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HOMELAND SECURITY

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

ON THE

PRESENT AND FUTURE ROLES OF THE DEPARTMENT OF ENERGY/NATIONAL NUCLEAR SECURITY ADMINISTRATION NATIONAL LABORATORIES IN PROTECTING OUR HOMELAND SECURITY

JULY 10, 2002

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HOMELAND SECURITY

WEDNESDAY, JULY 10, 2002

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 2:30 p.m. in room SD–366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Why don't we go ahead and start. We're all ready to proceed here.

The administration has recently proposed a move that various Senators and Congressmen had been advocating, and that is the creation of a Cabinet-level agency responsible for addressing threats to our homeland security. To the administration's credit, it's proposal to create a Department of Homeland Security gives a nod to the important role of the Department of Energy, and also the important role of the National Security—National Nuclear Security Administration, NNSA, national laboratories and the role they can play in protecting homeland security. These roles are many. They include developing new technologies to detect and deter terrorist threats and provide the skilled manpower to help mitigate the consequences of actual terrorist attacks.

I'm concerned that the administration's proposal does not recognize the full depth and breadth of the capabilities at our national laboratories, and particularly those laboratories that do not have national security as their overriding mission. I believe the new department needs to be encouraged to draw on needed capabilities wherever they exist, be that in our national laboratories, in industry, or in our universities. I'm also concerned that the administration's proposal does not recognize that the programs to be transferred from the Department of Energy and from NNSA to the new Department of Homeland Security will lack substantial vitality if they are cut off from the larger intellectual institutional context which now supports them. The best scientists want to work in institutions and environments that are pushing up against the frontiers of their field, not in areas that look more like technical service organizations.

Finally, I'm concerned that the organizational structure proposed for the new department may result in a disconnect between the people developing new technology to combat terrorism and the people who will ultimately employ the new technology. I believe we

need to look seriously at creating a position in the new department that would stand above the various undersecretaries and have some responsibility for developing and integrating research and development programs to address a priority list of technologies.

We have with us an excellent group of witnesses, starting with Ambassador Linton Brooks, Acting Administrator of the NNSA, Dr. Ray Orbach, who is the Director of the Department of Energy's Office of Science. We will then have a second panel of senior leaders from our national laboratories and a representative from the National Research Council's Committee on Science and Technology for Countering Terrorism.

I look forward to the testimony and hope that through this hearing we can gain some insights that will help in the upcoming debate here in the Senate on legislation to establish a Department of Homeland Security.

Let me defer to Senator Murkowski and then Senator Domenici for any opening statements they have.

STATEMENT OF HON. FRANK H. MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. Thank you very much, Senator Bingaman, Senator Domenici. I think the hearing is well in hand with my two friends from New Mexico.

I think it's appropriate that this committee maintain its jurisdiction and role in the issue of homeland security. I want to compliment the staff of the majority and of the minority for scheduling a hearing on the role of the Department of Energy's National Laboratories in the proposed development of the homeland security.

Let me first comment, I think our President deserves recognition for his bold initiative on this. Defending the Nation, whether at home or abroad, is one of the highest priorities of our government. It's part of our constitutional commitment. And, of course, we saw on September 11 that our enemies are real, they're unscrupulous, and they are very, very deadly.

I'm certainly open as to how the new department should be organized, but there is no question it should be created. Establishment of the Department of Homeland Security is certainly going to be a priority for the 107th Congress.

I wanted to remind everyone that our growing dependence on foreign energy is an equal threat to our national security. Some have been around here long enough to recall, in 1973, we had the Arab oil embargo. It brought our economy to its knees when we were 36-percent dependent at that time on foreign oil. Now we are 57-percent dependent, and the Department of Energy indicates we'll be in the 1960s within a few years.

As some of you recall, in 1973 we had gas lines around the block. People were outraged, "How could this happen in the United States," and they were blaming everybody and particularly pointing a finger at the Federal Government. But we oftentimes forget the lessons of history. But it's quite clear that energy is the difference, in many cases, between the victor and the vanquished. We've seen that in many areas of history and in warfare, as well.

And we can never, of course, be entirely independent, but we can buy a lot of insurance through increased domestic energy produc-

tion, whether it be oil, natural gas, nuclear, coal and renewables. Thus, we must complete action on the energy legislation that is now in the conference. As far as I am concerned, that's what should be covered under our homeland security effort.

With that, I look forward to hearing the witnesses and the input of this process in the development of homeland security.

Thank you, Senator Bingaman.

The CHAIRMAN. Thank you.

Senator Domenici.

STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

Senator DOMENICI. Mr. Chairman, I do believe I will make a little opening statement, and I will try to help you this afternoon by being here part of the time. If it will accommodate you, you can leave, and leave me. I might do that once in the session.

The CHAIRMAN. Thank you.

Senator DOMENICI. First of all, I've had an opportunity to review the President's proposal for homeland security, particularly as it relates to science and technology and the mission of the department and how our national laboratories should contribute to the cause of homeland security. And, obviously, one needs to know very little about them to know that they have a chance to contribute a great deal to this homeland security.

The proposal submitted by the President certainly recognizes the capability of the national laboratories, but the manner in which the initial plan was developed and announced and communicated to Congress led to a bit of confusion. So let me see if I can state quickly what I think it is.

Before I do that, let me say to Ambassador Linton Brooks, you're now the Acting Director of the NNSA. I don't know that we always are congratulatory when somebody moves up to a higher office, and I was wondering why he had taken our general that had just started putting this together, but I assume he needs him. And fortunately, we have somebody there that I feel very comfortable with in serving as an Acting Director. And so good luck to you. You have a very difficult job.

The President proposed an undersecretary to address the science, technology, and operational issues associated with chemical, biological, nuclear, and radiological threats. I would argue that under the Secretary's mission should be a—that that should be broadened to cover the entire science and technology mission for the whole department, and the operational mission should be run by other operational parts of the department. Certainly much of the focus will be on the chemical, biological, radiological, and nuclear threats, because they currently make up some of the threat potential.

