Report 4 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise

Panel to Track and Assess Governance and Management Reform
in the Nuclear Security Enterprise

Laboratory Assessments Board

Division on Engineering and Physical Sciences

A Consensus Study Report of

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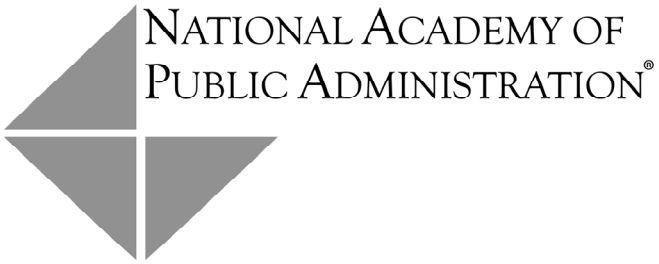

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Acknowledgment of Reviewers

This Consensus Study Report was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the National Academies of Sciences, Engineering, and Medicine in making each published report as sound as possible and to ensure that it meets the institutional standards for quality, 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 thank the following individuals for their review of this report:

David S.C. Chu, NAPA, Institute for Defense Analyses (retired)
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Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations of this report nor did they see the final draft before its release. The review of this report was overseen by Robert F. Sproull, NAE, University of Massachusetts, Amherst. He was responsible for making certain that an independent examination of this report was carried out in accordance with the standards of the National Academies and that all review comments were carefully considered. Responsibility for the final content rests entirely with the authoring committee and the National Academies.

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Executive Summary

As it approaches its conclusion later this year, the Panel to Track and Assess Governance and Management Reform in the Nuclear Security Enterprise, established by Congress in 2016, offers three recommendations to sustain the improvements seen to date across the enterprise. (See Box ES.1 below for the panel's statement of task.) That enterprise consists of the National Nuclear Security Administration (NNSA) plus a large, distributed system of laboratories, production plants, and other sites that are staffed by personnel working under management and operating contracts.

The first two of these recommendations deal with leadership. As noted in a number of external studies over two decades—more than 50 by one count[1]—the nuclear security enterprise has long been criticized as being poorly governed and managed. For example, the congressionally mandated report *A New Foundation for the Nuclear Enterprise* (hereafter, the "Augustine-Mies report"), released in November 2014, concluded "The existing governance structures and many of the practices of the [nuclear security] enterprise are inefficient and ineffective, thereby putting the entire enterprise at risk over the long term."[2]

As noted in the panel's previous report (issued in February 2019), the release of the *Nuclear Posture Review* in 2018 and increasing budgets provided a renewed impetus to the enterprise, along with a heavy workload and ambitious timelines. The current NNSA Administrator was sworn in early that year, and she hit the ground running. Her strong leadership of the enterprise included an emphasis on improving governance and management. She has pushed for, and modeled, much of what is needed to change culture and ensure a well-managed enterprise.

However, the panel is well aware of the scale of this challenge and the multiyear timelines required for culture change such as the ongoing reform of governance and management. The panel worries that today's state of progress is fragile and very dependent on the top leadership team, the installment of which was a necessary precursor to change. The current NNSA Administrator has for 2 years pushed energetically to adjust NNSA's governance and management of the enterprise, but the panel is very conscious of the fact that the average tenure of NNSA Administrators over the past 20 years has been just 3.7 years. Recognizing the value of greater continuity of leadership in such a complex and technical organization, the Augustine-Mies report[3] recommended that the NNSA Administrator's position should be changed to a fixed-term position. After reviewing the rationale presented by the Augustine-Mies report, considering other positions in the federal government that have fixed terms, and discussing options with select individuals with knowledge of such positions, the panel agrees that a change in the position's term should be made.

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[1] Commission to Review the Effectiveness of the National Energy Laboratories, 2015, *Securing America's Future: Realizing the Potential of the Department of Energy's National Laboratories: Final Report of the Commission to Review the Effectiveness of the National Energy Laboratories,* https://energy.gov/labcommission/downloads/final-report-commission-review-effectiveness-national-energy-laboratories, p. vi.

[2] Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, 2014, *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise*, http://cdn.knoxblogs.com/atomiccity/wp-content/uploads/sites/11/2014/12/Governance.pdf?_ga=1.83182294.1320535883.1415285934, p. ix.

[3] Ibid., p. 28.

Recommendation. Congress should consider amending the National Nuclear Security Act to convert the position of National Nuclear Security Administration (NNSA) Administrator to a fixed term, still as a Presidential appointment subject to Senate confirmation. (Chapter 4)

This recommended action might also minimize gaps between confirmed Administrators (which have averaged 247 days over the past four transitions) by reducing the chance of those transitions occurring during the months following a Presidential Inauguration, when substantial delays are most likely to occur. Even though Acting Administrators provide leadership between confirmed Administrators, gaps are undesirable. The second recommendation regarding leadership involves steps the Administrator should take quickly to help ensure that current progress in government and management is institutionalized.

In 2019, NNSA released three strategic documents to guide its work, including a framework for governance and management. Subsequent discussions between the panel and at least two dozen senior NNSA leaders indicated their unanimous support for the Administrator's main messages about governance and management, and the associated culture that is desired. That culture will be characterized by a spirit of "One NNSA," in which all members of the enterprise understand their role in achieving the mission and working together with a shared purpose—their roles and responsibilities are clear, they practice risk management rather than risk avoidance, and the guiding principle for management will be "getting to yes," while ensuring the safety and security of the enterprise.

During 2019, multiple steps have been taken toward institutionalizing the desired governance and management changes, which is heartening. What has yet to occur—not surprisingly, given the magnitude of the desired culture change—is for the new principles to be fully operationalized. That is a multistep process of communication, codification (in some cases), and translation of general principles into guidance that is useful to the day-to-day actions of people at all levels throughout the enterprise. Given the fact mentioned above about the relatively short average tenure of NNSA Administrators, the panel remains concerned (as it was a year ago) about the pace of progress and limited sense of urgency, the lack of metrics, and the remaining need for institutionalization. Progress is still heavily dependent on the top individuals who are pushing for change.

Accordingly, the panel makes the following recommendation:

Recommendation. The National Nuclear Security Administration (NNSA) Administrator should promptly designate a career senior executive as the accountable change management leader for the next several years. That person's responsibilities should include development and dissemination of documents that operationalize and institutionalize the desired governance and management practices and culture change more generally. These documents should be released within 6 months. The change management leader should actively monitor progress toward institutionalization of these changes. (Chapter 2)

The panel envisions that the challenge of institutionalizing high-level governance and management changes—of driving those messages down into the entire enterprise workforce and adjusting processes and written guidance so that the desired culture becomes ingrained—will require effort from managers across the enterprise. So the role of the accountable change management leader is to motivate, delegate, and monitor, not to shoulder all the tasks. The change leader also needs to keep attention on attaining the desired culture; operationalizing and documenting new practices must not become ends in themselves. Additional thoughts about the change management leader's responsibilities are found in the panel's third report.[4]

[4] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2019, *Report 3 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, p. 24.

Following the 2018 release of the *Nuclear Posture Review*, there has been a rapid increase in workload across the nuclear security enterprise, especially in connection with life-extension programs and the development of plutonium pit production capabilities. The panel felt it was important to check whether these highly visible activities, with their ambitious timelines, are having undesirable effects on the ability of the nuclear security enterprise to carry out the long-term research that sustains and builds the more generic science and engineering (S&E) capabilities needed by the enterprise. That long-term research is not normally tied to a specific near-term deliverable, but strong S&E capabilities create new options for addressing near-term deliverables while also providing tools that will be important to the enterprise further in the future.

Through three site visits in 2019 to the NNSA laboratories, panel members participated in free-ranging and frank discussions with over 90 researchers at varying levels of seniority. These interactions overall showed that research to support those S&E capabilities continues to receive attention and priority, and that the laboratories' scientists and engineers continue to produce valuable work. However, a primary observation arising from these visits is that near-term demands and some administrative issues are stressing this work by severely limiting the time that researchers can devote to deep and sustained creative thinking. Moreover, top research leadership at the three laboratories did not seem to fully recognize the amount of stress felt by those researchers. Accordingly, the panel makes the following recommendation:

Recommendation. The Directors of the three laboratories, with National Nuclear Security Administration (NNSA) assistance as needed, should periodically assess the environment for work that sustains the enterprise's core science and engineering (S&E) capabilities. This assessment should include input from the researchers engaged in that work, and identify steps needed to strengthen the environment. (Chapter 3)

In addition to these new recommendations, the panel's recommendations in its first three reports are still relevant and timely. The change management leader should revisit those recommendations and the panel's other past guidance as a foundation for action.

BOX ES.1
Statement of Task

[E]valuate the implementation plan developed by the National Nuclear Security Administration (NNSA) and Department of Energy (DOE) in response to the FY2016 National Defense Authorization Act, and the subsequent implementation of such plan. The study will be carried out collaboratively with the National Academy of Public Administration (NAPA), as directed by the FY2016 National Defense Authorization Act, and will follow [the National Academies'] procedures and policies. The committee will issue interim reports every 6-12 months to evaluate progress in implementing the plan. A final report will be issued at the end of the study to document the overall progress in executing the implementation plan, assess the effectiveness of the reform efforts under that plan, and recommend whether further action is needed.

1

NNSA's Strategic Documents and Culture Change

A high-profile 2014 report to Congress about the health of the nuclear security enterprise, the "Augustine-Mies report,"[1] concluded that successfully addressing management issues at the National Nuclear Security Administration (NNSA) would not be possible by focusing on quick fixes. Instead, NNSA needed to reform the management culture, specifically to a culture of "performance, accountability, and credibility" that is "mission-driven." Culture change is a long-term effort that requires sustained leadership attention and adequate resources.

The importance of clear plans and effective communication to effecting persistent culture change is well-known. This panel's second interim report, issued in early 2018, strongly urged NNSA to develop a more strategic approach to reforming its governance and management of the nuclear security enterprise.[2] The release of the *Nuclear Posture Review* in 2018, and the appointment of a new NNSA Administrator shortly thereafter, provided critical impetus and opportunity for NNSA to adopt a more strategic approach to reforming governance and management of the enterprise. Accordingly, the panel's 2018 report called for NNSA "to create two plans expeditiously: (1) an integrated strategic plan for the entire nuclear security enterprise, focused on mission execution, and (2) a more complete and better grounded plan to guide the ongoing program of governance and management reform."[3]

Consistent with element (1) of the quoted material above, in May 2019 NNSA released three strategic documents that provide a high-level vision and roadmap for the nuclear security enterprise:

- *National Nuclear Security Administration Strategic Vision: Strengthening Our Nation Through Nuclear Security* (NNSA, Washington, D.C., May 2019);
- *National Nuclear Security Administration Governance and Management Framework* (NNSA, Washington, D.C., May 2019); and
- *NNSA Strategic Integrated Roadmap 2020-2044* (NNSA, Washington, D.C., May 2019).

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[1] Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, 2014, *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise*, http://cdn.knoxblogs.com/atomiccity/wp-content/uploads/sites/11/2014/12/Governance.pdf?_ga=1.83182294.1320535883.1415285934.

[2] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press. NNSA is the government agency responsible for the nuclear security mission. The nuclear security enterprise consists of NNSA plus a network of eight laboratories, plants, and sites, each managed by a Management and Operating (M&O) contractor. The M&O workforce is much larger than NNSA's own.

[3] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, p. 1.

The *Strategic Vision* and *Governance and Management Framework* reports articulate the following five mutually supportive and interlocking expectations related to culture. Four were presented in the *Strategic Vision* report[4] and reiterated in the *Governance and Management Framework* report[5] as NNSA's "key expectations for the governance and management of the nuclear security enterprise," and the fifth—an overarching principle—was emphasized by the Administrator in her personal message of introduction to the *Governance and Management Framework*.[6]

1. *One NNSA.* "We work with a single purpose as 'One NNSA' through more effective teaming and improved mission integration."
2. *Workforce's understanding of their alignment with mission.* "We ensure every member of our workforce knows and understands our mission and his or her role in accomplishing it."
3. *Risk management, not risk avoidance.* "We empower leadership to streamline decision making and manage rather than avoid risk."
4. *Clarification of roles.* "We execute the mission based on clearly defined roles, responsibilities, authorities, and accountability to prevent redundancy and miscommunication."
5. *Getting to "Yes" to successfully deliver the mission.* "We will work together across the entire enterprise to achieve the Nation's priorities and goals. … Success with Governance and Management means success in delivering the mission. It means getting to 'Yes.'"

NNSA'S DEVELOPMENT AND ROLLOUT OF ITS THREE STRATEGIC DOCUMENTS

In the panel's view, the strategic documents are a step in the right direction and a significant improvement over NNSA's 2015 *Strategic Vision*. These 2019 documents present objectives, priorities, and the desired culture, including themes of "one NNSA," "getting to yes," and appropriately managing risk.

The *Strategic Vision* and *Governance and Management Framework* effectively set forth a vision for the future of the nuclear security enterprise. Those documents emphasize in several places that they pertain to the entire enterprise, and they refer to the aspiration of being a single team. For example, the *Governance and Management Framework* "Purpose" includes the statement that the document "encompasses the federal headquarters and field office staff, our partner laboratory, plant and site personnel, and the partners' corporate parents." Overall, the documents' language regarding culture (including values and behaviors) and the importance of governance and management is promising.

