Secretary of Energy Advisory Board

Interim Report of the Task Force on Nuclear Nonproliferation

July 28, 2014

U.S. Department of Energy

Table of Contents

Executive Summary

The SEAB Task Force on Nuclear Nonproliferation (TFNN) was established by the Secretary of Energy on December 20, 2014 to "advise the Department of Energy (DOE) on future areas of emphasis for its nuclear nonproliferation activities by addressing the following questions:

1. *What are the current and likely future challenges to nuclear nonproliferation?*
2. *What should DOE be doing to help the United States Government (USG) prepare to meet those challenges?*
3. *What are DOE's current areas of emphasis in nuclear nonproliferation?*
4. *In what ways should DOE's nuclear nonproliferation efforts be modified and/or expanded?*
5. *What obstacles stand in the way of making the recommended changes in DOE's nuclear nonproliferation activities, and how might they be overcome?"*[1]

This interim report of the Task Force sets forth its findings and recommendations to date in five timely and important areas: (I) Setting Objectives and Priorities for DOE Nuclear Nonproliferation Programs; (II) Improving DOE Nuclear Policy Integration, Analysis, and Advocacy; (III) Strengthening DOE Relationships with Field Offices, National Laboratories, and Production Facilities; (IV) Continuing and Revitalizing U.S.-Russian Nuclear Security and Nonproliferation Cooperation; and (V) Developing and Implementing an Investment Strategy for Nuclear Nonproliferation Research and Development. (A more complete report is to be submitted at the end of 2014.)

The gist of the findings and recommendations to date in each area appears below. These recommendations are mutually reinforcing.

In addressing the problem of nuclear proliferation, it must be recognized that despite substantial recent progress, there are nations pursuing nuclear weapons, there remain nuclear stockpiles that are dangerously insecure, and there are terrorists eager to acquire and use nuclear weapons. Urgent actions are needed to meet these continuing threats.

[1] In keeping with our charge, we interpret nuclear "nonproliferation" to include the full set of U.S. efforts to prevent additional states or substate groups from acquiring nuclear weapons and the technologies and materials needed to make them, including efforts that some refer to as counterproliferation, weapons of mass destruction (WMD) counter-terrorism, or nuclear security. While most of DOE's nuclear nonproliferation activities are implemented by the semi-autonomous National Nuclear Security Administration (NNSA), our charge focused on DOE's efforts enterprise-wide, and we refer to these efforts as being undertaken by "DOE" throughout, except where we mean to refer solely to NNSA.

I. Setting Objectives and Priorities for DOE Nuclear Nonproliferation Programs

Findings

1. *DOE's nonproliferation efforts have made and are making substantial contributions to U.S. national security.*
2. *DOE's nonproliferation programs have undergone several years of substantial budget reductions, with further reductions proposed for fiscal year (FY) 2015.*
3. *DOE does not have a risk-informed analysis of priorities to guide its nonproliferation efforts.*
4. *The U.S. government does not yet have a compelling vision for the future of its nonproliferation efforts or how DOE's programs fit in that larger picture, though DOE has launched an effort to develop one.*
5. *DOE often does not make the case persuasively for its nonproliferation programs to the White House, Congress, or the public.*

Recommendations

1. **Lay out a vision and set priorities.** DOE and the rest of the U.S. government should articulate a compelling vision of the nuclear security and nonproliferation future they seek to achieve. DOE should then establish a consistent process to develop risk-informed priorities for its nonproliferation programs, seeking to invest resources wherever they can make the biggest difference in reducing risk to U.S. and world security. To facilitate this effort, DOE should work with other relevant government agencies to develop approaches to assessing the balance of risks and opportunities and developing a consistent, risk-informed set of priorities across the nonproliferation enterprise, integrated with the broader U.S. government nonproliferation effort.

   The Task Force anticipates that among the higher priorities would be: (a) maintain the rate of progress in nuclear security**;** (b) provide needed technical expertise and options to support critical nonproliferation and arms control negotiations, such as those with Iran and North Korea; (c) contribute to reducing the risk that additional countries or groups will acquire key nuclear weapons-related technologies; (d) strengthen international organizations that help support important U.S. nuclear priorities, particularly the International Atomic Energy Agency (IAEA) and its safeguards system; (e) provide intelligence insight on nuclear threats, integrating technical and political expertise as DOE laboratories did in the past; and (f) provide the policy tools needed for the future, including both research and development (R&D) on new verification and nonproliferation technologies and maintaining the facilities and expertise needed to address future challenges.

2. **Develop a roadmap for achieving the vision.** DOE should work with the rest of the U.S. government, preferably through a formal interagency process, to develop a roadmap to achieve the U.S. government's vision of the nuclear security and nonproliferation future. This roadmap should specify milestones, indicators of progress, requirements for funding, and any needed changes in organizational structure and authorities.
3. **Ensure adequate funding to achieve high priority goals.** DOE should strive to ensure that high priority goals, such as maintaining progress in nuclear security, receive adequate funding.
4. **Make the case.** For each program, DOE should explain the threat, what it plans to do, which risks would be reduced and how the planned programs compare to alternative efforts to achieve the same goals, what the life-cycle cost would be, and why DOE believes the specific approach and scope it plans to pursue are the optimal strategy. In particular, DOE should consider producing a biannual report to the President and Congress on non-weapons national security activities, especially non-proliferation, comparable to the report that NNSA currently produces on the nuclear weapons program.
5. **Prepare for the unexpected.** DOE should (a) undertake a study of possible game-changing surprises and the steps that might need to be taken in response; (b) work with Congress to establish a contingency fund and contingency capabilities to be used as unexpected opportunities or requirements arise.