The undersecretary for the science and technology should be responsible for a number of things—utilizing R&D base for homeland security, as the President suggested, in that they are performing Ag and related R&D, as the President suggests. But there are several ideas that are left out. The undersecretary needs a mechanism to tap into the capabilities of the national laboratories. He also needs a DARPA-like organization that can rapidly procure technology for homeland security, and I think he needs a RAND-like

think tank, which has just been recently suggested by Science Council, and it's a very prestigious group. So they were there before we came to that conclusion. We might have borrowed it from them.

I think we should build upon the ideas that the President has suggested to really support the importance of S&T missions of this new department as it relates to these national laboratories.

Let me make just a few more comments. Tremendous capabilities exist at all the labs, much of it at Sandia, Los Alamos, and Livermore; but Oakridge, Idaho, Pacific Northwest have unique capabilities also. These capabilities should be fully utilized and managed by DHS or at—from a location that is certainly located among these laboratories. That's how I understand the proposal.

For the labs to work for the DHS, they should be governed by a few principles. The HHS should be able to task and fund the labs directly. Homeland security work should be done on an equal basis with other important security work at the laboratories, not on a work-for-others or a non-interference basis. DHS should be able to access all parts of the laboratory for expertise, not just a carve-out for homeland science.

In conclusion, the principles that I've just stated should be the basis on which the science and technology missions of the homeland department should be carried out.

I look forward to working with the administration and you, Mr. Chairman, and with those who run our laboratories to see that we present through the Government Operations Committee, the best possible proposal that we can put forth.

Thank you very much.

The CHAIRMAN. Thank you very much. Let me see if any of the other senators wish to make opening statements. Senator Akaka, did you wish to make a statement?

Senator AKAKA. Yes.

The CHAIRMAN. Go right ahead.

STATEMENT OF HON. DANIEL K. AKAKA, U.S. SENATOR FROM HAWAII

Senator AKAKA. Thank you very much, Mr. Chairman. I would like to add my welcome to the witnesses today.

The administration's proposal for the Department of Homeland Security includes contributions from the Department of Energy's National Energy Laboratories. However, the President's blueprint contains few details as to why these labs should be reorganized and few guarantees of security for Federal employees.

In the past month, I have participated in several hearings on the proposed functions of the Department of Homeland Security. Unfortunately, the administration has not yet given us a national strategy for homeland security. I am concerned about some of the President's recommendations pertaining to the national labs. For example, the administration proposes moving components of the International Materials Protection and Cooperation Program within the Department of Energy's Nuclear Security Administration into the new Department of Homeland Security. This program's core mission is to reduce the threat of nuclear proliferation and nuclear terrorism by improving security of weapons-usable material world-

wide. This office directs cooperative nonproliferation efforts in Russia, although it also assesses nuclear threats and hoaxes in the United States. These programs have primarily a foreign focus, not a domestic one, and are similar to international efforts managed by the State Department.

These nuclear security activities have been successful because of the relationships built between Russian and American scientists. By putting these functions in the Department of Homeland Security, American participants may be seen as security or intelligence personnel by their Russian counterparts rather than American scientists. I fear, as a result, that the success of our nonproliferation programs in the former Soviet Union could suffer.

The administration also would transfer DOE's intelligence program at Lawrence Livermore to the proposed department. I'm concerned that a new focus on homeland security would mean that analysis of nonproliferation intelligence on Russian, Chinese, and North Korean weapons of mass destruction will become less of a priority.

President Bush told Congress on June 18 that the accumulation of a large volume of weapons-usable fissile material in the territory of the Russian Federation continues to pose an unusual and extraordinary threat to the national security and foreign policy of the United States. He is right. And, for this reason, the administration needs to justify why changes to the organization of our current nonproliferation programs are necessary and how such changes will improve our security.

Mr. Chairman, it is interesting to note that while we hold this hearing on the contributions of the Department of Energy's labs to the proposed Department of Homeland Security, earlier today President Bush addressed thousands of Federal employees to reassure them that their agencies and jobs would not be threatened by the creation of a new department. In the President's proposal, I see few guarantees of security for the Federal employees or for the continuity of mission of their agencies.

I look forward to the testimonies of our witnesses. Mr. Chairman, thank you very much.

The CHAIRMAN. Thank you very much.

Senator Kyl, did you have some comments?

STATEMENT OF HON. JON KYL, U.S. SENATOR FROM ARIZONA

Senator KYL. Thank you, just a brief comment, Mr. Chairman, since I'm not sure I'm going to be here for all of the testimony of all of the witnesses, just to indicate that I would like to have the witnesses, either in their oral presentations or in writing later, address at least the role of the Department of Homeland Security with regard to the physical protection of our energy infrastructure, number one; number two, the cooperation and coordination with the governments of Canada and Mexico as we develop our homeland security program; and, three, a significant role in assuring cyber protection of our energy infrastructure.

The CHAIRMAN. What was the last one?

Senator KYL. Cyber security, since computers operate so much of our generation and grid as well as hydro systems, that's important. And then, finally, to just indicate general agreement with Senator

Domenici in the view that all of our national laboratories have a significant role to play in homeland security, and I'm interested in ensuring that they have an opportunity to play that role.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Senator Cantwell.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Mr. Chairman, and thank you for holding this important hearing on the Department of Energy's laboratories in our nation's effort to make our homeland more secure.

This is a big step and an enormous undertaking. I'm sure we'll hear from some of those testifying today about some of those challenges. But I believe it is important that, while we're looking through their testimony, we think of the important issues that are involved in creating a new department.

My primary concern is that, given that we have a very urgent need to improve our domestic security, how do we undertake a massive bureaucratic reshuffling in a way that will not slow our efforts and our ability to improve our defenses? And specifically, when it comes to the national labs, how do we ensure that we maximize and enhance the benefits of the research and development efforts already underway at the labs in a manner that ensures that DOE labs can continue to fill their multipurpose mission while still operating in conjunction with the Department of Homeland Security?