Some specific aspects of the strategic documents are particularly noteworthy. Placement of the statement "Strengthening Our Nation Through Nuclear Security" front and center on the *Strategic Vision*'s cover is an effective way to communicate leadership's focus on that mission. The "mission priorities" in the document are long term and strategic, and each mission priority includes "mission milestones."

The process for developing the documents was also a valuable step in governance and management reform. The *Strategic Vision* was developed with input from a variety of stakeholders; the panel understands that leaders from headquarters, NNSA field offices, and management and operating (M&O) partners had varying opportunities to provide input, and some Department of Defense (DoD) personnel were briefed on the *Strategic Vision* and given an opportunity to provide feedback before it was finalized. This inclusive process is at least as important as the documents themselves: it has the potential to strengthen relationships and trust across the enterprise and creates buy-in for change from key leaders and stakeholders.

[4] *Strategic Vision*, p. 5.
[5] *Governance and Management Framework*, p. 2.
[6] *Governance and Management Framework*, "From the Administrator," introduction (no page number).

The rollout of the documents included communication from the Administrator and other senior leaders. The documents were released at a town hall meeting that was broadcast to the federal workforce and featured the Administrator and leaders from key parts of the enterprise (including some M&O partner leadership). The Administrator also transmitted the documents, accompanied by a message from her to federal personnel via an all-hands e-mail.

In addition, the Administrator directed field office managers to communicate with their own staffs and share the documents with their M&O partners. Field office leaders have communicated with their staffs in a variety of ways, including all-hands meetings, videos, disseminating the documents (in some cases, the documents were placed on every employee's desk), and requiring managers to have one-on-one conversations with each of their direct reports.

During 2019, the panel carried out a number of discussion groups and interviews to gather thoughts about governance and management from personnel across the nuclear security enterprise.[7] Through these interactions, the panel also gained insight about the degree to which the Administrator's principles of governance and management have been heard and internalized. The panel's discussion groups—which were held 4-5 months after release of the strategic documents—indicated that awareness of those documents across the enterprise is divided. NNSA employees almost uniformly were familiar with the documents, while employees from M&Os, especially below the senior management level, were much less likely to have been aware of them prior to receiving the discussion group invitation. In fact, several M&O personnel indicated that the documents had not been "rolled out to the masses" and thought that, if the goal is "one NNSA," they should have had access to the communications and training available to NNSA employees. On the other hand, some thought most M&O employees would not care about the documents—either because they are not relevant to their day-to-day jobs or because they assume their site strategic plans (with which they are familiar) are, or will become, aligned with the NNSA documents.

Subsequently, the panel interviewed 20 NNSA headquarters leaders of both functional and program offices. All of those individuals indicated that they have bought into and support the strategic documents.

Most of the discussion group participants had a positive view of the three strategic documents. The following are examples of comments from those discussion groups:

- You can't argue with the core values.
- The documents provide a common-sense way to accomplish the mission.
- These documents energize the conversation and it's good to have a conversation about what good governance is.
- Governance and management are clearly a priority for the Administrator.
- The documents are better than previous versions of the *Strategic Vision*.
- The core values resonate with me in my day-to-day job.

While, in general, the documents enjoy strong stakeholder support, discussion group participants pointed out that the documents are at a very high level, and they are eager to learn how the documents will be operationalized. In other words, they want to understand how these documents affect their organization, themselves, and their specific jobs; they view having office leadership translate the documents into goals and objectives for their specific office as a necessary next step. These sentiments are aligned with other discussions the panel had during 2019, especially during its site visit in May to Los Alamos National Laboratory (LANL), during which panel members engaged in wide-ranging discussions with a variety of lab and field office employees. The general message is that the enterprise is receptive to, and eager for, more specific implementation guidance to improve governance and management and implement those improvements. This level of interest provides an opportunity for NNSA leadership to make meaningful progress.

[7] See Appendix A, "Data Collection Methodology."

NNSA'S STRATEGIC DOCUMENTS AS VEHICLES FOR CULTURE CHANGE

To effectively change an organization's culture—which is a crucial part of what NNSA is trying to do with respect to governance and management of the nuclear security enterprise—the following factors have been shown to be necessary (at a minimum):

- Senior leadership is aligned on the need for change and on change messages.
- Communication about the change is planned, targeted to different stakeholders, and phased to coincide with the stages of change implementation; there are feedback loops and other opportunities for two-way communication.
- Adequate resources are devoted to the change.
- Direction for change is centralized, but implementation is decentralized.
- Stakeholders throughout the enterprise are engaged in a manner that builds acceptance and shared ownership of the change.
- Change initiatives are coordinated, phased, and reinforced.
- Barriers to change are identified and removed.
- Progress is assessed and demonstrated.

It is too early for NNSA to have made substantial progress on some of these bulleted items. NNSA has done well on the first item, and most of the rest are being addressed somewhat, but incompletely.

Since the strategic documents were released, the Administrator has taken steps to ensure that they are used and implemented. Notable examples of those steps are

- Incorporating messages from the strategic documents into town hall meetings at the sites, and other interactions and communications with members of the enterprise.
- Disseminating a monthly governance and management newsletter, with each issue focusing on a specific management issue (such as risk management), to the federal workforce via e-mail.
- Requiring all federal employees to have completed a new, online governance and management training course, designed to further increase awareness of and familiarity with the Administrator's desired governance and management principles and goals.

Parenthetically, almost everyone with whom the panel spoke during its fall 2019 discussion groups who had taken the computer-based governance and management training viewed it negatively, describing it as too long and of limited value. Several people expressed disappointment that there is no indication that any follow-on to the training is being planned. These individuals appeared eager for the next step and recognized that, no matter its quality, training is not enough to drive change.

The Office of Policy and Strategic Planning (Office of Policy), which is in the Administrator's front office, led the effort to develop the strategic documents and has been tasked with spearheading communication about the documents. While this office is very small, it has contracted with a management consulting firm that is providing support for governance and management reform.

One of the Office of Policy's initiatives to follow up on the release of those documents was to organize in the fall of 2019 almost forty focus groups to solicit information and ideas related to improving NNSA governance and management. The focus groups were facilitated by the independent management consulting firm mentioned above, and each consisted of a mix of individuals from across the enterprise. The participants had varying levels of seniority and lengths of tenure and were drawn from both programmatic offices and functional offices, and from NNSA and its M&O partners; none of them were members of the Senior Executive Service (SES) or political appointees. The results of the focus groups were presented to the heads and deputy heads of NNSA's offices at a governance and management workshop in late January 2020 after this report was drafted, and the results were also presented to senior staff members at a leadership retreat immediately following. The panel has been told that focus group

results and feedback from those top leaders are being used by NNSA to guide next steps, including developing a governance and management action plan.

In the panel's discussions with a wide range of senior leaders across NNSA and its M&O partners,[8] it received positive comments and a sense that NNSA is moving in the right direction from virtually everyone. Multiple leaders used the words "exciting" to describe the documents and the Administrator's governance and management reforms, and "excited" to describe staff attitudes. Indications are that leaders have heard loudly and clearly the messages about "one NNSA" and "getting to yes" and fully support those concepts. Some offices, and some M&O partners, have developed their own strategic plans that align with the strategic documents, have incorporated components of the documents in their work, or have changed processes. Some details about those developments are included in Chapter 2.

SUMMARY

It is the consensus of the panel that the governance and management changes instituted by the NNSA Administrator and the organization's communication about the desired cultural norms are consistent with what is needed in the nuclear security enterprise. Since being sworn in, the Administrator has exerted strong leadership for improving governance and management. She has pushed for, and modeled, much of what is needed to change culture and ensure a well-managed enterprise. The panel's information gathering indicates that NNSA's communication strategies to extend the Administrator's reach have been somewhat successful, but the panel has not seen a comprehensive communication plan. It is the panel's understanding that the Office of Policy is developing an "action plan" that will encompass communication, but that plan will not be shared with the panel until it is reviewed and approved internally. Therefore, at this point it is unclear the extent to which NNSA's plans for culture change adhere to best practices and will suffice.[9]

Changing an organization's—or an enterprise's—culture is a difficult, multiyear undertaking. Given that understanding, the panel recognizes that NNSA's initial efforts have produced and encouraged continued attention to factors (e.g., leadership commitment and communication) that are necessary if NNSA is to achieve its governance and management goals. However, addressing each of those elements separately is not consistent with best practices in managing change; a sustained, methodical approach to change management substantially improves the likelihood of success. This was emphasized in Recommendation 3.1 of the panel's second report.[10] While NNSA has not yet developed such an approach, its intention to use the results of the recent focus groups to develop an action plan can serve as a step down that path. The key will be for them to "strike while the iron is hot."

Panel discussions with the Administrator have shown that she agrees with the panel that institutionalization—driving the desired behaviors down into the entire enterprise workforce and adjusting processes and written guidance so that the desired culture becomes ingrained—has not yet been accomplished. The next chapter examines progress in that direction.

[8] While most interviews with site leaders took place before the strategic documents were issued, the leaders had seen drafts of the documents and provided input to them.

[9] See, for example, American Productivity and Quality Center, 2014, *Transformational Change: Making It Last*, https://www.grantthornton.com/~/media/content-page-files/advisory/pdfs/2014/BAS-transformational-change-report.ashx.

[10] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, pp. 13-14.

2

Progress in Establishing Structures and Practices to Implement the *Strategic Vision* and the *Governance and Management Framework*

One of the principal concerns that the panel expressed in *Report 3* (February 2019)[1] was the lack of urgency by the National Nuclear Security Administration (NNSA) in putting in place the documentation and other institutional structures needed for governance and management improvements to take root and to last. The panel mentioned several times in that report the importance of institutionalization and related steps:

> The panel remains concerned with the lack of urgency, metrics, and institutionalization; progress is heavily dependent on the individuals involved. NNSA leadership has yet to put in place the institutional structures needed for further progress and to sustain success, starting with documentation and directives.[2]

Over the past year, the panel has seen some progress by NNSA in institutionalizing governance and management reform; however, the efforts under way are early steps.

NNSA'S INITIATIVES TO PUT THE DESIRED GOVERNANCE AND MANAGEMENT PRINCIPLES INTO PRACTICE AND TO INSTITUTIONALIZE THOSE INITIATIVES

This section briefly describes several initiatives undertaken by NNSA over the past year that appear directed toward changing governance and management culture in line with principles contained in the strategic documents. Generally speaking, these initiatives adjust the institutional environment so that it can better foster a more collaborative and mission-focused culture.

Insofar as these recent initiatives turn out to be successful, their results should become evident in the coming months and years—first, in the positive impressions, attitudes, and behaviors exhibited and described by leaders and employees throughout the enterprise, and second, in improvements in the enterprise's decision making and performance. For now, the panel is encouraged that NNSA is taking steps toward institutionalization of the kind of organization and culture envisioned in the Augustine-Mies report and elsewhere.

The Administrator's Signature Realignment Initiative

The Administrator's Signature Realignment, distributed to NNSA personnel in writing in July 2019, consists of several adjustments to NNSA's management framework. The Administrator specified

[1] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2019, *Report 3 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press.

[2] Ibid., p. 2.

realignment goals that are consistent with the desired culture change, and a working group was designated for each realignment goal. The working groups took a corporate approach (i.e., applying the "One NNSA" principle) and made recommendations to NNSA's senior leadership that sought to redefine roles and responsibilities so as to minimize redundancy and miscommunication, and they sought to improve accountability by focusing the functional offices on supporting program offices. It is hoped that these changes will streamline decision making and help in the management of risk and will enable greater collaboration and efficiency. The following realignments appear poised to address past governance and management challenges:

- *Creation of a matrix organization for planning, programming, budgeting, and evaluation (PPBE).* Until recently, different offices carried out PPBE functions using disparate processes and tools, and the individuals who handled that work were not part of a common cadre of professionals. During 2019, some 56 individuals were administratively moved from their offices across NNSA to form a unit of PPBE specialists within the NNSA Office of Management and Budget (NA-MB), although they physically remain located within their original offices. Three internal NNSA policy documents were released in December 2019 to codify key elements of this reform.

  MATRIXED ORGANIZATIONS

  Matrix structures are prevalent in large organizations like NNSA that must apply the efforts of specialized functional areas to multiple projects at the same time. In matrixed organizations:

  - Chains of command are combined.
  - Employees typically report to both a functional manager and a program or project manager.

  Matrixed structures have advantages and disadvantages:

  - They can enable better information sharing and collaboration, integrated decision making, and flexible allocation of resources.
  - But they can also contribute to confusion over roles and responsibilities and to internal competition for resources, and they can require more time for internal communications and meetings.

  In addition to providing management improvements, including more reliable cost estimation and better analysis of alternatives, it is intended that this realignment will help break down stovepipes by fostering a shared knowledge base for PPBE, which in turn enables PPBE professionals to move between offices as workloads shift. In turn, that should help to spread best practices while providing PPBE professionals with a better understanding of the shared mission of the nuclear security enterprise.