II. Improving DOE Nuclear Policy Integration, Analysis, and Advocacy

Findings

1. *Below the level of the Secretary and Deputy Secretary, there is no official or office within the Department responsible for looking at nuclear policy across the board.*
2. *DOE's policy role and voice in the national security interagency process is inconsistent, sometimes weak, and sometimes absent entirely.*

Recommendations

1. **Integrate nuclear policy within DOE.** Integrate responsibility for all aspects of nuclear policy within a single policy office. This could measurably strengthen DOE's role and voice in the interagency process, and in the USG debate and policymaking related to nuclear policy.
2. **Improve DOE's secure connectivity to the other national security agencies and the White House by ensuring that it has the equipment and procedures it needs for effective communications.**
3. **Strengthen the integration of science and technology expertise into nuclear policymaking.**

III. Strengthening DOE Relationships with Field Offices, National Laboratories, and Production Facilities

Findings

1. *The relationships among DOE headquarters, field offices, national labs, and production facilities are inadequate to ensure the health of the national laboratories and to maximize their contributions to nuclear nonproliferation.*
2. *A number of advisory groups and commissions currently are exploring ways to improve the health and management of the labs to support the full range of DOE missions.*

Recommendation

In light of the recommendations of the studies now in progress, DOE should as an urgent priority strengthen the relationship among DOE headquarters, field offices, national labs, and production facilities.

IV. Continuing and Revitalizing U.S.-Russian Nuclear Security and Nonproliferation Cooperation

Findings

1. *DOE's global work to improve nuclear security has substantially reduced the risk of nuclear terrorism, but there is more work to do.*
2. *The deterioration of U.S.-Russian relations resulting from the crisis in Ukraine makes nuclear security cooperation more challenging.*
3. *Continuing nuclear security cooperation with Russia remains critical to U.S. national security interests.*
4. *Nuclear security cooperation with Russia will not be easy, is likely to encounter delays, and will require creative approaches and sustained attention.*

Recommendations

1. **Continue nuclear security and nonproliferation cooperation with Russia.** DOE should make every effort to continue its nuclear security cooperation with Russia despite current tensions with Russia over Ukraine. Other U.S.-Russian cooperation that serves U.S. nonproliferation interests should also continue.
2. **Plan for different scenarios with Russia.** Given the crisis in Ukraine and heightened opposition in both the United States and Russia to any approach that smacks of

"assistance," DOE should develop plans to further U.S. interests in effective nuclear security under a range of scenarios.

3. **Develop a more equal approach in U.S.-Russian nuclear security cooperation.** With the era of large-scale equipment installation nearing its end, DOE should develop concepts for a new approach to nuclear security cooperation that could be implemented in the scenarios in which nuclear security cooperation is able to continue.
4. **Take a broader approach to consolidating nuclear material in the U.S. and Russia.** Political conditions permitting, DOE and Russia should work together to lay out strategic plans by which they can each accomplish their defense and civilian missions with the smallest number of locations with HEU or separated plutonium.

V. Developing and Implementing an Investment Strategy for Nuclear Nonproliferation Research and Development

Findings

1. *DOE's nonproliferation R&D program is critically important, and has provided major improvements in nonproliferation and arms control technologies.*
2. *DOE's approach of spreading nonproliferation R&D investment to large numbers of laboratories in small increments is inhibiting nonproliferation technology innovation within the labs.*
3. *DOE's nonproliferation R&D investments are inadequately coordinated within DOE and with other USG agencies.*

Recommendation

Formulate and implement a multiagency investment strategy for nuclear nonproliferation R&D. As indicated in the recent Defense Science Board study on "Assessment of Nuclear Monitoring and Verification Technologies," the U.S. government should develop a strategic investment strategy for R&D across the USG to create a more effective and efficient R&D capability that furthers U.S. national security interests and receives sufficient resources to succeed.

Introduction

The SEAB Task Force on Nuclear Nonproliferation (TFNN) was established by the Secretary of Energy on December 20, 2014 to "advise the DOE on future areas of emphasis for its nuclear nonproliferation activities by addressing the following questions:

1. *What are the current and likely future challenges to nuclear nonproliferation?*
2. *What should DOE be doing to help the United States Government prepare to meet those challenges?*
3. *What are DOE's current areas of emphasis in nuclear nonproliferation?*
4. *In what ways should DOE's nuclear nonproliferation efforts be modified and/or expanded?*
5. *What obstacles stand in the way of making the recommended changes in DOE's nuclear nonproliferation activities, and how might they be overcome?"*[2]

This document represents the interim report of the Task Force. (A more complete report is to be submitted at the end of 2014.) Herein, the Task Force sets forth its findings and recommendations to date in five timely and important areas: (I) Setting Objectives and Priorities for DOE Nuclear Nonproliferation Programs; (II) Improving DOE Nuclear Policy Integration, Analysis, and Advocacy; (III) Strengthening DOE Relationships with Field Offices, National Laboratories, and Production Facilities; (IV) Continuing and Revitalizing U.S.-Russian Nuclear Security and Nonproliferation Cooperation; and (V) Developing and Implementing an Investment Strategy for Nuclear Nonproliferation Research and Development. The recommendations are mutually reinforcing.