For us, in the Northwest, with the Pacific Northwest Laboratory, PNNL, where about 40 percent of the activities are related in some way to national security, we definitely see an overlap of issues. But yet I think it's important that we understand how those missions might be challenged in a new agency.

I would like to take this opportunity, if I could, Mr. Chairman, to submit for the record the testimony of Dr. Laura Powell, the PNNL's director.

[The prepared statement of Dr. Powell follows:]

PREPARED STATEMENT OF DR. LURA J. POWELL, DIRECTOR, PACIFIC NORTHWEST NATIONAL LABORATORY, DEPARTMENT OF ENERGY

As Director of the Pacific Northwest National Laboratory (PNNL) in Richland, Washington, I am pleased to provide this statement regarding the present and future roles of the Department of Energy (DOE) and National Nuclear Security Administration (NNSA) laboratories in protecting our homeland.

The DOE and NNSA national laboratories have attracted and developed many of our nations finest scientists and engineers. Their capabilities and assets have been applied toward homeland security and counter terrorism challenges long before September 11 as well as since then. I believe these capabilities and assets can continue to add significant value to the new Department of Homeland Security.

Specifically, PNNL, as a DOE Office of Science multi-program national laboratory, is prepared to continue supporting the nation's effort to secure the U.S. homeland. Since 1965, the Pacific Northwest Division of Battelle, a not-for-profit entity based in Columbus, Ohio, has operated PNNL for the DOE. PNNL employs approximately 3,500 staff and maintains a business volume in excess of $500M annually, $230M of which is related to national security work for a number of government clients in areas such as combating terrorism, homeland security, proliferation detection and monitoring, underground nuclear test detection, nuclear weapon dismantlement, nu-

clear materials safeguards and security, environmental and waste characterization, and fundamental science.

OUR HOMELAND SECURITY CHALLENGES

Terrorism is not a new phenomenon and for decades PNNL has performed work for government agencies with missions designed to combat terrorism. Recent events serve to remind us of the vulnerabilities to the security of our homeland and it is becoming even more evident that there are terrorist elements with a willingness to deploy weapons of mass destruction against U.S. interests—both abroad and at home.

The threat we face is dynamic and complex. We need to be as flexible and adaptable as are the adversaries who would threaten us. As we organize around the need to manage the risks associated with the threats posed by weapons of mass destruction (WMD), we must do so in a reasonable and systematic manner. The actual financial costs of developing and implementing mitigating strategies and countermeasures are only one consideration of a comprehensive risk management strategy. We must also ensure that the solution is implemented in a manner that considers negative consequences such as reduced operational efficiencies or productivity that currently give U.S. industry and the U.S. economy a competitive advantage.

Finally, it is imperative that organizational and technological standards evolve that ensure solutions can be integrated across the various functions and responsibilities outlined for the new Department of Homeland Security (DHS). Solutions must facilitate integration of operations and functions, information sharing, and interoperability.

PNNL CONTRIBUTIONS TO HOMELAND SECURITY

I'd like to offer a few examples of PNNL programs, technologies and capabilities that span the entire WMD threat spectrum.

- Millimeter Wave Holographic Imaging System: This system, developed for the FAA for personal security checkpoint screening, is capable of detecting specific threats and contraband.
- Acoustic Inspection Device: This handheld system was originally developed by PNNL for inspection of chemical weapon stockpiles in Iraq following the 1991 Gulf War. It can be used by Law Enforcement Officials to detect concealments, hidden compartments or anomalies in liquid-filled containers and solid form commodities; sort material types into groups of like and unlike, and identify liquids and solid materials over a wide range of temperatures. It has recently been commercialized by a private manufacturer and is being used by U.S. Customs and other organizations as an inspection and screening tool.
- Biodetection Enabling Analyte Delivery System (BEADS): It is necessary to process large environmental samples to obtain traces of threat biomaterial and deliver that material in a small volume to a sensor. BEADS enables automated sample preparation for biodetection systems.
- Plutonium Measurement and Analysis (PUMA): A radiation monitoring system that uses glass fibers to detect the presence of radionuclides, such as plutonium. This technology offers flexible, lightweight, low-power detection capability.
- Hazardous Material Chemical Agent Detector (HAZMATCAD): This commercially available tool takes advantage of special (sensitive and selective) polymers developed by PNNL and allows faster response times to lower concentrations of hazardous chemicals and agents.
- WMD Interdiction Training for International and Domestic Border Security Officials: In 1997, Congress provided for the U.S. training of international border security officers in detecting, identifying, and interdicting the smuggling of WMD materials and items. Since then, Border Officers from 17 nations have been trained as part of the International Border Security Training Program. PNNL is responsible for conducting this highly successful training known as Interdict/RADACAD at the Hazardous Materials Management and Emergency Response (HAMMER) Training Center, a $30M DOE facility located near PNNL at the Hanford Site. The value of this program has been demonstrated by seizures of sensitive materials in Eastern Europe, including nuclear reactor components destined for Iran and a quantity of Uranium-235. The border security officials responsible for both of these seizures attribute their success to the training they received in this program from PNNL at HAMMER. PNNL initiated the training of U.S. Customs Officers this year. Thus far, two 3-day courses in radiation detection and protection and the use of advanced detection equipment have been completed. For the foreseeable future, one U.S. Customs class per month is scheduled.