  A senior manager in NA-MB told the panel that he has established a set of metrics intended to demonstrate whether or not the realignment is successful. He also expects the metrics to keep everyone in the mindset of continuous improvement, noting that the current structure is not locked in and can be adjusted if feedback suggests that there is a better way to execute the mission.
- *Meshing of the NNSA Office of Acquisition and Project Management's (NA-APM's) capabilities with the capabilities in programs and field offices.* For three main business lines within the NA-APM, roles, responsibilities, authorities, and accountabilities between headquarters and field offices have been clarified. This has been manifested in adjustments in reporting structure and physical location for some employees. This "One NNSA" approach is meant to streamline decision making in acquisition and construction projects. For large or nuclear line-item construction projects such as the plutonium pit facility at Savannah River, NNSA at an early stage

convenes an integrated team of acquisition, design, and construction-management professionals, with an official from NA-APM in the lead.

- *The role of NNSA External Affairs (NA-EA) is strengthened and better integrated functionally with the field.* The strategic messaging function is being enlarged and consolidated at NA-EA headquarters, and NA-EA will establish a functional matrix with field office Public Affairs Officers, who will be functionally aligned with NA-EA but will remain supervised through the field office. This new arrangement is intended to better communicate the work of the nuclear security enterprise by increasing coordination between the program, functional, and field offices, contributing to the cultural expectation of One NNSA.

Other functional offices are also modifying their patterns of working with program and field offices by now having their specialists sit in on weekly project meetings. One example is NNSA's Office of General Counsel personnel. In this way, the expertise of these personnel is available to program and project personnel in real time, and simultaneously the functional office personnel become and remain much more knowledgeable about the status and challenges of programs and projects. Personal relationships are established, building mutual understanding and trust. Therefore, the functional office personnel can provide better-informed and more-timely advice when needed.

Engagement of Key Management and Operating (M&O) Leaders in the Annual Budget-Building Process

In 2019, NNSA involved upper managers from the labs and plants as it built up a future federal budget request for the enterprise. This collaborative approach, which is a big change from past practice in the enterprise, broadened the range of perspectives incorporated in that planning, and the panel was told that it helped to ensure that the assumptions underlying those budget requests (e.g., the proposed timelines) are realistic and acceptable to those who must execute against them. The panel was also told that some Department of Defense (DoD) officials were consulted as a further check that that important stakeholder was in agreement with the general plans embodied in the early-stage budgets.

Updates to the NNSA Supplemental Directive on Site Governance

NNSA Supplemental Directive on Site Governance SD226.1B, issued in 2016, codified the roles and responsibilities of various components of NNSA and roles and responsibilities of the M&O organizations and their corporate parents with respect to governance of operations at NNSA laboratories and production plants. A revision to this guidance, designated as SD226.1C, was issued on October 1, 2019. The revision codified several arrangements that help to institutionalize the governance and management principles put forth in NNSA's strategic documents:

- *Field Office Program Liaisons.* SD226.1C establishes field office positions that are explicitly charged with serving as liaisons to certain NNSA programs with the goal of promoting better integration across the enterprise. It is also possible that the Program Liaisons' situational awareness might reduce the number of data calls.
- *Safety Process Reviews.* An appendix to SD226.1C sets out a process for "identifying, coordinating, and conducting requirements-driven safety management program" reviews in order to provide "effective development and consistent implementation of safety programs and requirements." This process should codify practices that reflect a spirit of partnering and "getting to yes."
- *Site Integrated Assessment Plans.* Another appendix to SD226.1C codifies the process for Site Integrated Assessment Plans (SIAPs), which have been developed in recent years to provide a common understanding of external assessments imposed on the sites. That appendix provides

guidance to assist field offices and NNSA headquarters producing comprehensive, transparent plans for assessment activities for each fiscal year (FY), which in turn offers the possibility of "identifying efficiencies by combining similar assessment activities or eliminating duplicate activities." While the SIAP process is not new, this codification within SD226.1C increases its visibility, which may lead to greater effectiveness, reduction of some data collection burden, and streamlining decision making and alignment across the enterprise.

Steps Toward Financial Integration

Two of NNSA's major offices, NA-50 and NA-20, have relied on a financial system that is different from the system used throughout the rest of the agency. Their use of their own system provides certain benefits for their program managers, but having different financial systems within NNSA clearly interferes with agency-wide financial management. In particular, the two systems in use rely on different work breakdown structures (WBSs), making it difficult to reconcile accounts. As a pilot during FY2020, NA-MB is using a single, uniform WBS throughout NNSA, although the Office of Defense Nuclear Nonproliferation (NA-20) and Office of Safety, Infrastructure, and Operations (NA-50) may continue to support their alternative system.

It is intended that this step, which responds to Section 3111 of the FY2017 National Defense Authorization Act (NDAA), will encourage and enable better ways to manage budgeting and also enable further reductions in cost controls. It should reduce the record keeping and reporting burden on M&Os and enable the generation of financial data that is comparable across the enterprise.[3]

Governance and Management Core Values and Expectations Added to the Performance Evaluation of Most NNSA Supervisors

Recently, NNSA's Human Resources Office issued a "Specific Performance Objective" to align the performance evaluations of non-Senior Executive Service (SES) supervisors with NNSA's expectations for governance and management culture, thereby contributing to the institutionalization of the core values promulgated in the 2019 strategic documents. The new performance objective calls for those supervisors to

> Reinforce the organization's role and each member of the organization's individual responsibilities in meeting NNSA's four governance and management expectations: 1) work with a single purpose as "One NNSA" through more effective teaming and improved mission integration; 2) ensure every member of the team knows and understands NNSA's mission and his/her role in accomplishing it; 3) empower employees to streamline decision-making and manage rather than avoid risk; and, as applicable, 4) execute the mission based on clearly defined roles, responsibilities, authorities, and accountability to prevent redundancy and miscommunication.

This addition to supervisor performance evaluations conveys a desirable emphasis on establishing measurable goals and objectives for their work on keeping the governance and management framework in mind as they manage their work. The guidance has a welcome tone of continuous improvement, as conveyed by phrases such as "Responds to potential or actual problems . . . by identifying issues, determining alternative courses of action . . . and elevating to higher-level officials in a timely manner" and "Utilizes [various inputs] to develop/implement initiatives to improve." Evaluating individual performance against these expectations is both important and difficult. How that will actually be accomplished—thereby enabling NNSA to reward those who are successfully modeling the desired

[3] See also Government Accountability Office, 2020, "National Nuclear Security Administration: Additional Verification Checks Could Improve the Accuracy and Consistency of Reported Financial Data," GAO-20-180, https://www.gao.gov/products/GAO-20-180.

culture—is an open question that must be addressed before governance and management reform can truly be institutionalized.

Operationalization of Governance and Management Strategies Within Various NNSA Offices

The leaders of five NNSA offices have told the panel that they had developed their own strategic plan, vision statement, and strategic goals to align with the higher-level strategic documents. Other initiatives include office realignments; changes in processes to make them more inclusive and transparent; and institutionalizing changes, primarily through documenting processes and procedures.

One manager told the panel that he perceives greater willingness within the organization to identify problems and issues and use these as teachable events to avoid recurrence. He also sees a move away from a punitive "us versus them" approach toward more collaborative problem solving, in line with the principle of "getting to yes."

Collaborative Recruitment and Hiring Initiatives to Benefit both NNSA and M&Os

NNSA's *Governance and Management Framework* emphasizes the need for a world-class workforce. It cites the urgent need across the nuclear security enterprise for additional highly skilled personnel to meet new demands and to replace an expected large number of retirements. Congress, in the National Defense Authorization Act for Fiscal Year 2020, raised NNSA's cap on the number of full-time equivalent federal employees from 1,690 to 1,890, and raised the cap on excepted service hiring authority from 600 to 800 employees. Doing so is an effort to help NNSA hire the federal employees it needs to accomplish its mission.

Recognizing that NNSA's M&O partners also have tremendous hiring and recruitment needs, NA-MB worked with field offices and M&Os across the country to conduct joint job fairs and to streamline some hiring in 2019. Below are some examples of these efforts:

- Two job fairs were held in Washington, D.C. To maximize the chances of success, the job fairs were held near the Pentagon (potentially a source of individuals who already hold security clearances). Drug testing and other background reviews were done on site. All M&Os that were hiring participated in each job fair along with NNSA offices, and planning cleared away typical barriers and allowed provisional job offers to be made on-site.
- Working with the field offices and M&Os, additional job fairs were held at carefully selected universities around the country during the year to build long-term relationships to create pipelines of talent into NNSA as well as into the M&Os (which have long used this mechanism). Senior NNSA and lab/site/plant officials participated in these, including the Administrator. The planning that would allow immediate job offers to be extended to well-qualified applicants was put in place at some local job fairs, too.
- The length of time to get clearances has been a problem for both NNSA and M&O personnel for some time. By questioning procedures long in place, NNSA's Human Resources Office (within NA-MB) worked with the Department of Energy (DOE) on how to "get to yes" more quickly and reconfigured its own activities to streamline and significantly reduce the length of time for clearances to come through.

SUMMARY AND RECOMMENDATION

The panel is encouraged by the progress being made to reform governance and management in line with the goals envisioned by the Augustine-Mies report and others, including some steps to

institutionalize progress. As part of this culture change, the panel is especially glad to see the emergence of some practices within NNSA that enable continuous governance and management improvement, by providing opportunities to identify areas that need additional attention, as follows:

- The laboratory/site strategic planning process is institutionalizing annual opportunities to identify governance and management issues that impede the mission.
- The NNSA Governance Executive Steering Committee was chartered to implement guidance and share best practices and lessons learned to improve governance and management across the nuclear security enterprise. Its site-specific peer reviews have apparently been valued and could be the foundation for examining many business practices and generalizing and disseminating best practices across the enterprise.
- NNSA's fall 2019 focus groups demonstrate the value to be gained by surveying (in a sense) the enterprise workforce as a whole, to inform further work on governance and management.

However, the panel's discussion groups in fall 2019 revealed that those below the leadership level—especially in the M&Os—have not yet observed significant changes, in contrast to the situation at the leadership level. In any major culture change, it is typical for those at the leadership level to be aware of and be the early adopters/implementers of change; it takes longer for change to "take root" below that top level. The panel's discussion group participants indicated that, while "getting to yes" and "One NNSA" are being adopted by leadership, this mindset is not yet filtering down through the enterprise.

In its past reports, the panel has addressed the critical need for better structured change-management leadership and planning at NNSA. The steps recounted in this chapter do not appear to be part of a coherent plan for change. In Recommendation 3.1 of its second report, issued early in 2018, the panel recommended expeditious creation of a change-management implementation plan:

> NNSA should expeditiously create an implementation plan to enable achievement of the governance and management changes driven by NNSA's enterprise-wide strategic goals. This new implementation plan should link proposed actions explicitly to specific goals, including a timeline associated with each action, specification of who is responsible for which parts of the execution and who is accountable for the outcome, and measures to be used to gauge progress and impact.[4]

[4] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, pp. 2-3. *Report 2* also provided (p. 14) a more detailed description of what the enterprise needs from such a plan:

An adequate plan to steer governance and management reform should include the following elements:

1. A well-articulated statement of the intended concept of operations and goals (e.g., mission focus, simplicity, and clarity, as well as alignment of resources, organizations, and incentives) and what the intended result will be;
2. A plan for how to achieve the goals and intended results;
3. Active commitment to the goals and vision by senior-most leadership (at both NNSA and DOE);
4. A plan for how to accomplish the change, including centralized leadership and decentralized implementation;
5. Active involvement and engagement of personnel across the enterprise in planning and achieving the change;
6. Regularly scheduled reviews of progress against predetermined measures of effectiveness—with a visible cadence and a sense of urgency—that are conveyed across the enterprise and course corrections to be made as needed to accomplish the pre-set goals; and
7. A plan for communication and reinforcement of the desired attributes of the change through training, leadership activities, performance reviews, and ongoing continuous improvement programs.

Then, in Recommendation 2 of *Report 3*, issued early in 2019, the panel recommended the prompt establishment of a change-management leadership structure:

> NNSA should quickly designate a senior executive as the accountable change management leader for the next few years. The change leader should drive management and governance reform with urgency and a cadence focused on mission success. The time, resources, and authority needed to fulfill that responsibility should be provided and not be underestimated.[5]

Those two earlier recommendations are still appropriate, and, in light of the progress that has been made, and to try to reduce the risk that this forward momentum might be lost, the panel offers the following more-specific recommendation for 2020:

> **Recommendation. The National Nuclear Security Administration (NNSA) Administrator should promptly designate a career senior executive as the accountable change management leader for the next several years. That person's responsibilities should include development and dissemination of documents that operationalize and institutionalize the desired governance and management practices and culture change more generally. These documents should be released within 6 months. The change management leader should actively monitor progress toward institutionalization of these changes.**

The panel envisions that the challenge of institutionalizing high-level governance and management changes—of driving those messages down into the entire enterprise workforce and adjusting processes and written guidance so that the desired culture becomes ingrained—will require effort from managers across the enterprise. So the role of the accountable change management leader is to motivate, delegate, and monitor, not to shoulder all the tasks. Additional thoughts about the change management leader's responsibilities are found in the panel's third report.[6]

The documentation for implementing culture change might cover at least the following topics:

- How should workers at various levels across the nuclear security enterprise (both contractors and federal employees) ensure that they are contributing to the concepts of "One NNSA" and "getting to yes"? How should workers at various levels across the enterprise contribute to the goal of better integration of efforts across the enterprise? What training, if any, will be offered beyond the current general course, taking into consideration the negative feedback about the current course that is reported in Chapter 1?
- How will NNSA surveil, on a regular basis, the entire enterprise to find governance and management problems and identify opportunities for continuous improvement? How should workers at various levels across the enterprise seek opportunities to weed out inefficiencies and improve processes? How will continuous improvement be incentivized and rewarded, and how will identified problems be resolved at the lowest appropriate level?
- How will progress on these initiatives be monitored, and what are their indicators of success? How will progress be communicated and celebrated?[7]

In the near term, NNSA should of course continue to communicate about change and implement governance and management reforms based on the action plan coming out of the focus groups, but written documentation will help ensure that implementation strategies are coordinated with each other and

[5] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2019, *Report 3 on Tracking and Assessing Governance,* p. 2.