In addressing the problem of nuclear proliferation, it must be recognized that despite substantial recent progress, there are nations pursuing nuclear weapons, there remain nuclear stockpiles that are dangerously insecure, and there are terrorists eager to acquire and use nuclear weapons. Urgent actions are needed to meet these continuing threats.

The complete charge to the Task Force and a list of its members appear as Appendices A and B respectively.

[2] In keeping with our charge, we interpret nuclear "nonproliferation" to include the full set of U.S. efforts to prevent additional states or substate groups from acquiring nuclear weapons and the technologies and materials needed to make them, including efforts that some refer to as counterproliferation, weapons of mass destruction (WMD) counter-terrorism, or nuclear security. While most of DOE's nuclear nonproliferation activities are implemented by the semi-autonomous National Nuclear Security Administration (NNSA), our charge focused on DOE's efforts enterprise-wide, and we refer to these efforts as being undertaken by "DOE" throughout, except where we mean to refer solely to NNSA.

I. Setting Objectives and Priorities for DOE Nuclear Nonproliferation Programs

Findings

1. *DOE's nonproliferation efforts have made and are making substantial contributions to U.S. national security.*

   - DOE's efforts have dramatically improved nuclear security in Russia, the other states of the former Soviet Union, and a number of countries elsewhere, greatly reducing the risk that stolen plutonium or highly enriched uranium (HEU) will fall into the hands of terrorists – though risks remain, as discussed below.
   - DOE has helped over 20 countries eliminate all the weapons-usable nuclear material on their soil, eliminated such material from dozens of additional sites, and converted scores of research reactors so that they no longer use HEU as fuel.
   - DOE has provided crucial technical expertise to support U.S. arms control and nonproliferation negotiations, and continues to do so – including on critical issues currently being discussed in negotiations with Iran.
   - DOE has helped dozens of countries implement effective export controls on nuclear and dual-use technologies and helped with interdiction of thousands of dangerous technology transfers, forming a major part of the U.S. effort to stem black-market nuclear technology trafficking.
   - DOE has provided important technologies, training, and other support for the International Atomic Energy Agency (IAEA), strengthening global safeguards, security, and safety implementation.
   - DOE has developed a wide range of nonproliferation technologies, particularly focused on verification technologies, some of which are being applied today and some of which are available to support future negotiations.
   - Innovative efforts such as the Cooperative Monitoring Center have helped bring experts from countries with the potential for regional conflicts together to discuss verification and confidence-building measures. These ongoing efforts are vital tools for building relationships and understandings that can help reduce the risk of conflict and increase the potential for arms restraint.

2. *DOE's nonproliferation programs have undergone several years of substantial budget reductions, with further reductions proposed for fiscal year (FY) 2015.*

   The overall budget for DOE's nonproliferation programs has declined from over $2.2 billion in FY 2013 to an FY 2015 request of just under $1.6 billion, a reduction of over 30 percent. The FY 2015 request proposes to increase DOE's weapons activities by $544 million while decreasing its nonproliferation program by $399 million. Some of the nonproliferation reductions are the result of projects being completed or efforts being put on hold while DOE reviews its approach to them – most prominently including the uranium-plutonium mixed oxide (MOX) project for disposition of excess weapons plutonium, whose projected lifecycle costs have ballooned to over $30 billion. In a number of areas, however, including efforts to improve security for nuclear material around the world, it appears that important nonproliferation work is being slowed or canceled because of lack of funds. Overall, DOE's nonproliferation budget is now hundreds of millions of dollars a year less than these programs had been planning for only a few years ago.

3. *DOE does not have a risk-informed analysis of priorities to guide its nonproliferation efforts.*

   The Task Force made a concerted effort to determine DOE's nonproliferation priorities. Instead of priorities, we received a "laundry list" of everything DOE was currently doing in nonproliferation. These "priorities" are too numerous to provide effective strategic direction or efficient budgeting, or to enable DOE to build organizational capacity in the right places with limited resources. When everything is a priority, nothing is a priority.

   Setting clear priorities is always important, but it is all the more important today, when threats are shifting and budgets are declining. Priorities make clear what should receive more attention and resources, and why. The *process* of prioritization is also critical, fostering discipline and efficiency within DOE, deploying the best talent to tackle the most important issues, bolstering DOE's role in the interagency process, and enhancing nonproliferation efforts across the USG.

   Each nonproliferation program has developed a set of priorities for its own work. Many of these priorities are sensible. In a number of cases, however, these priorities are insufficiently risk-informed and differ significantly from one program to another. For example, in some cases the Global Threat Reduction Initiative (GTRI) has devoted millions of dollars to addressing material for which the Materials Protection and Accounting (MPC&A) program would not fund security upgrades, because of different judgments about the security risks posed by impure and modestly radioactive materials.

   Priorities for the work of individual programs do not solve the difficult problem of making choices among different programs. At present, it appears that priorities are set in substantial part on the basis of which program managers are most successful at selling their efforts to DOE leadership, the White House, and the Congress.