- International Emergency Preparedness for WMD: PNNL supports a U.S. government-sponsored training program that teaches international first responders how to recognize, respond to and manage an incident involving a WMD. In addition to the operations training at HAMMER, PNNL also supports a course for international mail handlers on Postal Chemical/Biological Incident Management. In the same way the international WMD interdiction training eventually expanded to accommodate U.S. Customs Officers, consideration should be given to leveraging this training capability and facility to accommodate the government's articulated desire to train U.S. first responders to handle WMD incidents.
- Federal Emergency Management Information System and Emergency Management Advantage (EMADVANTAGE): Decision support and command and control tools have been developed for both emergency managers and emergency responders. These tools provide an automated decision support architecture that applies to situation planning and response capabilities for large multi-user environments.
- National Counterdrug Center (NCC): Operational coordination (or interoperability) across multiple agencies, missions, or functions is a known limiting factor impacting interdiction efforts. PNNL is one of several organizations developing the NCC for the Department of Defense. The NCC is a simulation-based interoperability training system that can improve multi-agency operational planning and execution in a virtual environment. While the current focus is drug interdiction, this national capability can be readily leveraged to accommodate training and planning capability for all-threat interdiction to include weapons of mass destruction. In addition, since the underlying objectives are to support interoperability, it is plausible that the capability and concept of simulation-based interactive environments can support the needs of first responders (police, fire, and emergency medical) as well. One of several folks, not just PNNL. supporting.
- Information visualization and knowledge management: For over a decade PNNL has been conducting research that helps government analysts deal with the overwhelming amount of information they must process. PNNL has developed and successfully deployed software tools for exploiting large and diverse sets of information. Analysts within a number of government agencies are currently taking advantage of PNNL tools like SPIRE and Starlight to help them to "connect the dots."
- Critical Infrastructure Protection: PNNL is one of several DOE laboratories tasked to assure the integrity of energy infrastructures by conducting vulnerability assessments and recommending risk-mitigating strategies. The bulk of this work has focused on the electrical power infrastructure, an area in which PNNL has recognized capability.
- Radiological Detection Expertise: Even though PNNL has existed for nearly four decades, there are over 50 years of history related to radiation detection technology development and deployment as a result of the legacy from the Hanford site's involvement in the Manhattan project. Instruments incorporating PNNL radiation detection technologies have been fielded in a number of locations, including: outer space, deep undersea, within the core of both naval and civilian reactors, border crossings, international nuclear test detection networks, high altitude aircraft, nuclear accident sites such as Three Mile Island and Chernobyl, U.S. nuclear complex sites, and deep underground. In addition, PNNL staff participate in a number of U.S. Government or international policy working groups including the Radiation Detection Panel (DOE), the Nuclear Smuggling Working group (IAEA), and the Radiation Instrumentation Steering Committee (IEEE.) PNNL currently holds leadership positions in the International Nuclear Materials Management Association.
- Radiation Portal Monitoring Support to U.S. Customs: The U.S. Customs Service, Office of Information and Technology (OIT), Applied Technology Division (ATD), working with the Department of Energy (Pacific Northwest National Laboratory-PNNL), has established a terrorist radiation/nuclear detection project to investigate systems and technologies to augment and enhance their existing radiological detection capabilities. This project addresses the maritime, aviation, land crossing, and rail USCS inspection environments.

THE ROLE OF SCIENCE AND TECHNOLOGY AND OUR NATIONAL LABORATORIES

The science and technology response to our homeland security challenges must draw broadly on the talent and expertise resident in our research universities, our industry, and in all the government laboratories managed by multiple agencies. The

national laboratories managed by DOE and the National Nuclear Security Administration will play a very substantial role, particularly on weapons of mass destruction issues. These laboratories have specialized capabilities in several areas of science and technology, such as the control and detection of nuclear materials, and expertise pertinent to radiological, chemical and biological threats. The national laboratories maintain the interdisciplinary approach and scientific and engineering breadth necessary to take a broad systems view of these problems, and have the ability to deliver solutions in a secure environment.

I very much appreciate the opportunity to provide this statement for the record.

Senator CANTWELL. And while she was unable to join us today because of a conflict, her testimony details many of the contributions that PNNL is already making to homeland security. For example, PNNL is developing or has developed a holographic imaging system for the FAA, and they use that for personal security checkpoints. They've developed radiation detection technology, the legacy of which goes back to Hanford's involvement in the Manhattan project. They've been involved in training and border security, both with programs developed at the PNNL lab and the Hammer facility, which is located in Richland, Washington. So they've already trained, many people, I think, from 17 different nations in how to do border security.

So these are just some of the many examples, but there are other issues. For example, last spring I attended the dedication of the world's most advanced nuclear magnetic resonance spectrometer, which is at the PNNL Environmental and Molecular Science Lab, and is poised to play a central role in the fast-growing revolution in systems biology. And, while I can say that that would have some benefit for us in the area of bioterrorism, it has many other missions besides that. How will we make sure that those missions, whether it's helping us look at new sources of hydrogen necessary for distributed generation or looking at new ways to remediate nuclear waste are presented? There are so many things that that particular science and technology will allow us to do, and if its mission were moved to Homeland Security, how will we keep the key focus on those other projects?

So all of these, I believe, are important issues at the core of the Department of Energy, and I believe that our efforts in these areas should be redoubled and certainly not inadvertently undermined by moving part or some of them to the Department of Homeland Security.

And, Mr. Chairman, thank you again for holding the hearing and allowing us to give opening statements.

[The prepared statement of Senator Cantwell follows:]

PREPARED STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM WASHINGTON

HOMELAND SECURITY AND NATIONAL LABS

Thank you, Mr. Chairman, for holding this important hearing on the role of our Department of Energy laboratories in our nation's effort to enhance our homeland security. I applaud the Administration for stepping forward to propose a new Department of Homeland Security. This is a big step and an enormous undertaking. But I also believe it is Congress' duty to raise some very important questions, which I believe must be answered before moving toward creating this new Department.