[6] Ibid., p. 24.

[7] See also footnote 4 above.

aligned with other organizational changes (e.g., the structural realignment). Also, a communication plan is important because the information needs of stakeholders and the messages that resonate with them change depending on where they are in the change process.

The timeline in this recommendation is critical, because the planning structure and documentation should be developed and put in place while stakeholder interest across the enterprise is high and while NNSA's leadership slots are fully staffed.

3

Sustainment of the Enterprise's Core Science and Engineering Capabilities

A strong foundation of wide-ranging science and engineering research is essential to fulfilling the nuclear security mission, because the technical challenges of stockpile stewardship, and of nuclear security more generally, require deep and authoritative understanding of many areas of science and engineering. This foundational research maintains core competencies and builds new capabilities, enabling the nuclear security enterprise to overcome technical challenges that are otherwise intractable, along with providing scientific understanding of potential technological surprises that could threaten our national security. Carrying out this foundational research is also consistent with the laboratories' responsibilities as federally funded research and development centers (FFRDCs), as defined in federal law (48CFR 35.017): FFRDCs must have access to government data, facilities, and people beyond a typical contractual relationship; operate under a long-term relationship with the sponsoring agency to attract high-quality staff; maintain currency in their fields of expertise; preserve familiarity with the needs of their sponsoring agency; and meet the agency's special long-term research and development needs.

The past 2 years have seen a rapid increase in workload across the nuclear security enterprise, especially in connection with life-extension programs and the development of plutonium pit production capabilities. The panel felt it was important to check whether these highly visible activities, with their ambitious timelines, are having undesirable effects on the ability of the nuclear security enterprise to carry out the long-term research that sustains and builds the more generic science and engineering (S&E) capabilities needed by the enterprise. That long-term research is not normally tied to a specific near-term deliverable, but strong S&E capabilities create new options for addressing near-term deliverables while also providing tools that will be important to the enterprise further in the future.

Through site visits in 2019 to the three National Nuclear Security Administration (NNSA) laboratories, panel members participated in free-ranging and frank discussions with over 90 researchers at varying levels of seniority, with the goal of assessing how well the core S&E capabilities are being sustained. Those interactions overall showed that research to support those core capabilities continues to receive attention and priority, and that the laboratories' scientists and engineers continue to produce valuable work. However, a primary observation arising from these visits is that near-term demands and some administrative issues are stressing this work by severely limiting the time that researchers can devote to deep and sustained creative thinking. Moreover, top research leadership at the three laboratories did not seem to fully recognize the amount of stress felt by those researchers. Accordingly, the panel arrived at the following key findings:

Findings:

- Both product-focused work and sustainment of core S&E capabilities are essential to, and must be supported by, the nuclear security enterprise. That balance is essential to accomplishing the mission, and the laboratories' researchers are motivated by the dual challenge. This characteristic of NNSA labs benefits recruitment and retention and could be highlighted more prominently.

- People are the essential resource, and they are under stress.
- The infrastructure needs attention and is essential to enable continued excellence in S&E.
- Bureaucracy is overly burdensome to the staff.
- M&O leaders do not seem fully aware of staff concerns.

The panel's observations are discussed in the rest of this section.

THE NNSA LABORATORIES MUST SUPPORT BOTH MISSION WORK AND S&E CAPABILITIES

Laboratory scientists and engineers with whom the panel interacted value the fact that they are able to work as members of a team to solve mission-related problems. They take satisfaction in working to support an important mission while also partnering with very smart and accomplished colleagues. Those attributes of the laboratories are critical for recruiting and retention of top talent, especially in highly competitive fields. (While all of the laboratories are aware of significant competition from industry in some areas of research, they feel they can still attract and retain top talent, although with notable challenges in hot skill areas such as computer science, computer engineering, and data analytics.) Staff appear to take seriously the need to balance science advancement and mission deliverables. Sustaining an S&E capability for future circumstances and decisions *is an essential part of the mission*. If the S&E foundations are neglected or deemphasized, the overall mission will suffer.

A persistent challenge is the level of resources available for such research, which is generally not supported by the life-extension programs or other product-oriented funds. Support for the people who sustain the laboratories' core S&E capabilities is strongly dependent on a separate line of Laboratory Directed Research and Development (LDRD) funds, supplemented by smaller sources such as competitive awards from the Department of Energy (DOE) Office of Science. One area that is currently well-funded is advanced computing, which receives great support from the NNSA Office of Defense Programs (NA-10), the Office of Science, and the DOE Secretary's exascale computing initiative. In addition, support for core capabilities—for example, additive manufacturing, the dynamic mesoscale material science capability, and enhanced capability for subcritical experiments, along with funding associated the National Ignition Facility, Sandia's Z machine, and other experimental facilities—includes funds not only for facility operations but also for the core science programs associated with the facilities. Nevertheless, research staff at all sites visited voiced concern that as overall laboratory budgets are growing, funding to support core S&E capabilities is not growing proportionately. At one lab, some staff members expressed a concern of increasingly becoming a services organization rather than a research and development (R&D) lab. Some researchers are troubled by the fact that they are expected to find support for their own research, even when they are still very junior. All research staff with whom the panel interacted did, however, value the combination of mission work and science found at the labs.

Staff generally viewed the allocation of LDRD as strategically planned and executed. Some expressed concern regarding operational aspects of the program such as timely notification of proposal decisions. Some also expressed concern that getting the time and attention of mission leaders in order to incorporate LDRD results into life-extension programs (LEPs) or other weapon-specific work was very difficult owing to the pressure of timelines. This time pressure inhibits efforts to develop new technologies that could bring potential improvements. The panel encourages NNSA to remain mindful of these operational concerns as well as the necessity of keeping LDRD support in balance with the growing mission.

Based on the site visits, the panel urges NNSA and the laboratories to do more to convey strongly and clearly their commitment to support both the core S&E capabilities as well as work directly targeting specific weapons and other nearer-term goals.

PEOPLE WORKING ON CORE S&E CAPABILITIES ARE STRESSED

In general, the morale at the labs has made significant steps in recovering from what was generally perceived as a poor state 5 to 10 years ago. However, staff with whom the panel interacted at all the labs expressed feelings of stress and of having very little time to think or take on new work. They attributed this to the pressures of program work, with ambitious timelines—the effect of which cascades throughout the labs, even to those working on core capabilities—along with the considerable inefficiencies of overly burdensome administrative processes. Adding to this stress, all three laboratories are actively hiring additional scientists, and current staff are responsible for mentoring and rapidly integrating the new hires, which takes conscientious thought and considerable time.

While workers in many walks of life feel overworked, this feeling was expressed by almost everyone with whom the panel met, who described it as something new. In most cases, this was described as their worst problem. Science and engineering research is a very creative process, one that requires adequate time to develop fresh and deep understanding, and to uncover innovative ideas. An environment in which time is overly constrained can limit the quality of all work, particularly the creative work that sustains core S&E capabilities.

Many parts of the labs exhibit a great S&E environment, including strong teamwork among leaders, which provides critical support for the S&E staff. Still, a variety of other specific concerns were raised by S&E staff. At two of the labs, researchers expressed frustration that it takes some 5 years to be recognized and accepted as a fully capable staff member. At all three labs, staff were concerned that new hires are rarely brought on board early enough to overlap with the experienced staff member with special expertise that they are to replace. This inhibits the retiring person's experience and unwritten knowledge from being effectively passed on.

Senior and mid-career staff described spending considerable time writing proposals and selling their programs. The shortage of administrative assistance to help with the burdensome bureaucracy was also cited as a problem. Some researchers described spending up to 20 percent of their time doing tasks that could be more effectively accomplished with much less expensive administrative staff help.

Staff at all three labs said there was virtually no new-hire orientation beyond compliance training and paperwork. For example, most had not received background about their laboratory's heritage and accomplishments in essential service to the nation. Mentoring is important, but it is not uniform—some staffers with whom the panel interacted had received great mentoring and some none at all. Continuing education program offerings are not consistent across the labs, with some programs benefiting from the university partners involved in the laboratory's management, while others are focused on tactical training. It is important for all three laboratories to have effective programs to support their rapidly changing research workforce, such as mentoring programs available to all; on-boarding programs that convey the mission, ethos, and history of the laboratory; and career-enhancing continuing education programs.

Although two of the three laboratories have gone through contract transitions in recent years, the stresses and concerns brought to the panel's attention may not all be attributed to those disruptions.

INFRASTRUCTURE NEEDS ATTENTION

Infrastructure (facilities, equipment, etc.) at all three labs is inadequate and in various states of disrepair. At one laboratory, the staff felt optimistic about infrastructure improvement because the lab had plans in place and had shared them. At the other two labs, there was not the same optimism. One lab is undergoing "densification" owing to its rapid hiring and insufficient office space—requiring many researchers to share offices. Some staff described frustration about the *multiple years* needed to get a new science lab operational. Staff stated that it is challenging to maintain facilities and major equipment that are not supported by an LEP; there is no funded program to support the technical base facilities that broadly serve multiple weapons systems.

Staff at all three laboratories would benefit from better communication about plans for infrastructure revitalization and strategies for facility sizing for the current and projected workforces. The labs also need to assess the balance of their workforces to ensure adequate and effective administrative support while not unduly increasing the overhead burden.

SOME PROCESSES ARE OVERLY BURDENSOME

The S&E staff feels that too many of their laboratories' administrative processes are burdensome, rather than working (as intended) to facilitate the conduct of the mission. Staff lamented that too many of the current systems and processes do not increase effectiveness or provide helpful structure. For example, the current implementation of Earned Value Management for nuclear weapons projects (the use of which is mandated by NNSA) was described as "consuming" the Product Realization Teams with little to no value observed. There was, however, staff enthusiasm for safety staff when they are observed transitioning from the mindset of "you can't do what you need to do" to "let's find a safe way for you to do what you need to do." That attitude shift is a welcome one from what had been seen as a risk-averse culture.

While some burdensome practices have been identified by NNSA and the laboratories, more needs to be done to methodically surveil for inefficiencies and mitigate them. Laboratory staff often cannot discern whether any particular administrative burden is "home-grown" or driven by outside requirements, so NNSA and laboratory leadership must proactively address this so as to reduce stress on the staff. This issue was raised in the panel's first report; see Finding 3.1 and Recommendation 3.1, which are reproduced in Appendix C of this report.

ONGOING MONITORING OF THE HEALTH OF CORE S&E CAPABILITIES

It is noteworthy that research leadership at all three laboratories painted a more upbeat picture of their S&E work environment than did their staff at multiple levels. While the research leaders recognized that the workload has grown, it is not clear that they are aware of the high level of stress affecting their staff. The stresses recounted above were not clearly understood, perhaps not even recognized, by the laboratory executives with whom the panel interacted during the site visits. While some of those stresses may be traced to recent growth in the overall workload of the nuclear security enterprise, others (e.g., infrastructure, burdensome processes, size of the administrative staff, onboarding practices) should be at least somewhat under local control.

SUMMARY AND RECOMMENDATION

For those doing scientific and engineering research, the work environment and adequate time for thoughtful exploration are crucial for maintaining S&E excellence and capabilities. Because the health of the core S&E capabilities is vital to the nuclear security enterprise, especially in maintaining the ability to recruit and retain top talent, laboratory leadership and NNSA need to proactively monitor and support that health. The issues raised to the panel were recounted readily, so all that is needed is a commitment to asking questions and listening. Research leadership could follow a similar practice. (A previous panel recommendation[1] stressed the value of regularly monitoring employees across the enterprise.) The panel therefore offers a specific recommendation for the three laboratories, as follows:

[1] Recommendation 3.3 of National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management*

Recommendation. The Directors of the three laboratories, with National Nuclear Security Administration (NNSA) assistance as needed, should periodically assess the environment for work that sustains the enterprise's core science and engineering (S&E) capabilities. This assessment should include input from the researchers engaged in that work, and identify steps needed to strengthen the environment.

Reform in the Nuclear Security Enterprise, Washington, D.C.: The National Academies Press, p. 3: "As a first step toward meeting the need for objective evidence and data, NNSA should begin surveying the entire workforce of the nuclear security enterprise (possibly by leveraging existing surveys) so as to gain understanding of attitudes and engagement throughout the enterprise and insight about specific worker concerns."