4. *The U.S. government does not yet have a compelling vision for the future of its nonproliferation efforts or for how DOE's programs fit in that larger picture, though DOE has launched an effort to develop one.*

   NNSA's Office of Defense Nuclear Nonproliferation has made a worthy effort to explore the challenges and opportunities it will face in the future. The Task Force sees NNSA's over-the-horizon review as a step in the right direction.

   What is ultimately needed, however, is a comprehensive and compelling U.S. government nuclear nonproliferation vision that includes a view or views of the future state of the world that the U.S. seeks to achieve; a strategic roadmap that lays out the key steps, specific goals, and organizational, human capital, and budgetary resources needed to achieve success; and measures and feedback systems to assess progress and make midcourse corrections.

5. *DOE often does not adequately make the case for its nonproliferation programs to the White House, Congress, or the public.*

   As already noted, DOE's nonproliferation programs have suffered years of budget reductions. DOE is not likely to get increased funding until it can make a stronger case to the White House and the Congress on the value proposition from its nonproliferation programs, outlining the risks to U.S. national security that could be reduced with additional funds and the risks that will likely increase without those funds.

   The Task Force heard criticism from White House and Congressional experts that DOE was often unable to articulate what the effects would be of cutting back or increasing funding for particular programs by 10-20 percent. Similarly, they reported that DOE was often unable to explain how it had decided what the scope of its efforts in a particular area should be, how much the planned efforts would reduce risk, and what the effect on risk of a smaller or larger effort would be. As one example, DOE has not effectively articulated how much the total risk of nuclear and radiological trafficking would be reduced if it helped countries install and operate radiation detection systems at all the sites where it plans to do so, and how that risk reduction would change if the number of sites was decreased or increased.

Why the Challenges Persist

We do not yet fully comprehend the factors driving DOE's difficulty in establishing clear priorities for its nonproliferation efforts. It is clear there are multiple drivers. The following discussion should be considered as preliminary hypotheses.

First, establishing priorities in this complex area is inherently difficult. Reasonable people will disagree over whether installing security upgrades for a research reactor with a modest stock of HEU does more or less to reduce risk than spending the equivalent amount of money training a

developing country's experts to strengthen their ability to detect and stop illicit shipments of nuclear technologies, to take one of countless examples.

Second, no one wants to have their program called out as a lower priority than others – and in some quarters, doing so seems likely to serve only to identify places the budget could be cut. Not articulating priorities is seen by some as a way to avoid further budget reductions.

Third, as discussed elsewhere in this report, DOE does not have an office or process with the staff and mandate to develop cross-cutting policies concerning the many different areas of nuclear technology it handles, from nuclear weapons to nuclear waste. While recent years have seen increased coordination among the senior leaders of efforts on nonproliferation, nuclear energy, and nuclear weapons, overall each of these activities largely proceeds in its own stovepipe – and within the nonproliferation effort, each individual program is largely operating within its own stovepipe as well, attempting to optimize its ability to achieve its own objectives with its own resources.

Fourth, DOE has been subject to the vagaries of shifting priorities determined elsewhere, from the Congressional decision to cut off scientist engagement to the White House decision to call a pause in Second Line of Defense installations.

Fifth, the pressures of day-to-day management of programs inherently make it difficult to draw back and ask larger questions about priorities and long-term strategies. In the midst of a battle to take a particular hill, it is very difficult to have perspective on how much that hill matters to victory in the larger war. This is one reason why the task of developing cross-cutting priorities is likely to require a separate group, not charged with ongoing management of DOE's nonproliferation effort, as discussed elsewhere in this report.

Recommendations

1. **Lay out a vision and set priorities.** DOE and the rest of the U.S. government should articulate a compelling vision of the nuclear security and nonproliferation future they seek to achieve. DOE should then establish a consistent process to develop risk-informed priorities for its nonproliferation programs, seeking to invest resources wherever they can make the biggest difference in reducing risk to U.S. and world security. To facilitate this effort, DOE should work with other relevant government agencies to develop approaches to assessing the balance of risks and opportunities and developing a consistent, risk-informed set of priorities across the nonproliferation enterprise, integrated with the broader U.S. government nonproliferation effort.

   DOE priorities should be aligned with national priorities, based on both the scale of the risk to be addressed and the degree of the opportunity for DOE to contribute to reducing it. There are some large risks, for example, where other agencies are in the lead, and DOE needs only a modest investment to provide support; there may be other cases where there

is a substantial risk to be reduced but little near-term opportunity to convince the relevant countries to take the action needed to reduce it. Setting these priorities will require difficult judgments among quite disparate types of risks and activities, particularly as some programs that seem to offer little near-term risk reduction may lay important foundations for the long term.

The Task Force anticipates that among the higher priorities would be: (a) maintain the rate of progress in nuclear security**;** (b) provide needed technical expertise and options to support critical nonproliferation and arms control negotiations, such as those with Iran and North Korea; (c) contribute to reducing the risk that additional countries or groups will acquire key nuclear weapons-related technologies; (d) strengthen international organizations that help support important U.S. nuclear priorities, particularly the International Atomic Energy Agency (IAEA) and its safeguards system; (e) provide intelligence insight on nuclear threats, integrating technical and political expertise as DOE laboratories did in the past; and (f) provide the policy tools needed for the future, including both R&D on new verification and nonproliferation technologies and maintaining the facilities and expertise needed to address future challenges. (The Task Force intends to include in its more complete, year-end report detailed recommendations on priorities for DOE's nuclear nonproliferation efforts.)