I recently had the opportunity to question Governor Ridge regarding the specifics of the Administration's proposal as a member of the Judiciary Committee. My primary concern in that context is, I believe, quite relevant here: Given that we have a very urgent need to improve our domestic security, how do we undertake a massive bureaucratic re-shuffling in a way that will not further slow our ability to im-

prove our defenses? And specifically when it comes to our national labs, how do we ensure that we maximize and enhance the benefits of the research and development efforts already underway in a manner that ensures our DOE labs continue to fulfill their multiple important missions, while bolstering the efforts of the Department of Homeland Security?

As I mentioned, substantial effort is already being devoted to homeland security issues at many of our national labs—including Washington state's Pacific Northwest National Laboratory (PNNL), where about 40 percent of the activities are in some way national security-related.

I would like to take this opportunity to submit for the record the testimony of Dr. Lura Powell, PNNL's Director. While Doctor Powell was unable to join us here today due to a conflict, her testimony details many of the contributions PNNL is poised to make to our homeland security. For example, PNNL is developing or has developed: a holographic imaging system for the FAA's use at personal security checkpoints; radiation detection technology, the legacy of which dates back to the Hanford site's involvement in the Manhattan Project; and training for border security agents in the interdiction of weapons of mass destruction. This last training program—developed by PNNL and the HAMMER facility also located in Richland, Washington—has already educated boarder officers from 17 nations and resulted in the seizure of materials in Eastern Europe, including nuclear reactor components and Uranium-235 destined for Iran.

This is just a sampling of PNNL's activities, which makes clear that our national labs can and must make a crucial contribution to the effort to improve our homeland security. But I also want to add one important note. As Congress continues to refine the President's proposal, we must remain vigilant about unintended consequences. That is, certain ongoing multidisciplinary programs may contribute to the homeland security effort, but must continue to serve the independent objectives that remain part of DOE's core mission.

For example, this spring I had the opportunity to attend the dedication of the world's most advanced NMR (nuclear magnetic resonance) spectrometer at PNNL's Environmental and Molecular Sciences Lab, which is poised to play a central role in the fast-approaching revolution in systems biology, the seeds for which were sown by the amazing success of the Human Genome Project. While it's true that systems biology and proteomics (PRO-TEE-OHM-ICS) research will have an important role in quelling the bioterrorist threat, it will also lead to new and innovative strategies to address climate change, technologies allowing us to more efficiently tap our nation's abundant renewable energy resources, ways to more efficiently produce the hydrogen necessary to power certain sources of distributed generation such as fuel cells, and even innovations in the remediation of our nation's nuclear waste sites.

All of these are important, core missions of the Department of Energy and I believe our efforts in these areas should be redoubled—and certainly not inadvertently undermined as we move forward with the proposed Department of Homeland Security. In fact, I believe a clear legislative mandate for the Department of Energy's biological research programs would likely be beneficial for our overall federal research initiatives—creating a more transparent R&D structure among and between the various departments.

So I look forward to today's testimony, and thank you again, Mr. Chairman, for holding this important hearing.

The CHAIRMAN. Thank you. Senator Feinstein, did you have any opening comments?

STATEMENT OF HON. DIANNE FEINSTEIN, U.S. SENATOR FROM CALIFORNIA

Senator FEINSTEIN. Just briefly, Mr. Chairman, if I might. I'm delighted to see Chancellor Orbach again. He was the distinguished chancellor at the University of California at Riverside and did some very important work in that capacity, so it's good to see you again, Doctor.

I am really delighted that Lawrence Livermore was chosen as a center of excellence in this program. Originally, there was a great deal of concern that the entire $1.2 billion budget at Livermore would be shifted to the new department. Now I understand that just about $40 to $50 million of program areas will shift over, and

I believe this represents about one-third of the Department of Energy's lab spending at Livermore that will be transferred to the new Department of Homeland Security.

I have some concern about the size of the Department of Homeland Security, but I think the administration is moving in the right direction here by targeting the DOE lab programs most directly related to homeland security for inclusion in the new department.

I have a couple of concerns. And maybe the witnesses can address these concerns in their comments. And I'd just like to quickly spell out two. I'd like to get a better understanding of how the transition of these lab programs would work. For example, when the administration says it's moving Livermore's chemical and biological programs to the Department of Homeland Security, how will that be reflected in the day-to-day work of lab personnel? Do they stay in the same lab? Do they go to a different place? Will scientists and others be relocated? Would a scientist that worked on homeland security at Livermore also be able to do research for the Department of Energy? That's one area of concern.

The other is in the—Livermore's intelligence programs. Livermore has important intel programs, and my understanding—they're proposed for transfer to the Department of Homeland Security. Now, they also provide important support to our country's strategic nuclear defense posture, and so I would like to know how this program ensures that both intel goals are met by this transfer.

With that, I'm anxious to hear from the witnesses.

The CHAIRMAN. Well, thank you very much.

Why don't we go ahead and hear from the witnesses? Ambassador Brooks, why don't you go first, and Dr. Orbach follow him, and then we'll have some questions.

STATEMENT OF AMBASSADOR LINTON F. BROOKS, ACTING ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Ambassador BROOKS. Thank you very much, Mr. Chairman. I have a prepared statement. I'd just like to summarize——

The CHAIRMAN. We'll include the full statement in the record of both witnesses.

Ambassador BROOKS. I'm very pleased to be here to talk about the DOE and NNSA and the national labs contribution to homeland security. And the focus of this hearing on the national laboratories is apt, because the national laboratories, from the technology side, are the key to making all of this work.

The first and most important message that I want to leave with the committee is that the Secretary of Energy and the whole department, the National Nuclear Security Administration, are fully committed to the homeland security mission. We're fully committed to the successful establishment of the Department of Homeland Security, and we're fully convinced that the President's approach does not represent any reduction in our ability to carry out our core mission. And, in the question period, I can amplify on that if you wish.

I think the new department will let us respond more effectively to today's threats. Now, to do that, the new department will require some capabilities, as the opening statements have made clear, that are now under my stewardship. The details of what will

be transferred were worked out directly with our office, and they were worked out collegially. And so we are both satisfied that we're going to be able to continue to carry out our mission, and we're committed to making the transfer of responsibilities both smooth and effective.

