinated way, given the tight fiscal environment.

This early work by ODNI staff led to an April 2009 meeting with DOE Secretary Steven Chu, Deputy Secretary Daniel Poneman, NNSA Administrator Thomas D'Agostino, and DNI Dennis Blair and other ONDI staff to discuss the NNSA laboratories' role in supporting the national security agencies. The DNI stressed the importance of the laboratories maintaining capabilities in core areas to support existing IC missions, as well as having the flexibility to invest in new inter-disciplinary capabilities to meet

[4] This was the top recommendation from the IC-DOE laboratories working group led by the National Intelligence Officer for S&T for then Principal Deputy Director of National Intelligence Donald Kerr.

over-the-horizon national security challenges. DOE and NNSA officials recognized that without the external pull from other agencies, the envisioned transformation would be unlikely. Further, it reflected the start of a conversation between partner agencies in which mission problems of the partners could be better aligned with the country's existing capabilities regardless of which agency they fell under. DOE and NNSA expressed a willingness to develop a mechanism that would strengthen understanding of the capabilities the IC needed and result in a process to support the sustainment of current capabilities or development of new ones. Following this meeting, representatives of the four agencies (DOE, DOD, DHS, and ODNI) began to meet to work on how to implement this multiagency vision. A "Principles for Principals" memorandum was agreed to in the fall of 2009, and the Governance Charter for the four-party (DOE-DNI-DHS-DOD) strategic partnership was agreed at the staff level in late 2009, signed by Secretary Chu and the DNI in December 2009, Deputy Secretary Jane Holl Lute for DHS in June 2010, and Secretary Robert Gates for DOD in July 2010.

A BRIEF HISTORY OF THE MISSION EXECUTIVE COUNCIL

The first meeting of the Mission Executive Council (MEC) was held in October 2010 and included Deputy Secretary participation by DOE, DHS, and ODNI, and DOD's Under Secretary for Acquisition, Technology, and Logistics. Five topics were agreed upon as test cases for exploring mission requirements and related capability requirements at DOE laboratories.[5,6] A working group was established to explore each of the five topics. The MEC requested the groups to identify any potential "extinction events" (i.e., prospects for mission critical facilities to be closed or mission critical skills to be lost) for consideration in fiscal year (FY) 2013 budget planning. The MEC met for the second time in March 2011 to hear from all five working groups. The third MEC meeting was held in October 2011, and meetings have since continued at a pace of about two per year.

[5] Information on the early MEC meetings is drawn, inter alia, from an unclassified internal IC document prepared by an ODNI participant in the process and presentations to the NRC study committee.

[6] MEC membership currently is as follows: IC—National Intelligence Officer for S&T and Director/National Counter Proliferation Center; DOE—Administrator/NNSA and Under Secretary for Science; DOD—Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs and Assistant Secretary of Defense for Research and Engineering; DHS—Under Secretary for S&T and Director/Domestic Nuclear Detection Office. The NNSA laboratories are not formally members of the MEC, but a representative does attend the meetings. Similarly, the Office of Science and Technology Policy is an ex-officio participant in the MEC meetings.

Participants and observers agree that the MEC is getting traction. One former participant reported to the committee that the MEC is a unique space where senior agency officials can have strategic discussions on important national interagency security science and technology issues.[7] The IC has found that the MEC process has helped drive internal consideration of priorities and established lines of internal communication that had not existed before.

Nonetheless, most comments on the MEC suggest it still has further to go before meeting its potential to provide strategic partnership for the national security laboratories. In particular, to function well, the MEC needs agencies to be prepared to discuss their long-term challenges, which means the agencies must have a long-term substantive strategic plan for the laboratories. A secondary but important aspect relates to providing the laboratories with clear strategic guidance on future priority issues and needs and coordinating that guidance with DOE. Lastly, and most important, is the challenge in developing a mechanism to coordinate with DOE and Congress on funding for the investments needed to sustain current laboratory capabilities and develop new laboratory capabilities to meet national security agency expectations and requirements that may be of lesser importance to DOE.

[7] Former DHS Under Secretary for S&T, Tara O'Toole, May 5, 2014.

H

Conceptual Model for Facilitating the WFO Approval Process[1]

The conceptual model proposed here under a system of Work Scope Agreements/Work Boundary Agreements (WSA/WBA) mentioned in Recommendation 4.1 would allow work to come into the NNSA laboratories with a significantly reduced amount of approval overhead. The responsibility for the safe, secure, and environmentally responsible execution of the work would be placed on the laboratories and their management and operating (M&O) contractor. A demonstrable, robust system of review and management would have to be in place at each laboratory for the system to be approved.

The notional Work Scope Agreement (WSA) in Box H.1 is a very limited example of the type of agreement that would allow maximum flexibility and efficiency in processing Interagency Orders (IOs, or Work for Others [WFO] contracts) while assuring that appropriate controls are in place to assure that legal and regulatory requirements are met. It outlines an agreement between one NNSA laboratory (LLNL) and one strategic partner agency (the Department of Defense [DOD]).

Note that these technical areas could be derived from descriptions of existing work from the determinations and findings (D&Fs) required in each WFO contract. A careful review of all current D&Fs would allow a comprehensive list of work that has already been attested by both

[1] This appendix is based on material supplied by Dori Ellis, Associate Director at Large for Interagency Mission Enhancement, Lawrence Livermore National Laboratory, on September 17, 2014.