2. **Develop a roadmap for achieving the vision.** DOE should work with the rest of the U.S. government, preferably through a formal interagency process, to develop a roadmap to achieve the U.S. government's vision of the nuclear security and nonproliferation future. This roadmap should specify milestones, indicators of progress, requirements for funding, and any needed changes in organizational structure and authorities.

3. **Ensure adequate funding to achieve high priority goals.** DOE should strive to ensure that high priority goals, such as maintaining progress in nuclear security, receive adequate funding.

   Given the immense consequences of a nuclear terrorist attack and the modest costs of nuclear security, the basic U.S. policy should be to provide sufficient funding so that no effort that shows promise of being able to make a significant and lasting reduction in the risk of nuclear terrorism will be delayed because money is not available to implement it. The ongoing shift toward less emphasis on installing equipment and more emphasis on convincing countries to take action themselves will mean lower spending levels in the future – but the reduction should not come at a pace that would slow important nuclear security efforts. The U.S. government should develop a plan to ensure, as rapidly as practicable, that all nuclear weapons and weapons-usable nuclear materials worldwide are sustainably and effectively protected against the full range of plausible adversary threats, and should provide the full funding that is needed to implement that plan. Nuclear security, however, should not be thought of as an effort that will be "finished" at a particular moment, but as

an objective that will require on ongoing focus on continuous improvement for as long as nuclear weapons and materials continue to coexist in the world with terrorists seeking mass destruction.

4. **Make the case.** For each program, DOE should explain the threat, explain what it plans to do, which risks would be reduced and how the planned programs compare to alternative efforts to achieve the same goals, what the life-cycle cost would be, and why DOE believes the specific approach and scope it plans to pursue are the optimal strategy. In particular, DOE should consider producing a biannual report to the President and Congress on non-weapons national security activities, especially non-proliferation comparable to the report that NNSA currently produces on the nuclear weapons program.
5. **Prepare for the unexpected.** DOE should (a) undertake a study of possible game-changing surprises and the steps that might need to be taken in response; (b) work with Congress to establish a contingency fund and contingency capabilities to be used as unexpected opportunities or requirements arise.

II. Improving DOE Nuclear Policy Integration, Analysis, and Advocacy

Findings

1. *Below the level of the Secretary and Deputy Secretary, there is no official or office within the Department responsible for looking at nuclear policy across the board.*

   - DOE's policies related to the U.S. nuclear weapons stockpile are shaped in Defense Programs; its policies focused on nonproliferation are shaped in Defense Nuclear Nonproliferation; its policies focused on nuclear energy and nuclear waste management are shaped in the Office of Nuclear Energy (though that is largely a research and development organization rather than one focused on broader policy issues facing nuclear energy); its policies with respect to the development of the naval fuel cycle are developed within Naval Reactors.
   - Each of these offices is developing and implementing policies that have effects on each other. In the absence of an office where all aspects of nuclear policy are considered together, decisions and strategies are adopted that may undercut objectives in a separate sector of nuclear policy. Yet no current office within the Department (except for the Secretary's office) is positioned to integrate and mediate the sometimes competing interests of the different nuclear programs.
   - There are currently two main policy offices within the Department of Energy: the Office of International Affairs and the Office of Energy Policy and Systems Analysis. Neither office currently has the staff expertise or mandate to handle nuclear policy issues across the broad set of nuclear issues.

- Decisions taken with respect to the US nuclear stockpile are often not examined in the context of nonproliferation policy objectives. Indeed, they sometimes compete with U.S. nonproliferation goals. Similarly, efforts in DOE's nuclear energy program also have effects on nonproliferation.

2. *DOE's policy role and voice in the national security interagency process is inconsistent, sometimes weak and sometimes absent entirely.*

- Traditionally, DOE has been seen as an also-ran on national security after the "main" security agencies, National Security Council (NSC), State, Defense, and intelligence. DOE is often seen more as an implementing agency than as one with a major role in developing policies. But given its role in maintaining the U.S. nuclear weapons stockpile, its broad nonproliferation activities (larger than those of any other agency), the deep technical expertise of its laboratories and facilities, and the creative ideas that sometimes originate from those wells of experience and expertise, DOE has the potential to play a more significant and useful role in the interagency policy process than it does today.
- The Department of Defense dominates the decision process related to nuclear weapons requirements and policies. The Department of State is the dominant interagency voice on nonproliferation policy. This is true despite the fact that DOE, among all agencies, should be uniquely positioned to integrate a wide range of aspects of nuclear policy and could bring to bear the unparalleled technical expertise of its laboratories.
- The Task Force was told of a number of cases in which DOE played a smaller policy role than was justified by its engagement in the issue; did not bring its full technical expertise to the interagency discussion; or offered the view from only one part of DOE rather than an integrated departmental perspective.
- In some cases, DOE is simply not invited to participate. For example, DOE was not represented in Syria chemical weapon (CW) discussions, even though issues such as arranging secure shipments relate to nuclear work DOE has been doing in many countries.

Why these challenges persist

Because DOE lacks a lead office for creating a single coherent and compelling nuclear policy that integrates interests from the Department's nuclear energy, nonproliferation, and nuclear weapons programs, DOE's interests are sometimes represented narrowly in interagency security discussions.