4

Length of Tenure for NNSA Administrators

The Augustine-Mies report recommended that the National Nuclear Security Administration (NNSA) Administrator's position should be changed to a fixed-term position in order to ensure greater continuity of leadership in such a complex and technical organization.[1] After reviewing the law regarding the appointment of the NNSA Administrator, and the rationale presented by the Augustine-Mies report, the panel agrees that such a change should be made. The long-standing need for governance and management reform in the nuclear security enterprise illustrates the need for continuous, multiyear leadership at the top, which NNSA has not always had. Major change begins with clear, sustained direction from top leaders. In the case of governance and management reform, a strong direction could not be set until the current Administrator was installed in early 2018, and the associated culture change will require several more years at least. More generally, NNSA's programmatic work has long time horizons that require a vision measured in decades.

The Administrator's position is a Presidential appointment subject to Senate confirmation (PAS). The time required for the President to nominate a new Administrator, coupled with the time for Senate confirmation, has resulted in long gaps without a confirmed Administrator. Since the position was created in 2000, there have been four transitions to new Administrators, with an average gap of 247 days, as shown in Table 4.1. Acting Administrators have been in place during the gaps, and they have met day-to-day needs. However, based on panel members' experience, acting Administrators are less empowered, because they are by definition temporary, to bring about management changes and provide strong leadership.

In addition to the "gap issue," the panel is concerned about the potential for turnover and short tenure in the Administrator position, which is especially problematic given NNSA's specialized technologies and critical national security responsibilities. In its 20-year history, the NNSA Administrators have served an average of 2.1 years in the Administration within which they were appointed. Fortunately, succeeding Administrations of different political parties have kept them on for an average of 1.6 additional years, but there is no guarantee of that practice being followed for any given transition, and those added months may have a tenuous feel. Regardless, the average tenure of 3.7 years is short compared with the long timelines of NNSA's work.

In light of these concerns, NNSA's creation in 2019 of a new career senior executive position of Associate Principal Deputy Administrator is a welcome move. That new position provides greater front office continuity, because the Administrator and the Principal Deputy Administrator are political appointees.

[1] Recommendation 3.3 of Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise, 2014, *A New Foundation for the Nuclear Enterprise: Report of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise*, http://cdn.knoxblogs.com/atomiccity/wp-content/uploads/sites/11/2014/12/Governance.pdf?_ga=1.83182294.1320535883.1415285934, p. 28: "To provide needed seniority and continuity of leadership, the [Administrator] should be have the rank of Deputy Secretary or Under Secretary, be compensated at the rate of Executive Schedule Level II with a minimum six-year term."

TABLE 4.1 Length of Time Between Senate-Approved Administrators at NNSA

Administrators	Dates Without a Senate-Confirmed Administrator (Position Was Unfilled or Filled by Someone in an Acting Capacity)	Days Elapsed Without a Senate-Confirmed Administrator (Position Was Unfilled or Filled in an Acting Capacity—Approximate)
John Gordon—Linton Brooks	7/8/2002-5/16/2003	313
Linton Brooks—Thomas D'Agostino	1/19/2007-8/13/2007	208
Thomas D'Agostino—Frank Klotz	1/16/2013-4/8/2014	445
Frank Klotz—Lisa Gordon-Hagerty	1/20/2018-2/15/2018	23
Average Days Without a Senate-Confirmed Administrator		247

The panel engaged in discussions with multiple individuals who have served in PAS positions both within NNSA and outside it to explore pros and cons of possibly recommending a fixed tenure for the Administrator. In order to change the current appointment period for the NNSA Administrator, Congress would have to amend the National Defense Authorization Act (NDAA; 42 U.S. Code § 7132(c), which provides for the appointment and Senate confirmation of the Administrator) to increase the typical tenure and thereby reduce significantly the gaps without a confirmed Administrator. The panel believes that the Administrator should remain a PAS appointee because, in the panel's experience, that status is very important for ensuring that the Administrator is involved in discussions where NNSA should be represented.

There are precedents across the federal government for PAS officers being appointed with fixed terms, especially where the position calls for specialized technical knowledge and objectivity. The panel considered the following examples:

- Commissioner of the Internal Revenue Service (5 years)
- Administrator of the Federal Aviation Administration (5 years)
- Comptroller of the Currency (5 years)
- Director of the Mint (5 years)
- Director of the Bureau of the Census (5 years)
- Director of the National Science Foundation (6 years)
- Director of the Navy Strategic Systems Programs (6 years)
- Director of the Office of Financial Research, Department of the Treasury (6 years)
- Chairman of the Board of Veterans' Appeals, Department of VA (6 years)
- Director of the Institute of Education Sciences, Department of Education (6 years)
- Director of NNSA's Naval Nuclear Propulsion Program (8 years)
- Director of the Federal Bureau of Investigation (10 years)

The Augustine-Mies report recommended a term of "at least six years," which would be somewhat aligned with the tenure of the leaders of the Navy Strategic Systems Programs and NNSA's Naval Nuclear Propulsion Program.

An incumbent NNSA Administrator could, of course, leave prior to the end of the fixed-year term, and the President could always ask for an Administrator's resignation. However, a fixed term seems likely to increase the time served by confirmed Administrators. Also, new appointments are less likely to be required during the first year of a new administration, during which many positions must be filled and delays are more likely to be lengthy.

Other changes to the law could be made to reduce gaps in the Administrator position. Even if his or her term is complete, the Administrator could be permitted to remain in office, without further review, until a successor is confirmed, as long as the President and the incumbent agree. Also, the law could provide a newly confirmed Administrator with a full fixed term rather than being limited to completing the predecessor's term.

Recommendation. Congress should consider amending the National Nuclear Security Act to convert the position of National Nuclear Security Administration (NNSA) Administrator to a fixed term, still as a Presidential appointment subject to Senate confirmation.

The panel believes that the President, with the Senate's encouragement, should continue to seek NNSA Administrator nominees who have the management and technical experience necessary to lead this important organization. The panel hopes that the changes it recommends will take better advantage of the skills of future appointees.

5

Other Governance and Management Issues Examined in the Past Year

THE ROLE PLAYED BY CONTRACTING OFFICERS AND CONTRACTING OFFICER REPRESENTATIVES

Chapter 4 of the Augustine-Mies report discusses how to maximize the contributions of the management and operating (M&O) organizations to execution of the mission. It points out that "The government needs access to and a healthy working relationship with first-class scientific, engineering, manufacturing and management expertise that in some cases is not resident within the government," but that "There is concern across the NNSA complex that these needed relationships have eroded over the years, and have become more of an arm's length, even adversarial contracting relationship, rather than the needed collaborative one."[1] In the years leading up to that report, "changes in mission, increased regulatory oversight, reduced budget flexibility, and ascendancy of contracting officers in the management structure overturned accepted relationships within the nuclear weapons program. DOE/NNSA has increasingly moved toward detailed direction and regulation of the M&Os."[2]

One aspect of this concern—which deals overall with the health of federally funded research and development center (FFRDC) relationships within the nuclear security enterprise—is the role of Contracting Officers (COs) and Contracting Officer's Representatives (CORs). During 2018 and over the first half of 2019, the panel solicited information on the role of COs and CORs today. In particular, the panel explored whether people in those roles hinder the ability to achieve mission results by unduly delaying or withholding necessary approvals at the field office level. The panel examined the role of COs and CORs at National Nuclear Security Administration (NNSA) field offices through several sessions at the panel's 2019 site visit to Los Alamos National Laboratory (LANL) and the panel's Albuquerque meeting held at Sandia National Laboratories (SNL) in May, focusing largely on the impact of COs and CORs on NNSA and laboratory operations. The panel also engaged in conversation with selected NNSA officials located in Washington, D.C.

The NNSA and M&O personnel with whom the panel spoke did not report the kind of pervasive and severe dysfunction that concerned the Augustine-Mies Commission. LANL field office and laboratory personnel did describe instances when COs' subpar performance caused delays or confusion, but the prevalence and severity were relatively modest and seemed to arise from particular situations of understaffing and inexperience during the contract transition rather than from systemic or pervasive problems in the role of COs.

The panel's overall impression is that the CO and COR problems identified by Augustine-Mies have dissipated.

[1] Augustine-Mies report, p. 65.
[2] Ibid., p. 67.

MANAGEMENT OF MAJOR PROGRAMS

A key finding in the Augustine-Mies report is that "NNSA was not provided [by the NNSA Act] the line-management authority necessary to integrate safety, security, and environmental concerns into the decision making for executing NNSA's mission."[3] More generally, that report expresses concern in other places about the quality of program management:

- "Additional skilled personnel will be needed in several management disciplines, including cost and resource analysis and program management … NNSA's inability to estimate costs and execute projects according to plan has been a major source of dissatisfaction among the national leadership and customers and has significantly undermined NNSA's credibility."[4]
- "The Secretary should develop a Memorandum of Understanding (MOU) with DOD to … encompass sending program management interns to the Defense Acquisition University to acquire formal, professional program manager training and certification."[5]

As an indication of the program management that the report admired, it notes that "the B61 LEP program manager has been provided control over a significant share of the resources necessary to execute the program and has been granted a 5 percent management reserve by Congress."[6]

In order to learn about the caliber of program management today at NNSA and gain insight about management structures, while also illustrating how roles and responsibilities are apportioned within the enterprise, the panel recently began examining (at an unclassified level) the management structure and processes to build up the enterprise's pit-production capacity. As a first step, a small working group of the panel has met with leaders from the Office of Production Modernization (NA-19) and the Plutonium Program Office (NA-191) to learn about the nature of its authority within defense programs, field offices, and M&O sites, and with other NNSA and Department of Energy (DOE) headquarters offices. A site visit to LANL is planned for the coming months to gain further insight.

RESOLUTION OF A PROBLEM IDENTIFIED IN THE CRENEL REPORT

The CRENEL report recommended "Congress should repeal Section 301(d) of the FY 2015 Consolidated Appropriations Act as soon as feasible to remedy the transactional burden it creates for OMB, DOE Headquarters, and the laboratories when operating under a continuing resolution."[7] Section 301(d) codifies the annual appropriations "base table" into statute, which enforces relatively granular instructions about how much appropriated money may be spent for each of various purposes during the relevant fiscal year. Each statutory appropriation category contains a number of smaller "base table" categories of spending. During Continuing Resolutions, which have been frequent in recent years, this clause could unduly constrain financial decision making.

Over the course of 2018-2019, the panel met on several occasions with officials from the Office of Management and Budget (OMB), DOE, NNSA, and M&Os to examine the effort under way to reduce the burden 301(d) places on the nuclear security enterprise. Based on information from these interviews, the

[3] Ibid., p. xii.
[4] Ibid., 41.
[5] Ibid., p. 54.
[6] Ibid., p. 57.
[7] Commission to Review the Effectiveness of the National Energy Laboratories (CRENEL), 2015, *Securing America's Future: Realizing the Potential of the Department of Energy's National Laboratories: Final Report of the Commission to Review the Effectiveness of the National Energy Laboratories*, https://energy.gov/labcommission/downloads/final-report-commission-review-effectiveness-national-energy-laboratories, p. 34.

panel is pleased to relay that OMB's most recent revision to Circular No. A-11 effectively eliminates the burdensome impact of the 301(d) provision.

ROLES AND RESPONSIBILITIES OF CHIEF FINANCIAL OFFICERS

The panel had heard past reports of some confusion in roles and responsibilities between DOE and NNSA Chief Financial Officers (CFOs). It examined this topic in 2019 and was told that working relationships in the area of financial management have improved substantially over the past few years.

The fact that DOE's Acting CFO used to work at NNSA has been an important contributor to today's state, but discussions with career personnel suggest that the improvement reflects more than just personalities. Interviewees within NNSA report that the DOE CFO respects NNSA's independence, while being part of the Department gives NNSA valuable influence and access in cabinet-level decisions.

The panel was also told that quarterly meetings among financial management personnel from all of the DOE labs and plants, including financial management leaders from both DOE CFO and NNSA NA-MB, are very helpful in ensuring access and problem-solving among DOE, NNSA, and NNSA's labs and plants.

Appendixes

A

Data Collection Methodology

PANEL MEETINGS AND INTERVIEWS

The full panel met three times during the year leading up to this report. Two 2-day meetings were held at the National Academy of Sciences in Washington, D.C., and one 1-day meeting was held at Sandia National Laboratories (SNL) in Albuquerque, New Mexico. Each meeting included panel members, staff, and guests from across the nuclear security enterprise, including the Administrator at one meeting and the Deputy Administrator at another. The meetings were held on May 16, September 5-6, and December 5-6, 2019. Panel meetings were structured so that members could hear presentations by senior National Nuclear Security Administration (NNSA) and management and operating (M&O) officials, and could discuss relevant material and issues with these decision makers.

Additionally, information gathering for this report included formal interviews with senior-level officials within the NNSA and greater Department of Energy (DOE). Some of these were fairly general, while others focused on specific topics such as the Administrator's tenure and changes in financial and contracting processes.

In addition to these interviews, panel co-chairs and project staff spoke frequently with the leadership of NNSA's Office of Policy. The interviews and Office of Policy calls were structured to inform the panel and staff about initiatives, objectives, plans, accomplishments, and barriers in instituting governance and management reform.