I want to talk briefly about the functions first, in title III, which is the technology area, and then very briefly in title V. With respect to title III, the capabilities that are being proposed for transfer are now within my Nonproliferation and Verification Research and Development Program. Now, that program has three elements. It has an element, about a third of it—the whole program is about $286 million—somewhere around a third of it is nuclear explosion monitoring, and that will remain in the Department of Energy and is not at issue. Somewhere around $70 million is chemical and biological national security, and that will all be transferred to the new department. And I'll say a word or two about that in a minute. And then the third and largest area is called proliferation detection. Proliferation detection sponsors a number of technologies that have both nonproliferation and homeland security application. Where we can disaggregate and show that something is primarily one or the other, that's where it'll go. And, at a minimum, our efforts to counter nuclear smuggling are clearly homeland-security related, and they'll be transferred to the new department.

Where the programs are so intertwined that they must continue to support both departments, the President's legislation authorizes—the President's proposed legislation authorizes us to look at joint programs. This is illustrative of a basic principle. We understand that the Department of Energy and the new department, in this area, are going to have to work together very closely, because we're going to be sharing the resources of the national laboratories.

The chemical and biological functions to be transferred develop technologies primarily to detect and respond to domestic attacks against civilian targets, so it complements the work done by the Department of Defense. An example is the so-called PROTECT system, which was demonstrated in December in the Washington metro to detect against chemical attack, or the so-called BASIS system, which is a biological detector which was deployed at the Winter Olympics.

In proliferation detection, nuclear smuggling, which is about $10 million, clearly is relevant to the new department and will be transferred. That program grew from the work to determine nuclear-weapons signature, and that's illustrative of the point that several of the senators made in their opening statements that the capabilities of the national laboratories are going to be involved in both my world and the homeland-security world in the future, just as they have been in the past.

In addition, we propose to transfer the department's Nuclear Assessment Program. I need to make it clear, because there have been several conflicting reports. The Nuclear Assessment Program is administratively located within the Material Protection Control and Accounting Program, which, as the Senator mentioned, is primarily a program that involves upgrading facilities in Russia.

The facilities in the work in Russia will remain with me and are not proposed for transfer. There's a very small $6 million effort

which is administratively located within this program which evaluates nuclear threats. It evaluates claims of nuclear extortion. And that seems to us to be more appropriately a homeland-security function. Basically what this program does is it reaches into the national laboratories for experts so that when a threat is received, we can help law enforcement assess the credibility. That's the only part of what you might think of as nonproliferation operational work that is being transferred. Our nonproliferation programs will remain in the department.

Under title V, we propose to transfer operational responsibility for responding to nuclear incidents. We are, as you know, prepared to respond anywhere in the world to nuclear and radiological incidents in emergencies. We have about 900 people, the overwhelming majority of whom are at the laboratories and are part-time, and they derive their expertise in incident response from what they do in their regular jobs.

The way the President's proposal would work, we would continue to be responsible for maintaining that capability, for training and equipping them, but, just as the National Guard or the volunteer fire department can be called up in time of emergency, they could be called in time of emergency and would operate under the direction of the office of homeland security.

Under the approach that the President has proposed, we will be establishing—or the Office of Homeland Security will be establishing—centers of excellence at several of the national laboratories. At the moment, we envision the three weapons laboratories, Pacific Northwest Laboratory and Oakridge, but that obviously can be adjusted, depending on need. And the notion here is to make certain that the new department can tap all of the capability of all of the national laboratories.

Let me conclude with a couple of observations.

The CHAIRMAN. Is that last statement on your part, the centers of excellence, is that a substitute for what has been bantered around as a new headquarters at Livermore?

Ambassador BROOKS. It's not a substitute, sir. It's something different. The notion——

The CHAIRMAN. Do you need both?

Ambassador BROOKS. What is now being proposed is that the Office of Homeland Security would have a Federal facility, Federal employees to do the oversight and management. That facility will, keeping in mind that many of these decisions are not yet made, probably be located at Livermore. But it's important that the department be able to reach into all of the laboratories, and so there would be a mechanism created at each of the laboratories to make sure that all of the capability is made available to the new department.

The CHAIRMAN. Thank you very much.

Ambassador BROOKS. A couple of concluding points, if I may, Mr. Chairman. It seems to me that it is going to be critically important for the new department and for the congressional committees that oversee it to join with us in maintaining the technology base at the national laboratories. The reason we could provide some capabilities quickly after September 11 is that the laboratories and the department had invested, over the years, in the technology base. And

it will be very important that both departments continue to regard that technology as important.

Second, and particularly with regard to proliferation protection programs, no matter how we do the split, there will be things in each department's area of responsibility that also benefit the other department. And, therefore, it is going to be particularly important that the Department of Energy and the Department of Homeland Security work together closely. We are starting that effort by trying to work very closely in the development of the president's proposal with the Office of Homeland Security, and we are completely committed to that partnership.

Finally, I want to conclude where I began. The Secretary and I fully support the establishment of a new the Department of Homeland Security. We're fully comfortable with the transfer of the programs that have been proposed by the President. And we think that this will help us meet our fundamental obligation to ensure that all Americans are safe.

And, with that, sir, I look forward to your questions after you've heard from Dr. Orbach.

[The prepared statement of Ambassador Brooks follows:]

PREPARED STATEMENT OF LINTON F. BROOKS, ACTING ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

INTRODUCTION

Thank you, Mr. Chairman for having me here today. This is an exciting time: the United States is on the verge of establishing a new Government Agency that will have sweeping responsibilities. It will enable us to more effectively respond to today's threats, through a streamlined and dynamic institution that will greatly enhance our ability to respond quickly, decisively, and where necessary, before threats against our homeland materialize. In short, we are on the verge of making history. It's critical that we get it right.