DOE's fundamental added value to policy discussions comes from the expertise and operational capacities of its laboratories. Yet DOE has limited science and technology (S&T) expertise within the policy offices called upon to represent DOE at interagency discussions. As a result, DOE is

not always able to represent and leverage the deep expertise available from the labs within the context of interagency discussions.

One of the key mechanisms for bringing laboratory experts into DOE headquarters has been the use of Intergovernmental Personnel Act (IPA) transfers. This instrumentality is now used infrequently, partly because of concerns over conflict of interest. (One interviewee described the IPA process as "broken.") In the absence of analysts with strong technical credentials, DOE's policy making is informed primarily by foreign affairs specialists who are not best positioned to represent the core strengths of the DOE complex or technical aspects of issues related to nuclear policymaking.

Recommendations

1. **Integrate nuclear policy within DOE**. Integrate responsibility for all aspects of nuclear policy within a single policy office. This could measurably strengthen DOE's role and voice in the interagency process and in the USG debate and policymaking related to nuclear policy.

   While the Task Force unanimously agrees on the need for an integrated policy office, there are competing views on where that office should be located within the Department. We offer the following options for consideration by the Secretary of Energy: (1) merge these functions into the existing DOE Office of Energy Policy and Systems Analysis; (2) create an office of nuclear security policy in DOE; or (3) create an office of nuclear security policy in NNSA.

   In examining these options, DOE should consider:

   - Whether the current organizational structure of DOE policy offices is effective or whether a more systemic overhaul is needed.
   - How the proposed nuclear policy office will ensure sufficient attention to longer-term thinking and planning.
   - What are the most appropriate and effective counterpart offices in relevant USG agencies to maximize interagency coordination and collaboration.
   - What key levers will enhance prospects for success of the policy office. These include providing appropriate professional incentives to attract top staff, fostering a culture that values effective policy and planning, selecting the right leadership, and communicating the importance of the office to DOE's mission.

2. **Improve DOE's secure connectivity to the other national security agencies and the White House by ensuring that it has the equipment and procedures it needs for effective communications.**
3. **Strengthen the integration of science and technology expertise into nuclear policymaking.**
   - Examples of mechanisms by which this integration might be accomplished include:

- Recruiting regular technical talent from the labs through the Intergovernmental Personnel Act (IPA) mobility program on rotating two to three year assignments.
- Creating a senior technical advisor or "Science Council" of several advisors within both the Office of Defense Nonproliferation and the newly established Integrated Policy Office. These advisors would serve in full-time positions and report directly to the head of those offices.
- Establishing standing advisory committees to provide independent review and advice to the same key offices on a regular basis.

III. Strengthening DOE Relationships with Field Offices, National Laboratories, and Production Facilities

Findings

1. *The relationships among DOE headquarters, field offices, national labs, and production facilities are inadequate to ensure the health of the national laboratories and to maximize their contributions to nuclear nonproliferation.*
2. *A number of advisory groups and commissions currently are exploring ways to improve the health and management of the labs to support the full range of DOE missions.*

Why these findings matter

A robust, technically strong, and well managed DOE laboratory system is vital to achieving many of the non-proliferation objectives discussed in this report. The laboratories provide crucial technical support to all agencies involved in formulating U.S. national security missions, including nonproliferation policy and executing nonproliferation programs. Given the dynamic nature of the threat environment, it is essential that the national labs maintain the human capital, budgetary resources, and organization necessary to continue developing innovative capabilities and maintain the technical expertise required for their national security missions. All initiatives that are considered to improve the relationship among the elements of the DOE/NNSA system should devote special attention to assure that nonproliferation and other national security requirements are met as well as the requirements of the weapons research development test and evaluation (RDT&E) program. Although specific recommendations and analyses lie outside the scope of this report it is clear that a healthy lab system consists of three key components: a top-flight work force of experts who are technically knowledgeable about nuclear activities around the world; sufficient budgetary resources for capabilities to address priorities; and a management system that ensures this technological expertise is effectively and efficiently utilized by all relevant elements of the U.S. government.

Recommendation

In light of the recommendations of the studies now in progress, DOE should as an urgent priority strengthen the relationship among DOE headquarters, field offices, national labs, and production facilities.

IV. Continuing and Revitalizing U.S.-Russian Nuclear Security and Nonproliferation Cooperation

Findings

1. *DOE's global work to improve nuclear security has substantially reduced the risk of nuclear terrorism, but there is more work to do.*

   Terrorists cannot make a nuclear bomb if they cannot get the needed nuclear material. Securing and accounting for nuclear material – or removing it entirely from sites around the world – are critical steps to reduce the danger of nuclear terrorism. DOE's work with Russia, the other states of the former Soviet Union, countries in South Asia, China, and other countries around the world have reduced major risks to U.S. security. Substantial risks remain in countries around the world, however, that must be addressed.