PANEL DISCUSSION GROUPS AND PULSE CHECK INTERVIEWS

The panel carried out a number of discussion groups and interviews in 2019 to gather thoughts about governance and management from personnel across the nuclear security enterprise. Through these interactions, the panel also gained insight about the degree to which the Administrator's principles of governance and management have been heard and internalized.

The panel conducted six discussion groups during a site visit to Los Alamos National Laboratory (LANL) in May 2019. Those groups were comprised of NNSA field office and M&O personnel drawn from a mix of organizations that included both those with functional and those with program responsibilities. A total of 37 individuals participated in those discussions.

In addition, the panel held 12 discussion groups between September 25 and October 31, 2019. These discussion groups took advantage of the fact that NNSA was at that time holding focus-group sessions to explore related topics. The members of 12 of those focus groups were able to stay for a separate session with the panel. (NNSA's "focus groups" and the panel's "discussion groups" used different methodologies, hence the difference in nomenclature.) Each discussion group consisted of a variety of individuals from across the nuclear security enterprise, including personnel from NNSA headquarters and field offices, and staff from various M&O partners who, collectively, covered a broad range of levels of

responsibility and lengths of tenure in both programmatic and functional offices. The total number of discussion group participants was 116; the groups ranged in size from 7 to 13 participants.

Subsequently, in the winter of 2019-2020, the panel interviewed 20 NNSA headquarters leaders of both functional and program offices. Each individual was a senior-level manager within their respective office. The participants held varying lengths of tenure and levels of responsibility within NNSA. The offices of leaders interviewed included NA-10, NA-20, NA-50, NA-70, NA-80, NA-APM, NA-EA, NA-GC, and NA-MB. Almost all of the participants held Senior Executive Service (SES) status.

Each pulse check interview was conducted using a semi-structured interview guide. The comments made by interviewees were organized around predetermined topic areas covered during the interview. Panel staff performed a content analysis of meeting notes to identify patterns or themes, and results included major areas of disagreement when or if they occurred. These pulse check interviews complement the interviews the panel held with field office and M&O leaders in fall 2018, which it plans to repeat in spring 2020.

The panel also spoke to Los Alamos field office and M&O leaders during the May 2019 site visit.

While the panel's discussion groups provided insights about governance and management within the enterprise, information received through these should not be viewed as conclusive, owing to the small sample size. Nevertheless, an analysis of the discussions, particularly when taken in conjunction with the pulse checks and other interviews, illuminates where progress is being made and where challenges likely remain. The results of these data collection activities were shared with the Office of Policy and informed the panel's observations regarding the effectiveness of NNSA's governance and management and culture change initiatives as described in Chapters 1 and 2.

SITE VISITS

Los Alamos National Laboratory

On May 14-15, 2019, the panel visited Los Alamos National Laboratory (LANL). While there, it interacted with site leaders and held discussion groups with federal and M&O personnel. While at LANL, the panel conducted six 90-minute discussion groups with field office (NA-LA) and LANL participants. The discussion groups contained 6-12 participants, each of whom had 5 or more years of working experience with NNSA and/or LANL. A total of 37 individuals participated in the discussions.

Site Visits to NNSA Laboratories to Assess the Health of Work to Support the Science and Engineering Capabilities of the Enterprise

A working group comprising six panel members conducted site visits from July 31 through August 2, 2019, to evaluate the science and engineering (S&E) capabilities base at the three NNSA laboratories in four locations: Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL, California), Sandia National Laboratories (SNL, New Mexico), and Los Alamos National Laboratory (LANL). The panel met with senior research leadership, senior researchers, mid-career researchers, and early-career researchers.

The working group focused its data collection on five categories as they relate to governance and management: mission and science, people, leadership, infrastructure, and bureaucracy.

DOCUMENT REVIEW

The panel's staff performed secondary data collection through documents provided and produced by NNSA and the greater DOE. Staff and NNSA shared specific documents with panel members through e-

mail correspondence, at panel meetings, and in other meetings and discussion. The documents helped the panel track changes and institutionalization of governance and management principles within NNSA.

B

List of Interviewees by Organization

NATIONAL NUCLEAR SECURITY ADMINISTRATION

Senior officials are listed; other employees of NNSA headquarters were also interviewed but are not listed here. In particular, the names of 116 discussion group participants from fall 2019 are omitted because they were promised anonymity.

- Lisa Gordon-Hagerty, Administrator
- William Bookless, Principal Deputy Administrator
- Megan Milam, Director for the Office of Policy and Strategic Planning
- Dave Huizenga, Associate Principal Deputy Administrator
- Douglas Freemont, Chief of Staff
- Charles Verdon, Deputy Administrator for Defense Programs
- Brent Park, Deputy Administrator for Defense Nuclear Nonproliferation
- James McConnell, Associate Administrator for Safety, Infrastructure, and Operations
- Jeffrey Johnson, Associate Administrator for Defense Nuclear Security and Chief Defense Nuclear Security
- Jay Tilden, Associate Administrator and Deputy Under Secretary for Counterterrorism and Counterproliferation
- Frank Lowery, Associate Administrator for Management and Budget
- Robert Raines, Associate Administrator for Acquisition and Project Management
- Mark Anderson, Acting Associate Deputy Administrator for Research, Development, Test, and Evaluation
- Dean Childs, Director of Audits and Internal Affairs
- William (Dale) Conwell, Deputy Associate Administrator for Budget
- Kelly Cummins, Deputy Assistant Deputy Administrator for the Office of Production Modernization
- Stephanie Duran, Deputy Director for the Office of Policy and Strategic Planning
- John Evans, Assistant Deputy Administrator for Stockpile Management
- Vincent Fisher, Assistant Deputy Administrator for Secure Transportation
- Kevin Greenaugh, Assistant Deputy Administrator for Strategic Partnership Programs
- Keith Hamilton, Deputy Associate Administrator for Acquisition and Project Management
- Susan Head, Director for the Office of Personnel and Facility Clearances and Classification
- Kasia Mendelsohn, Principal Assistant Deputy Administrator for Defense Nuclear Nonproliferation
- John Michele, Director for the Plutonium Program Office
- Lewis Monroe III, Deputy Associate Administrator Office of Defense Nuclear Security
- Mischell Navarro, Chief Human Capital Officer
- Patrick Rhoads, Acting Chief of Staff for Acquisition and Project Management
- David Rude, Chief Learning Officer

- Kenneth Sheely, Deputy Associate Administrator for Infrastructure
- Daniel Sigg, Deputy Associate Administrator for Safety
- Brian Smith, Deputy Associate Administrator for Management
- Joel Spangenberg, Deputy Associate Administrator for External Affairs
- Henry Van Dyke, Deputy General Counsel for General Law and Litigation
- Oliver Voss, Head of the Contracting Activity Office of Acquisition Management
- Theodore Wyka, Principal Deputy Associate Administrator for Safety, Infrastructure and Operations

Los Alamos National Laboratory Site Visit, May 2019

All participants may not be listed.

- Frances Chadwick, Staff Director
- Marc Clay, Director of Mission Assurance and Prime Contract
- Chris Fryer, LANL Fellow
- Steve Goodrum, NA-LA Field Office Manager
- Rusty Gray, LANL Fellow
- Thom Mason, LANL Lab Director
- David Moore, LANL Fellow
- Gabe Pugh, NA-LA Deputy Field Officer Manager
- John Sarrao, Deputy Director, Science Technology, and Engineering
- Rick Verhaagen, Deputy Field Office Manager, Technical Operations and Senior Technical Advisor

NA-LA Staff

- Chris Bondi
- Jennifer Jung
- Jody Pugh
- Jason Saenz
- Jason Sines
- Dennis Svatos
- Erika Wisdom

LANL Staff

- Bill Archer
- Markus Berndt
- Craig Douglass
- Chris Fresques
- Herb Funsten
- Karen Haynes
- Jennifer Jordan
- Greg Juerling
- Ryan Kalas
- Lisa Lloyd
- Larry Lucero
- Andrea Martinez
- Jonathan Morgan
- Harishini Mulandez
- Jeff Pietryga
- Bill Priedhorsky
- Nina Rosenberg
- Mark Schraad
- Alissa Tatro
- Blas Uberuaga

Los Alamos National Laboratory Site Visit, August 2019

- John Sarrao, Deputy Director, Science Technology, and Engineering
- Nan Sauer, Senior Director, Partnerships and Pipelines Offices

- Toni Taylor, Associate Laboratory Director, Physical Sciences

Members of the Technical Staff

- Eva Bimbaum
- Laurent Capolungo
- Lukasz Cincio
- Manvendra Dubey
- Han Htoon
- Abigail Hunter
- Paul Johnson
- Christopher Lee
- Carrie Manore
- Pat McClure
- Pat McCormick
- Marisa Monreal
- Nathan Moody
- Reeju Pokharel
- Filip Ronning
- Roger Wiens

Lawrence Livermore National Laboratory Site Visit, July 2019

- Patricia Falcone, Deputy Director, Science and Technology
- Glenn Fox, Associate Director, Physical and Life Sciences
- Bruce Hendrickson, Associate Director, Computing
- Anatha Krishnan, Associate Director, Engineering

Members of the Technical Staff

- Teresa Bailey
- David Beckingsale
- Peter Brown
- Sara Chinn
- Angela Cook
- Thomas Desautels
- Heather Enright
- Maya Gokhale
- John Heeber
- Mike Heffner
- Stephen Herbein
- Stephen Klein
- Tzanio Kolev
- Adam Kunen
- Lara Leininger
- Rob Neely
- Robert Panas
- Georgios Papadimitrious
- Tashi Parsons-Davis
- Ryan Quinlan
- Brian Ryujin
- Andrea Schmidt
- Michael Schneider
- Chris Spadaccini
- Elizabeth Wheeler
- Mimi Yung

Sandia National Laboratories (California) Site Visit, July 2019

- Grant Heffelfinger, Director, Advanced Science and Technology Management Program
- Anup Singh, Director, CBRN Defense and Energy Technologies Center
- Tedd Rohwer, Director, CA Weapons Components Engineering Center

Members of the Technical Staff

- Bonnie Antoun
- Dorian Balch
- Janine Bennett
- Kim Celio
- Robert Clay
- Alex Hanson
- Brian Fu
- Marie Kane
- Tammy Kolda
- Raga Krishnakumar
- Robert Meagher
- Nalini Menon
- Mark Musculus
- Erin Mussoni
- David Osborn
- Krupa Ramasesha
- David Robinson
- Chris San Marchi
- Brandon Talamini
- LeRoy Whinnery

Sandia National Laboratories (New Mexico) Site Visit, August 2019

- Corey Cruz, Senior Manager, Advanced Science and Technology

- Grant Heffelfinger, Director, Advanced Science and Technology Management Program

Members of the Technical Staff

- Kate Bell
- Harlan Brown
- Rachel Chang
- Mary Crawford
- Kevin Cross
- Matt Eichenfield
- Katie Harrison
- Lisa Hood
- Amanda Jones
- Scott Jones
- Briana Klein
- Nick Leathe
- Steve Lehill
- Matt Marinella
- Joseph McDonald
- Michael McLain
- Tina Nenoff
- Jelena Paripovic
- Enrico Quintana
- Dan Rohe
- Dorina Sava Gallis
- Randy Schunk
- Kathy Simonson
- Andrea Staid
- Greg Ten Eyck
- Kyle Thompson
- Greg Tipton
- Ben Ulme

DEPARTMENT OF ENERGY

- Steven Erhart, Deputy Chief Human Capital Officer
- Randall Hendrickson, Deputy Chief Financial Officer

OTHER INTERVIEWEES

- Madelyn Creedon, NNSA Principal Deputy Administrator (retired)
- Frank Klotz, NNSA Administrator (retired)
- John Koskinen, IRS Commissioner (retired)
- Richard Mies, U.S. Strategic Command Commander-in-Chief (retired)
- George Yacus, NNSA Quality Management Team Lead

C

Main Themes of the Study's First Three Reports

EXCERPT FROM THE EXECUTIVE SUMMARY OF THE STUDY'S FIRST REPORT[1]

Many previous reports have emphasized the importance of defining and implementing clear roles, responsibilities, authorities, and accountability within the nuclear security enterprise. Those studies found that overlapping and poorly defined functions and authorities have fostered inefficient and overly risk-averse procedures and cultures within DOE and NNSA. Furthermore, they noted that the lack of clear allocation of responsibilities between the M&O contractors and their federal sponsors has contributed to a significant deterioration in their relationship.

The existence of burdensome practices that limit the efficiency of work in the nuclear security enterprise has also been noted by many previous reports. Elements in the field are subject to oversight by a multiplicity of parties and policies—not only those of DOE and NNSA, but also those of the DOE Inspector General, DOE's Office of Enterprise Assessment, the relevant NNSA field office, program offices at NNSA, and other federal and non-federal agencies, such as the Occupational Safety and Health Administration, the Government Accountability Office, the Department of Defense, state and local regulators, the Defense Nuclear Facilities Safety Board, and so on. The resulting excessive and uncoordinated oversight—through management processes and through inspections, audits, reviews, site visits, and data calls—fuels inefficiencies, per past reports. Balancing the burden and value of necessary oversight has not been approached systematically, and it could be.