The Department of Energy and the National Nuclear Security Administration are fully committed to the homeland security mission, and the successful establishment of the Department of Homeland Security. We recognize that this will require some restructuring and relocation of critical assets now under the stewardship of the NNSA. We are prepared to support these shifts in responsibilities, and indeed, to do what is necessary to make any transfer of responsibilities as smooth and painless as possible.

There is an enormous amount of experience and expertise now residing in DOE/NNSA that will be vital to the success of the new Department. Our Technology Research and Engineering assets have been applied to homeland security problems long before last September; since then, such contributions became even more focused and accelerated.

We've conducted the PROTECT subway demonstration, which will help provide chemical protection to the U.S. population. We deployed a prototype biodetection capability at the winter Olympics. We have greatly increased our work with the U.S. Customs and Coast Guard with radiation and nuclear technology—specific areas that will directly benefit the new Department. DOE/NNSA is committed to ensuring that its assets can continue to provide enabling science and technology to support homeland security and counter-terrorism mission needs.

There are a number of capabilities currently residing in the Department of Energy that will support or be transferred to the new Department. Today I want initially to focus on those relevant to Title III of the legislation, that is, those germane to technology research and development in support of the Homeland Security mission.

We currently support the FBI in its role as "lead agency" in responding to an emergency within the United States, including a potential nuclear emergency. We expect that these emergency response functions will play a major role in supporting the Homeland Security mission, as stipulated in Title V of the bill. I want to discuss these functions as well.

Before turning to those topics, let me briefly mention a few things that the Homeland Security Act does not do. It will not affect our ability to conduct our principle missions of stockpile stewardship, nuclear nonproliferation, naval reactors, and, just coming to NNSA, emergency response. NNSA will retain all of its programs and responsibilities that contribute to our ability to assure the safety, security, and reliability of the nation's nuclear weapons stockpile.

With respect to nuclear nonproliferation, the Administration proposes to transfer the core of our chemical-biological WMD work and certain nuclear programs related to the domestic threat. This is largely self-contained work and almost exclusively supports domestic preparedness programs.

NNSA has unique assets and capabilities, developed primarily from our work with nuclear weapons and with nonproliferation, that have been applied to homeland security problems long before last September.

Some of these initiatives have long timelines. Long before 9/11, DOE has led USG efforts to support "first responders" with our chemical, biological, and nuclear research programs. We've worked closely with the FBI and other agencies to ensure that cutting edge detection and identification technologies are available to those that would need them first. And we began this work long before there was a recognized need to do so—we took the initiative because we anticipated the requirement. It is as good an example as any of why long-range research is so critical to the security of this country.

We have aggressively pursued these efforts since last 9/11. But it's time for a more focused organization and we are committed to that change and to continuing to provide enabling science and technology in support of homeland security and counter-terrorism mission needs.

TITLE III ISSUES

The NNSA Nonproliferation and Verification Research and Development Program conducts applied research, development, testing, and evaluation of technologies that lead to prototype demonstrations and resultant detection systems. As such, the program strengthens the U.S. response to current and projected threats to national security worldwide posed by the proliferation of nuclear, chemical, and biological weapons and the diversion of special nuclear material. The R&D program provides operational organizations with innovative systems and technologies to satisfy their nonproliferation and counter-terrorism mission responsibilities. The program's four main elements are:

- Nuclear explosion monitoring, which will remain within the Department of Energy;
- Chemical and Biological National Security, which will be transferred in its entirety to the Department of Homeland Security;
- Proliferation Detection; and
- Supporting Activities.

Within the proliferation detection program is an element on nuclear smuggling that will be transferred to the Department of Homeland Security. Proliferation detection has aspects that support both nonproliferation and homeland security. Those elements that can be disaggregated and identified as supporting homeland security will be transferred to the new Department. Where the activity supports both the homeland security and non-proliferation functions, we will examine such arrangements as joint programs. The Administration's proposed legislation gives the President the necessary flexibility to provide for joint operation.

Let me describe those functions that will be transferred, after which I will return to the subject of long-term coordination.

Major Activities Identified for Transfer

Within, the Nonproliferation and Verification Research and Development Program, the Chemical and Biological National Security Program and the nuclear smuggling detection activity fall squarely into the Homeland Security mission and thus have been designated for transfer in their entirety.

The Chemical and Biological National Security Program develops and applies detection technologies entirely for domestic homeland mission requirements, such as a prototype biological detection system used at the Salt Lake City Olympics and a prototype chemical detection system currently being installed in Washington D.C.'s metro system. The nuclear smuggling detection directly supports U.S. homeland nuclear detection requirements, such as a nuclear detection system designed for regional deployment, for example around a major city. I wish to describe each program briefly, and then also discuss our nuclear assessments program, which is also to be transferred.

Chemical and Biological National Security Program

The Chemical and Biological National Security Program works to develop technologies and systems to improve the U.S. capability to prepare for and respond to domestic chemical and biological threats against civilian populations, complementing DOD's focus on the battlefield and military installations. As part of its primary nuclear science and technology mission, NNSA and the National Laboratories have developed extensive capabilities in chemistry, biology, and materials and engineering sciences that form the basis for the NNSA chemical and biological national security program. We have conducted research on the biological foundations necessary to establish signatures of biological threat agents and develop assays certified by the Centers for Disease Control for those agents, which are applied to develop detectors.

NNSA has conducted demonstration projects of prototype detector capabilities in partnership with other agencies to support their operational missions, such as the systems I just mentioned that have been developed and applied for the Olympics and the Washington Metro, to illustrate possible system approaches for population protection. We are now working to expand the number of signatures and assays of biological agents that we can detect with increased sensitivity, and to improve public health response through the CDC. The next generation of bio-detectors will detect a much wider range of agents, which will enable public health agencies to more rapidly treat affected people.