2. *The deterioration of U.S.-Russian relations resulting from the crisis in Ukraine makes nuclear security cooperation more challenging.*

   In both Washington and Moscow, the political context for cooperation has completely changed. In both capitals, hostility is running very high and many cooperative efforts have been cut off or put on hold. While neither Russia nor the United States has yet cut off nuclear security cooperation, both houses of the U.S. Congress have passed legislation calling for such cooperation to be cut off, and the Russian government has been moving slowly on some important efforts.[3] Russia's actions in Ukraine are unacceptable and require a firm response – but the U.S. retains a vital interest in ensuring that Russian nuclear stockpiles are effectively and sustainably secured. The United States has the same vital interest in other countries – and a variety of political difficulties are inhibiting nuclear security cooperation elsewhere as well. But it is in Russia that the situation has fundamentally changed; hence, the Task Force has chosen to focus on nuclear security cooperation with Russia in this interim report.

[3] In general, this legislation would prohibit DOE cooperation, including nuclear security cooperation, unless the administration certified that certain conditions were met. Congress has not yet developed the final version of the certification requirements, which would determine whether the legislation really slowed or stopped this cooperation or not.

3. *Continuing nuclear security cooperation with Russia remains critical to U.S. national security interests.*

   Two decades of nuclear security cooperation with Russia have resulted in tremendous improvements in and accounting for Russia's vast stockpiles of nuclear weapons and materials. The risk of nuclear theft has been greatly reduced. But the job is not done. Russia continues to have the world's largest stockpiles of nuclear weapons, separated plutonium, and highly enriched uranium (HEU), in the world's largest number of buildings and bunkers – and a variety of vulnerabilities remain that a sophisticated conspiracy could exploit.

   Russia and the United States have the world's largest nuclear stockpiles and nuclear complexes, and the world's largest reservoirs of experience in providing security and accounting for nuclear weapons and the materials needed to make them. They bear a special responsibility for nuclear security, as the U.S. and Russian presidents have repeatedly agreed. Effective nuclear security for all stockpiles worldwide will be almost impossible to achieve without Russia and the United States working together – on improving and sustaining nuclear security in their own countries, helping other countries improve their nuclear security, and strengthening the global nuclear security framework. Just as the United States cooperated with the Soviet Union to build the global nonproliferation regime even when the two countries were locked in a global cold war, the United States must seek ways to cooperate with today's Russia where doing so serves U.S. national interests.

   DOE's efforts in nuclear security are an investment in U.S. security, not a favor to Russia. Indeed, much of the Russian government is unenthusiastic about this cooperation, seeing it as unwanted American intrusion into Russian nuclear secrets.

4. *Nuclear security cooperation with Russia will not be easy, is likely to encounter delays, and will require creative approaches and sustained attention.*

   As noted earlier, this cooperation is already encountering rocky political waters in both capitals. In the lead-up to the expiration of the Nunn-Lugar umbrella agreement in mid-2013, cooperation virtually ground to a halt as Russian officials waited to see what would happen. Even since the follow-on agreement was completed, providing a firm legal foundation for nuclear security cooperation, Russian officials have been slow to move forward. Although leaders at many nuclear sites remain eager for continued cooperation with the United States, these efforts have lost the popularity they once had in Washington and Moscow.

   Even if it survives the current political crisis, U.S.-Russian nuclear security cooperation is entering a new phase that will require new approaches. The phase that was focused on major equipment installations and construction of new security systems is nearing its end. The future will be much more focused on sustaining and improving what has been put in

place, including effective regulation, sharing best practices, strengthening security culture, and building sustainability. It will be reducing U.S. investments coupled with efforts to motivate Russia to take additional steps on its own. And it may be focused on working together to help other states improve their nuclear security. This different focus of nuclear security work will cost less, but it will require different approaches, including a shift away from a donor-recipient approach to a more equal approach, with resources and ideas coming from both sides. Achieving that will not be easy.

There is a legitimate question as to why Russia should not be paying for its nuclear security itself, more than two decades after the collapse of the Soviet Union, and with a Russian budget deficit far smaller than the U.S. budget deficit. But at present Russia is not making the needed investments in nuclear security areas the United States views as critical, or putting in place a regulatory structure as strong as the U.S. government believes is necessary. The work of securing these stockpiles will not get done to the standards necessary unless the United States continues to invest – while simultaneously working aggressively to persuade the Russian government to increase its own investment and strengthen its own rules.

Recommendations

1. **Continue nuclear security and nonproliferation cooperation with Russia.** DOE should make every effort to continue its nuclear security cooperation with Russia despite current tensions with Russia over Ukraine. Other U.S.-Russian cooperation that serves U.S. nonproliferation interests should also continue.

2. **Plan for different scenarios with Russia.** Given the crisis in Ukraine and heightened opposition in both the United States and Russia to any approach that smacks of "assistance," DOE should develop plans to further U.S. interests in effective nuclear security under a range of scenarios.

   These scenarios should include:

   - A positive scenario in which the crisis over Ukraine is resolved and the United States and Russia return to relations that permit a range of cooperative work;
   - A scenario in which the crisis continues but nuclear security cooperation is able to continue;
   - A scenario in which the crisis continues and only very limited nuclear security cooperation is possible; and
   - A scenario in which nuclear security cooperation with Russia becomes impossible.

   For each of these scenarios, DOE should prepare a plan for the activities to be pursued, the tactics and approaches to be used, and the budget allocations required to support the work.

For now, DOE should budget for a significant level of continuing nuclear security work in Russia – but should also prepare plans for other uses of those funds if these efforts are greatly constrained or delayed.