BOX H.1
Notional Work Scope Agreement

Work Scope Agreement between the Department of Energy and the Department of Defense for FYxx through FYxy Interagency Orders To Be Performed at Lawrence Livermore National Laboratory

The Department of Defense proposes to issue multiple IOs to be performed at the Department of Energy Federally Funded Research and Development Center at Lawrence Livermore National Laboratory in the areas of research and development identified below, in a combined amount not to exceed $XXXXM. The period of performance of this agreement is from October 1, 201x through September 30, 201y.

IOs shall be issued pursuant to the authority of the [appropriate legal authority]. As required by Federal Acquisition Regulation 17.503, DOD has confirmed with DOE that these projects are permitted under the terms of DOE's sponsoring agreement and verified that this work cannot be obtained conveniently or economically through other sources, and does not place the Laboratory in direct competition with private industry.

Categories of work to be performed under this agreement include:

1. General technical area 1.
2. General technical area 2.
3. Etc.

The Department of Energy concurs that work executed under this Work Scope Agreement is consistent with the missions of DOE and within the capabilities and capacity of Lawrence Livermore National Laboratory. This work will be performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344 with Lawrence Livermore National Security, LLC, and subject to the terms and conditions of that agreement.

_____ _____

Signature: DOE representative Signature: DOD representative

the Department of Energy (DOE) and DOD as meeting the federally funded research and development center criteria. This agreement could be reached annually, or over some longer period, as the types of work that the laboratories execute for DOD are consistent and based on the core capabilities and experience of the laboratory in question. It would be expected that there would be one WSA for each partnership between a laboratory and a strategic partner agency. Because more than 80 percent

of the WFO portfolio at LLNL is executed on behalf of three agencies, the number of individual transactions would be reduced dramatically.

WORK BOUNDARY AGREEMENT

The other half of the conceptual model between the NNSA laboratories, DOE, and other agencies is the WBA. This agreement would be between the DOE/NNSA and its laboratories. It covers those areas of operations requirements that must be met for the IOs to receive automatic approval (with an appropriate audit trail) from DOE. The WBAs would cover environment, safety, and health (ES&H), security, facility, project, and financial management, and any other appropriate operations requirements. All of these requirements are already documented in the individual contracts between the management and operating (M&O) contractors and DOE. If the Contract Assurance Systems are working properly, establishing the working envelope should be straightforward, although perhaps tedious the first time through.

Automatic approval of IOs would only be allowed if the laboratory attests that appropriate review has taken place and the project is in compliance with all requirements. For example, in ES&H a project review might include the following:

1. Review for compliance with DOE environmental, safety, and health requirements.
2. Assurance that the laboratory/facility contains all necessary ES&H approvals (laser interlocks, Operational Security Plan, Facility Safety Procedure, etc.) required for this type of work. The work will be performed in accordance with [the laboratory's] Integrated Safety Management program.
3. Assurance that the development effort is within the existing safety basis of the facility in which it will be executed.
4. Pre-start reviews and standard laboratory ES&H protocols, as required.
5. Review for compliance to all applicable ES&H standards.
6. If needed, an Integrated Work Sheet as required by Integrated Safety Management System standards.

The requirements for the WBA could be obtained from the existing ES&H and other requirements that are levied on all recent projects. These agreements could be approved on the same schedule as the WSAs, with periodic renewals.

WORK STATEMENT

The work statement defines the effort and enables execution by the laboratory. It is typically refined by an iterative process between the sponsoring agency, the NNSA field office, and the laboratory. This process, which can be time consuming, would not change. However, in this model the work statement is only provided to DOE for information (i.e., not requiring approval) to ensure DOE cognizance that the work is within the boundary agreement.

EXCEPTIONS

Neither the WSA nor the WBA would allow the laboratories to do work that is not already routinely approved under the current review and approval system. Work outside of the norm—for example, work that requires expanding the safety basis of a facility, introducing Category I or Category II radioactive material onto the site, having explosives over a certain limit, requiring facility modification over a some limit, or other "off-normal" conditions, could be exempted from the pre-approval process and require additional review by the field office.

I

Acronyms

D&F	determination and finding
DHS	Department of Homeland Security
DNFSB	Defense Nuclear Facilities Safety Board
DNI	Director of National Intelligence
DOD	Department of Defense
DOE	Department of Energy
ERDA	Energy Research and Development Agency
ES&H	environment, safety, and health
FFRDC	federally funded research and development center
IC	Intelligence Community
IO	Interagency Order
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
M&O	management and operating
MEC	Mission Executive Council
MOU	memorandum of understanding
NNSA	National Nuclear Security Administration

NNSS	Nevada National Security Site (formerly the Nevada Test Site, or NTS)
NRC	Nuclear Regulatory Commission, or National Research Council
ODNI	Office of the Director of National Intelligence
ORNL	Oak Ridge National Laboratory
PCAST	President's Council of Advisors on Science and Technology
PNNL	Pacific Northwest National Laboratory
R&D	research and development
S&T	science and technology
SNL	Sandia National Laboratories
ST&E	science, technology, and engineering
WBA	Work Boundary Agreement
WFO	Work for Others
WSO	Work Scope Agreement