At a higher level, addressing the issues noted in reports such as that from the Augustine-Mies study required the nuclear security enterprise to embark on a program of large-scale change. Experience with change in many organizations has shown that successfully achieving and sustaining improvements to effectiveness, efficiency, and culture across the nuclear security enterprise will require sustained effort and an iterative process. Many management and governance changes have been recommended for DOE and NNSA over the years by many experts and committees, and yet sustained effective change has not been achieved. The FY2016 NDAA noted that correcting the longstanding governance and management problems afflicting NNSA and the nuclear security enterprise would require "personal engagement by senior leaders, a clear plan, and mechanisms for ensuring follow-through and accountability."[2] Thus, an approach that explicitly prioritizes *sustainable* change is necessary to the accomplishment of NNSA's mission, especially in partnership with its M&O contractors.

In this beginning stage of its study, the panel was impressed to see that longstanding governance and management issues in the nuclear security enterprise have received focused attention over the past 1 to 2 years. The direct involvement of the DOE Secretary and NNSA Administrator has been very valuable and absolutely necessary for this endeavor. In particular, the establishment of an NNSA Office of Policy to serve as a nexus for change management is an important element. It is critical that this momentum be sustained—a challenging requirement given the transition in top leadership and future uncertainty regarding funding and priorities. In fact, for the purpose of clarifying roles,

[1] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2017, *Report 1 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, reprinted from pp. 2-4.

[2] National Defense Authorization Act for Fiscal Year 2016, H.R. 1735, 114th Cong. (2015-2016).

responsibilities, authorities, and accountability—a task that is foundational to addressing other governance and management challenges—the panel believes greater urgency should be demonstrated. For example, although the need for clarification was identified in 2014 or earlier, a new governance construct was not released until 2016, after which a working group was established to resolve implementation details, which is ongoing. Further, an important open question is whether these initial changes are having the desired effect. This first report can assess only the very beginning of what may be a long trajectory.

The panel arrived at the following findings and recommendations, which are numbered here as they are numbered in the full report:

Finding 2.1. Many of the reform efforts called for in the Augustine-Mies report and elsewhere (e.g., reductions in the burden associated with necessary oversight) are contingent on having clarity as to roles, responsibilities, authorities, and accountability. The communications and relationships between NNSA's M&O contractors and the agency appear to have improved in recent years, thanks in part to the creation of several crosscutting boards and advisory groups. However, there remains considerable ambiguity in roles, responsibilities, authorities, and accountability.

Finding 2.2. DOE and NNSA have issued several new documents and have undertaken other activities to address the recommendations for clarifying roles, responsibilities, authorities, and accountability, both among the officials and offices within DOE and NNSA and between the M&O contractors and their government sponsors. But the panel's information gathering to date is not yet sufficient to fairly assess the current articulation and implementation of roles, responsibilities, authorities, and accountability (although laboratory staff expressed concerns to the panel) or to ascertain whether the current articulation and implementation are yielding the intended results.

Recommendation 2.1. The NNSA Administrator should demonstrate urgency in efforts to clarify roles, responsibilities, authorities, and accountability, with particular emphasis on clarifying interactions and relationships between NNSA's management and operating contractors and their government sponsors. Future documents need to resolve ambiguity in several of the earlier policy documents.

Finding 3.1. The mix of burdensome practices affecting the nuclear security enterprise is not characterized precisely enough to lead to targeted interventions for all of them. It would be helpful to know, for example, what fraction of oversight activities are within NNSA's control, which burdensome practices are contributing the most to "burden" and why, which are associated with overlapping responsibilities, and so on. Such understanding is necessary before rational rebalancing is possible. The panel is not suggesting that a complete inventory of regular or ad hoc audits, investigations, and requests for data needs to be compiled.

Recommendation 3.1. The NNSA Administrator should develop and promulgate criteria to help the nuclear security enterprise understand when a process is adding burden that is not commensurate with its value and establish feedback loops so that burdensome practices are recognized. The nuclear security enterprise can then more rationally determine which practices to re-engineer through working groups that bring together the affected parties. In the long term, NNSA should strive to move away from a subjective debate over "burdensome practices" and seek to adopt a more systematic approach for defining oversight requirements.

Finding 4.1. NNSA has not defined what success looks like as it works toward implementing the recommendations from previous reports, and it lacks qualitative or quantitative metrics to identify and measure change.

Finding 4.2. The change management process in place within NNSA is promising—it has addressed many foundational elements, such as obtaining top-level direction and involving participants from across the subcultures of the nuclear security enterprise. But the first steps of change are not yet fully embedded.

Recommendation 4.1. The NNSA Administrator should define an effective mission-focused operating model as the vision for implementing the changes called for in reports of the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise and the Commission to Review the Effectiveness of the National Energy Laboratories and elsewhere. NNSA should continue to embrace the concept that change is an iterative process, requiring the sustained attention of leadership and the institution of a mature change management process. NNSA and the management and operating contractors should identify meaningful metrics that can be used to facilitate the identification, measurement, and tracking of change. Results from early change successes should become the foundation for subsequent, iterative actions that support the enterprise in achieving its important mission.

EXCERPT FROM THE EXECUTIVE SUMMARY OF THE STUDY'S SECOND REPORT[3]

While the panel sees promise in several of the [NNSA] activities it reviewed, it strongly concludes that those activities are not rooted in an adequate foundation of strategic thinking. With the release of the 2018 *Nuclear Posture Review* and the appointment of a new NNSA Administrator, NNSA is faced with an excellent opportunity—and challenge—to move from a tactical to a strategic approach for executing the critical mission of the enterprise. This report calls for NNSA to create two plans expeditiously: (1) an integrated strategic plan for the entire nuclear security enterprise, focused on mission execution, and (2) a more complete and better-grounded plan to guide the ongoing program of governance and management reform. The emphasis in both cases must be on creating a strategic vision that is clearly connected to mission. This is not a call to develop new processes and reports per se, which should follow only once clear and well-rationalized direction has been set.

Recommendation 2.1. In response to the 2018 *Nuclear Posture Review* and other policy statements, the new NNSA Administrator should urgently and personally lead the development of a mission-focused enterprise strategic plan that defines where the nuclear security enterprise needs to be in 10 years and what will be needed to get there.

One of the goals of the strategy should be to ensure that the strategies of the various organizations in the enterprise are integrated and aligned. The strategy should focus on mission-related issues but should also address management issues such as those raised in the Augustine-Mies report. The Administrator should "own" the resulting strategy and take responsibility for promoting it throughout the enterprise by articulating what it means for each organization and encouraging discussions that lead to a shared vision and culture.

Ongoing governance and management improvements should continue while the enterprise strategic plan is being developed. The panel found, however, that the current implementation plan that is meant to steer governance and management reform is inadequate for that task:

Finding 3.1. The panel considers the December 2016 DOE-NNSA report to Congress, *Governance and Management of the Nuclear Security Enterprise*, to be inadequate in several dimensions. Rather than following a careful process of specifying goals and then articulating a plan to achieve them, NNSA has laid out actions it would take without linking them clearly to desired outcomes or explaining why the actions were selected. It does not consider how the various activities will interact to effect the needed changes nor does it convey how the activities will impact mission success. Of equal concern, it gives little indication of how change will be measured—there are no baselines—or how one would know that success has been attained. Furthermore, there is no plan for communicating and socializing the overall goals and progress throughout the enterprise. Such communication is necessary in order to promulgate changes, embed responsibilities for carrying out steps in the plan, and prepare for necessary adjustments to the culture across the enterprise.

[3] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, reprinted from pp. 1-3.

An adequate plan to steer governance and management reform should include the following elements:

1. A well-articulated statement of the intended concept of operations and goals (e.g., mission focus, simplicity, and clarity, as well as alignment of resources, organizations, and incentives) and what the intended result will be;
2. A plan for how to achieve the goals and intended results;
3. Active commitment to the goals and vision by senior-most leadership (at both NNSA and DOE);
4. A plan for how to accomplish the change, including centralized leadership and decentralized implementation;
5. Active involvement and engagement of personnel across the enterprise in planning and achieving the change;
6. Regularly scheduled reviews of progress against predetermined measures of effectiveness—with a visible cadence and a sense of urgency—that are conveyed across the enterprise and course corrections to be made as needed to accomplish the pre-set goals; and
7. A plan for communication and reinforcement of the desired attributes of the change through training, leadership activities, performance reviews, and ongoing continuous improvement programs.

Recommendation 3.1. NNSA should expeditiously create an implementation plan to enable achievement of the governance and management changes driven by NNSA's enterprise-wide strategic goals. This new implementation plan should link proposed actions explicitly to specific goals, including a timeline associated with each action, specification of who is responsible for which parts of the execution and who is accountable for the outcome, and measures to be used to gauge progress and impact.

This implementation plan and the activities described in it will combine to create a path toward major change.

Of the many actions under way to improve governance and management, the new process to improve site governance appears quite promising:

Finding 3.2. Although measures of effectiveness have not yet been established to assess the benefits of the site-governance and management peer review process, the panel believes it represents a useful and promising approach that is already contributing to improved communication, better-defined roles and responsibilities at individual sites, and cross-enterprise learning.

Recommendation 3.2. The NNSA Administrator should ensure that measures of effectiveness are defined and tracked, and then use the site governance and management peer review process across NNSA as a mechanism for communicating and reinforcing shared values/behaviors, strengthening processes and relationships at each site, and improving the usefulness of the sites' contractor assurance systems.

However, overall the efforts to reform governance and management are greatly hampered by a lack of data and other objective evidence:

Finding 3.3. NNSA lacks systematic data collection—tailored to inform well-specified questions in order to assess the scope and severity of its governance and management challenges and the effectiveness of its improvement efforts.

The panel makes one specific recommendation regarding data collection, both because knowledge of workforce attitudes is fundamental and because relevant survey information may already exist:

Recommendation 3.3. As a first step toward meeting the need for objective evidence and data, NNSA should begin surveying the entire workforce of the nuclear security enterprise (possibly by leveraging

existing surveys) so as to gain understanding of attitudes and engagement throughout the enterprise and insight about specific worker concerns.

These recommendations should be acted on quickly and aggressively.

EXCERPT FROM THE EXECUTIVE SUMMARY OF THE STUDY'S THIRD REPORT[4]

The past year brought important changes to NNSA and the nuclear security enterprise. The 2018 release of the *Nuclear Posture Review* provided a renewed clarity of purpose, and ambitious goals and timelines, which in turn led to an increase in overall funding. A new Administrator was sworn in late in February 2018, as was a new Deputy Administrator for Defense Programs (NA-10) more recently. The Administrator has taken a number of steps that appear to have placed NNSA on a promising path toward remedying the governance and management problems that have been flagged by so many reports. She has pushed energetically for partnership and mission focus throughout the enterprise, modeling healthy relationships between the government and its management and operating partners, which in turn may be reducing some transactional oversight. She has worked toward healthier relationships with the Department of Defense (DoD) and with the rest of the Department of Energy. In accordance with the panel's 2018 recommendation for better strategic planning, she is working to improve practices in that area. It now appears that the building blocks for essential change are slowly coming together.

However, the panel remains concerned with the lack of urgency, metrics, and institutionalization; progress is heavily dependent on the individuals involved. NNSA leadership has yet to put in place the institutional structures needed for further progress and to sustain success, starting with documentation and directives. Some of this is in preparation but not available for the panel's examination. NNSA has yet to identify the metrics that will be needed to monitor and drive progress over time.

The management and governance reforms needed in NNSA constitute a culture change, and culture change requires consistent, sustained leadership in order to take root and to last. An appointed focal point for change management other than the Administrator is essential for NNSA.

The panel makes the following recommendations in this report:

Recommendation 1. DoD and NNSA leadership should continue to promote transparent exchange of information about program plans and operations and to encourage teamwork at all levels, and they should institutionalize the current practices that are contributing to a healthy relationship.

Recommendation 2. NNSA should quickly designate a senior executive as the accountable change management leader for the next few years. The change leader should drive management and governance reform with urgency and a cadence focused on mission success. The time, resources, and authority needed to fulfill that responsibility should be provided and not be underestimated.

In addition to these new recommendations, the panel's recommendations in its first two reports are still relevant and timely. The change management leader should revisit those recommendations and the panel's other guidance as a foundation for action.

[4] National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2019, *Report 3 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press, reprinted from pp. 1-2.

D

Biographical Sketches of Panel Members

Jonathan D. Breul (Co-Chair) is an independent consultant. Previously, Mr. Breul was the executive director of the IBM Center for the Business of Government and a partner in IBM Global Business Services. Prior to joining IBM, Mr. Breul had a lengthy career in the federal government, concluding as senior advisor to the deputy director of management in the Office of Management and Budget (OMB). He was an adjunct professor at Georgetown University's McCourt School of Public Policy and received an M.P.A. from Northeastern University and a B.A. from Colby College. He is a fellow of the National Academy of Public Administration.