3. **Develop a more equal approach in U.S.-Russian nuclear security cooperation.** With the era of large-scale equipment installation nearing its end, DOE should develop concepts for a new approach to nuclear security cooperation that could be implemented in the scenarios in which nuclear security cooperation is able to continue. Both Russia and the United States continue to face serious nuclear security challenges. Both can benefit from learning from sharing experience and best practices. Hence, if the political situation makes it possible, Russia and the United States should undertake an ongoing, long-term nuclear security cooperation effort, focused on helping other countries improve their nuclear security and on exchanging ideas, visits, and technologies to make further improvements in their own nuclear security arrangements.

4. **Take a broader approach to consolidating nuclear material in the U.S. and Russia.** Russia has a vastly outsized infrastructure of buildings and bunkers with weapons-usable nuclear material, the largest in the world. The United States has greatly consolidated its own holdings of weapons and materials in the last two decades, driven in part by the high costs of meeting post-9/11 nuclear security requirements for each site where potential nuclear bomb materials exist. This effort has resulted in hundreds of millions of dollars a year in annual security savings. While Russia has consolidated its complex as well, with some help from DOE, it has not gone as far.

   Political conditions permitting, DOE should undertake a much broader discussion with Russia about consolidation. DOE and Russia should work together to lay out strategic plans by which they can each accomplish their defense and civilian missions with the smallest number of locations with HEU or separated plutonium.

V. Developing and Implementing an Investment Strategy for Nuclear Nonproliferation Research and Development

Findings

1. *DOE's nonproliferation R&D program is critically important, and has provided major improvements in nonproliferation and arms control technologies.*

   DOE's nuclear nonproliferation program, based primarily in its multiple laboratories, provides the core science and technology needed for new and improved devices, detectors, and protocols. More than 75% of the program's budget is allocated to the laboratories for R&D and for execution of U.S. government nonproliferation efforts at home and abroad. DOE's contributions to U.S. nonproliferation efforts stem largely from its ability to engage

the nation's leading experts, including those working on the problems of chemical and biological weapons proliferation, in nuclear nonproliferation activities. Accordingly, DOE and the U.S. government as a whole have a fundamental interest in ensuring the health and vitality of the DOE laboratories. Yet the Task Force consistently heard concerns from laboratory officials and others that the Department's management of the enterprise often impedes scientific and technical progress.

2. *DOE's approach of spreading nonproliferation R&D investment to large numbers of laboratories in small increments is inhibiting nonproliferation technology innovation within the labs.*

   In particular, concerns were raised about the absence of a strategic approach to R&D investments and that the system for managing R&D across the enterprise is smothering innovation. For example, DOE's nonproliferation R&D program has evolved to a program that is spreading small amounts of funding across more than a dozen laboratories and facilities. In fact, as a regular practice, the only source of funding for breakthrough innovations in the labs is coming not from projects initiated by the Department, but from laboratory directed R&D (LDRD). The current management system rewards exquisite, tightly controlled project management instead of technology innovation, which is inherently riskier.

3. *DOE's nonproliferation R&D investments are inadequately coordinated within DOE and with other USG agencies.*

   There is also inadequate coordination between DOE and other USG agencies (in particular the Defense Threat Reduction Agency (DTRA) R&D programs), and only modest incentives to integrate the effort in a broader national R&D strategy. As a result, the technical outcomes and abilities of the labs are being diluted and there is no integrated, innovative R&D program across the whole of government. A serious look at performers and priorities is required to avoid inappropriate adjustments to programs and priorities going forward.

Why these challenges matter and persist

The present DOE nonproliferation R&D program appears balkanized. Resources are spread across all the DOE labs, not just the weapons labs. This is appropriate to access capabilities not strongly or essentially demonstrated in the weapons labs (e.g., new fuel element design) or to access unique capabilities developed by other agencies at particular labs (e.g., the DoD investments at the Pacific Northwest National Laboratory), but it is not credible that eight or nine labs actually have essential or unique capabilities in all areas. DOE should strive for a program with fewer but appropriate performers who are maintained at a level above critical mass.

DOE is the principal developer of technical tools for verification and monitoring and is usually the demonstrator of them to at least prototype status as part of developing deployment and operational plans. The Department of State at the policy end of the problem and DoD/DTRA and Department of Homeland Security (DHS)/Domestic Nuclear Detection Office (DNDO) with fielding and operational roles abroad and domestically must be properly coupled to the assessment of risk and opportunity if DOE's R&D programs are to provide the highest value per dollar invested.

Recommendation

Formulate and implement a multiagency investment strategy for nuclear nonproliferation R&D. As indicated in the recent Defense Science Board study on "Assessment of Nuclear Monitoring and Verification Technologies," the U.S. government should develop a strategic investment strategy for R&D across the USG to create a more effective and efficient R&D capability that furthers U.S. national security interests and receives sufficient resources to succeed.

A logical structure for the strategy is to identify the components of the tasks to be performed, the special operating competencies of each of the organizations identified above, and their R&D activities in support of each task. A past successful model for such coordination, albeit on a much smaller scale, is the way in which DOE/NNSA, DTRA, DHS, the Federal Bureau of Investigation (FBI) and the Intel community assessed and coordinated their activities in an integrated post-detonation nuclear forensics program. This coordination has involved not just the R&D components of the program, but also those operational components that are stressed and tested in realistic exercises.