Donald Levy (Co-Chair) is the Albert A. Michelson Distinguished Service Professor of Chemistry Emeritus at the University of Chicago. For 10 years, ending in 2016, Dr. Levy was the university's vice president for research and national laboratories, with responsibility for the oversight of the Department of Energy (DOE) Fermi and Argonne National Laboratories. He earned a B.A. from Harvard University in 1961 and a Ph.D. from the University of California, Berkeley, in 1965. After 2 years at Cambridge University as a National Institutes of Health and then North Atlantic Treaty Organization postdoctoral fellow, Dr. Levy joined the University of Chicago in 1967 and has spent his entire career there. Among his many honors, he has served as editor of the *Journal of Chemical Physics* (1998-2007), chair of the American Institute of Physics Editors' Panel (2000-2002), chief executive officer and board member of the UChicago Argonne LLC (2007-2016), vice chair of the Argonne National Laboratory board of governors and chair of its Science Policy Council (2007-2016), member of the Fermilab board of directors (2007-2016), and fellow of the American Physical Society, American Association for the Advancement of Science, Optical Society of America, American Academy of Arts and Sciences, and American Chemical Society. Dr. Levy is an elected member of the National Academy of Sciences.

Allan V. Burman is president of Jefferson Solutions (Solutions), the government consulting company of the Jefferson Consulting Group. Under Dr. Burman's leadership, Solutions provides analysis, evaluation, program management, and acquisition assistance and assessment services to many government departments and agencies. Dr. Burman had a lengthy career in the federal government, serving in policy positions in the Office of the Secretary of Defense and in OMB. In OMB, he served in the Senate-confirmed position of Administrator for Federal Procurement Policy. Dr. Burman is chairman of the Procurement Round Table, a fellow and member of the Board of Advisors of the National Contract Management Association (NCMA), a member of the Partnership for Public Service, and an honorary member of the National Defense Industrial Association. In 2018, he was awarded NCMA's Lifetime Achievement Award, the association's highest honor.

Keith A. Coleman is currently assigned as the advanced weapons portfolio manager in Boeing Phantom Works. Mr. Coleman is responsible for new franchise weapon development including all missiles, direct attack guided projectiles, and hypersonic strike weapons. He has worked in the Boeing military aircraft production and Phantom Works advanced design organizations, working in production and prototype

fighter and unmanned air vehicle aircraft and weapon systems for more than 33 years. He was previously assigned as the division chief engineer for Boeing's cruise missile systems and direct attack weapons within Boeing Defense Systems. Mr. Coleman recently worked in Boeing's Special Pursuits Cell designing and building a special-purpose Tier 2 class unmanned air vehicle. He was also the program manager for the Office of the Secretary of Defense Counter Electronics High Powered Microwave Advanced Missile Project Joint Capability Technology Demonstration, resulting in the world's first successful air-launched high-power microwave cruise missile.

Dona L. Crawford is the retired associate director for computation at the Lawrence Livermore National Laboratory (LLNL), where she was responsible for the development and deployment of an integrated computing environment for petascale simulations of complex physical phenomena. This environment includes high-performance computers, scientific visualization facilities, high-performance storage systems, network connectivity, multiresolution data analysis, mathematical models, scalable numerical algorithms, computer applications, and necessary services to enable laboratory mission goals and scientific discovery through simulation. Prior to her LLNL appointment in July 2001, Ms. Crawford had been with Sandia National Laboratories since 1976, serving on many leadership projects, including the Accelerated Strategic Computing Initiative, the Nuclear Weapons Policy Board, and the Nuclear Weapons Strategic Business Unit.

Martin C. Faga is a retired president and chief executive officer of the MITRE Corporation. As a federally funded research and development center (FFRDC), MITRE's governance has parallels with the governance of National Nuclear Security Administration facilities. Before joining MITRE, Mr. Faga served from 1989 until 1993 as Assistant Secretary of the Air Force for Space, where he was responsible for overall supervision of Air Force space matters. At the same time, he served as director of the National Reconnaissance Office, responsible to the Secretary of Defense and the Director of Central Intelligence for the development, acquisition, and operation of all U.S. satellite reconnaissance programs. Mr. Faga served from 2006-2009 on the President's Intelligence Advisory Board.

Paul A. Fleury is the Frederick William Beinecke Professor Emeritus of Engineering and Applied Physics at Yale University. Dr. Fleury is the founding director of the Yale Institute for Nanoscience and Quantum Engineering. He served as dean of engineering at Yale from 2000 until 2008. Prior to joining Yale, Dr. Fleury was dean of the School of Engineering at the University of New Mexico from January 1996, following 30 years at AT&T Bell Laboratories. At Bell Laboratories, he was director of three different research divisions covering physics, materials, and materials processing research between 1979 and 1996. During 1992 and 1993, Dr. Fleury was vice president for research and exploratory technology at Sandia National Laboratories. He is a fellow of the American Physical Society, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences, and a member of both the National Academy of Sciences and the National Academy of Engineering.

T.J. Glauthier is president and CEO of TJG Energy Associates, LLC. Mr. Glauthier is also an executive board member and advisor for public and private organizations in the energy sector. He currently serves on the board of two corporations: EnerNOC, a provider of energy intelligence software, and VIA Motors, manufacturer of electric-drive pickup trucks and vans. Mr. Glauthier advises Stem, an energy storage and management company headquartered in Silicon Valley, and Booz Allen Hamilton's energy practice. He co-chaired the congressionally chartered Commission to Review the Effectiveness of the National Energy Laboratories, which produced the 2015 report *Securing America's Future: Realizing the Potential of the Department of Energy's National Laboratories*, and he was also a member of the congressionally chartered Advisory Panel on the Governance of the Nuclear Security Enterprise (the Augustine-Mies panel) that produced the 2014 report *A New Foundation for the Nuclear Enterprise*. Mr. Glauthier is a graduate of Claremont McKenna College and the Harvard Business School.

David Graham is deputy division director in the Strategy, Forces, and Resources Division at the Institute of Defense Analyses (IDA), an FFRDC. Since 1995, Dr. Graham has led several dozen studies addressing post-Cold War national security roles, responsibilities, and organizations for a variety of sponsors. His work on the DOE nuclear weapons complex includes coauthoring IDA's 1996 "120-Day Study" of The Organization and Management of the Nuclear Weapons Program, participating in Admiral Hank Chiles's 1999 Presidential Commission on Nuclear Expertise, co-authoring the Chiles's studies of DOE security in the early 2000s, and serving as a member of the 2008 Defense Science Board Panel on nuclear deterrence skills. Dr. Graham served for 4 years (1999-2003) as the IDA study lead for the Panel to Assess the Reliability, Safety, and Security of the U.S. Nuclear Stockpile (the Foster panel). In 2013-2014, he served as the executive director for the congressionally mandated Augustine-Mies panel and assisted in preparing their 2014 report and testimony, which led to the current study. Most recently, Dr. Graham led a congressionally mandated study on the management of security operations at DOE's Category I nuclear sites.

William Greenwalt is an advisor and consultant to a range of government and private sector clients on defense and government matters. Previously, Mr. Greenwalt served as a professional staff member for the Senate Armed Services Committee, focusing on acquisition, industrial base, and management reform issues. Prior assignments have also included serving as the Deputy Under Secretary of Defense for Industrial Policy, a visiting fellow at the American Enterprise Institute, the vice president for acquisition policy at the Aerospace Industries Association, deputy director for surveys and investigations for the House Appropriations Committee, and federal acquisition policy director at Lockheed Martin. He also served previously in professional staff positions with the U.S. Senate and the Government Accountability Office.

Robert Hale is a senior executive advisor at Booz Allen Hamilton and an adjunct senior fellow at the Center for a New American Security. The Honorable Robert Hale previously served as the Department of Defense comptroller and chief financial officer, and in that role he acted as principal advisor to three Secretaries of Defense on budgetary and financial matters. He also served as the Air Force comptroller. Prior to service in the Department of Defense, Mr. Hale was the executive director of the American Society of Military Comptrollers and held other private-sector positions. His career began as an active duty officer in the U.S. Navy. Mr. Hale received a B.S. with honors and an M.S. in operations research from Stanford University along with an M.B.A. from the George Washington University. Mr. Hale has provided valuable input in the National Academies, including contributing to the recent National Academies publication *Building a 21st Century SES: Ensuring Leadership Excellence in Our Federal Government*.

Barbara Romzek is a professor of public administration and policy at American University and former dean of American University's School of Public Affairs. Before joining American University, Dr. Romzek held faculty and senior leadership positions at the University of Kansas, the last being interim senior vice provost for academic affairs. Dr. Romzek is recognized for her expertise in the area of public management and accountability, with emphases on government reform, contracting, and network service delivery. Building on her research on formal accountability structures and processes, her recent work focuses on informal accountability in collaborative network settings. Dr. Romzek's research has encompassed complex federal work settings, including the National Aeronautics and Space Administration, Congress, and the U.S. Air Force, as well as state agencies, local governments, and nonprofit agencies. Dr. Romzek has received research awards from the American Society for Public Administration and the American Political Science Association (APSA). Most recently, she received the John Gaus Award from APSA for lifetime achievement in political science and public administration. Dr. Romzek is a fellow of the National Academy of Public Administration.

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, Dr. Woodard led the energy technology development programs and 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. Dr. Woodard led several strategic initiatives, including strategies for energy, cybersecurity, and the future of science and technology. She also served as deputy laboratory director of nuclear weapons at Sandia Corporation. Dr. Woodard earned her doctorate's degree in mechanical engineering from the University of California, Berkeley, and a master's degree in engineering economics from Stanford University.

Merri Wood-Schultz is a retired fellow and guest scientist at Los Alamos National Laboratory (LANL). Dr. Wood-Schultz is currently a member of the Nuclear Forensics Science Panel for the Department of Homeland Security, and, in that capacity, she is a part-time consultant for Noblis. Her work at LANL included the physics design of thermonuclear weapons, nuclear weapons-related laboratory experiments (aboveground experiments), the development of concepts and methods for certifying nuclear performance (the effects of code calibration on predictions and the quantification of margins and uncertainty), and nuclear intelligence. Before the end of nuclear testing, Dr. Wood-Schultz was responsible for the conceptual and physics design of numerous nuclear tests and add-on experiments. She holds a Ph.D. in physics from Georgia Institute of Technology.

E

About This Study

The National Defense Authorization Act for Fiscal Year 2016 (FY2016 NDAA)[1] called for a 4½-year joint study between the National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration (NAPA) to track and assess actions in the nuclear security enterprise aimed at persistent problems of governance and management. In part, the study was intended to force continued attention to these matters that had been diagnosed many times over many years but had not been successfully addressed. This report is the fourth in a series of reports to be issued over 2017-2020 as part of that study.[2] The overall charge for the National Academies-NAPA study is given in Box E.1.

BOX E.1
Statement of Task

[E]valuate the implementation plan developed by the National Nuclear Security Administration (NNSA) and Department of Energy (DOE) in response to the FY2016 National Defense Authorization Act, and the subsequent implementation of such plan. The study will be carried out collaboratively with the National Academy of Public Administration (NAPA), as directed by the FY2016 National Defense Authorization Act, and will follow [the National Academies'] procedures and policies. The committee will issue interim reports every 6-12 months to evaluate progress in implementing the plan. A final report will be issued at the end of the study to document the overall progress in executing the implementation plan, assess the effectiveness of the reform efforts under that plan, and recommend whether further action is needed.

[1] Section 3137 of the National Defense Authorization Act for Fiscal Year 2016, Pub. L. 112-92 (Nov. 25, 2016).

[2] The study's first report—National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2017, *Report 1 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press—was released in March 2017. The second report—National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2018, *Report 2 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press—was released in February 2018. The third report—National Academies of Sciences, Engineering, and Medicine and the National Academy of Public Administration, 2019, *Report 3 on Tracking and Assessing Governance and Management Reform in the Nuclear Security Enterprise*, Washington, D.C.: The National Academies Press—was released in February 2019.

F

List of Acronyms

CFO	Chief Financial Officer
CNS	Consolidated Nuclear Security
CO	Contracting Officer
COR	Contracting Officer's Representative
DoD	Department of Defense
DOE	Department of Energy
FFRDC	federally funded research and development center
FY	fiscal year
LANL	Los Alamos National Laboratory
LDRD	Laboratory Directed Research and Development
LEP	life-extension program
LLNL	Lawrence Livermore National Laboratory
M&O	management and operating
NA-10	NNSA Office of Defense Programs
NA-19	NNSA Office of Production Modernization
NA-20	NNSA Office of Defense Nuclear Nonproliferation
NA-50	NNSA Office of Safety, Infrastructure, and Operations
NA-70	NNSA Office of Defense Nuclear Security
NA-80	NNSA Office of Counterterrorism and Counterproliferation
NA-191	NNSA Plutonium Program Office
NA-APM	NNSA Office of Acquisition and Project Management
NA-EA	NNSA Office of External Affairs
NA-MB	NNSA Office of Management and Budget
NAPA	National Academy of Public Administration
NDAA	National Defense Authorization Act
NNSA	National Nuclear Security Administration
OMB	Office of Management and Budget
PAS	Presidential appointment subject to Senate confirmation
PPBE	planning, programing, budgeting, and evaluation
R&D	research and development
S&E	science and engineering
SES	Senior Executive Service
SIAP	Site Integrated Assessment Plan
SNL	Sandia National Laboratories
WBS	work breakdown structure