Homeland Security Nuclear Smuggling Activities

The nuclear smuggling component of our proliferation detection program also squarely fits within homeland security and will be transferred. NNSA and the National Laboratories have unique insight into nuclear proliferation activities—the facilities and infrastructure, as well as the observable signatures of nuclear weapon development activity. We also have the capability to develop technical solutions for the U.S. government to detect and characterize such proliferation activities in their early stages. NNSA has worked closely with homeland security agencies, including U.S. Customs, U.S. Coast Guard, and the Departments of Transportation and Justice to apply this technical base to detection of nuclear weapons and materials at U.S. borders. We have previously conducted demonstrations with these agencies of radiation detection methods at an international border station, a port, a rail yard, and airport personnel and baggage handling facilities. With many of these agencies becoming part of the new Department, it is a good fit for the R&D applications to counter nuclear smuggling to be transferred to the Department of Homeland Security.

Nuclear Threat Assessment and Trafficking in Nuclear Materials

The Department of Energy's Nuclear Assessment Program provides a national capability to assess accurately and swiftly the credibility of communicated threats of nuclear terrorism. The Lawrence Livermore National Laboratory (LLNL) leads this unique effort. Since September 1978, the Nuclear Assessment Program has been used to assess the credibility of over 60 nuclear extortion threats, 25 nuclear reactor threats, 20 non nuclear extortion threats and approximately 650 cases involving the reported or attempted illicit sale of nuclear materials.

When activated, DOE-based threat credibility assessment teams perform comprehensive technical, operational and behavioral assessments of communicated nuclear threats at the start of an actual or perceived emergency. Since communicated nuclear threats are a serious violation of federal law, the FBI is the lead federal agency. Since the Program's inception in 1977, the Nuclear Assessment Program has developed close and working relationships with its counter-terrorism counterparts in Customs, State, FBI, DIA, CIA, and others in the nonproliferation community. The Program also provides expert technical support to law enforcement and others for Special Event Preparedness, on-scene technical support, and national and international training.

Since 9/11 the Nuclear Assessment Program has performed approximately 70 assessments involving communicated nuclear threats, reports of illicit trafficking of nuclear materials, and special analysis reports for law enforcement and intelligence components. This national asset provided immeasurable support to all government agencies tasked with separating critical from non-critical information in the aftermath of 9/11.

TITLE V ISSUES

I want to now turn to emergency response, and Title V of the proposed bill.

The Department is prepared to respond immediately, anywhere in the world, to discrete and specific nuclear-radiological incidences and emergencies. People and equipment are trained, and they are ready to respond right now.

There are seven basic teams that make up this nuclear-radiological incident response capability, which includes nuclear emergency support activities. These include aerial measurement teams, accident response groups, and a radiological assistance program that works closely with state and local agencies. Through these tailored and responsive teams, NNSA marshals highly trained and unique scientific and technical expertise, drawing across the NNSA resources and the Department as a whole.

There are more than 900 individuals on call to respond in the event of a nuclear-radiological incident or emergency. Only a handful of these about 70 are full time. It is the ability to call upon a broad range of professionals from across the weapons complex that brings this program its depth and ability to respond to a wide range of crises or emergencies.

Comparisons to volunteer fire departments or National Guard units have been made; these teams are staffed with nuclear professionals who take this work on as additional duty. Day-to-day, they are the individuals who ensure the safety, the security, and the reliability of our nuclear weapons stockpile. It is this everyday work that qualifies them for serving in an emergency.

To support the new Department, we envisage that these teams would, when requested, be activated and deployed to help manage a crisis; in other words, current practices would prevail. The team members would continue to work in their current jobs in the Department of Energy and the NNSA. In response to a WMD incident, our teams would deploy under the authority of the Department of Homeland Security. We do not anticipate that the DOE-NNSA capabilities or response to a nuclear-radiological accident or incident would be compromised in any way by this transfer of operational control for specific domestic responses.

OBSERVATIONS

With the transfer of Title III programmatic responsibilities to the Department of Homeland Security, it will be critically important that the new Department maintain the technical base at the National Laboratories, so that the capability and the scientific atmosphere to pursue high risk, long-term research be encouraged in spite of the need to focus on short-term requirements for homeland security. It is the ability to pursue such research that makes our national laboratories a national treasure—and a unique asset with unmatched capabilities. Only through such investment will the scientific and technical capability exist to meet the needs for innovative solutions to future homeland security problems.

With respect to the remainder of the proliferation detection program, no matter how the responsibilities are finally apportioned, the research will be of value to both departments. For that reason, it is critical that we work together closely. By so doing, our nonproliferation and homeland security efforts will continue to benefit from the unparalleled capabilities of the National Laboratories.

I support fully the concept of locating the new Department's main research facility at Lawrence Livermore, with satellite centers of excellence located at other national laboratories. It will create a campus-like environment where scientists will be dedicated, full-time, to thinking about homeland security, and it will allow for direct interaction with the expertise that resides at the other DOE labs as well as other labs throughout the federal government. It's good for DOE and it's good for the Department of Homeland Security.

Just as DOE and NNSA fully support the transfer of programs as stipulated in Section 302 of the bill, we also believe that Title V of the bill is the right way to incorporate the NNSA nuclear emergency response assets into the operations of the new department.

CONCLUSION

I want to reiterate in no uncertain terms: The National Nuclear Security Administration supports fully the transfer of the programs noted in Section 302(2) of the bill under discussion. The details of what would be included in the legislative package were worked out directly with my office. These programs are a natural fit for the Department of Homeland Security, whose primary mission is the critical task of protecting the United States from catastrophic terrorism. DOE/NNSA will also work to ensure that its assets can continue to contribute enabling science and technology in support of DHS mission needs.

Obviously, that is a goal that I am pleased to support wholeheartedly. I believe that the bill as being discussed goes a long way toward its realization.

Thank you, and I look forward to any questions you may have.

The CHAIRMAN. Dr. Orbach, why don't you go right ahead, and then we'll have some questions.

STATEMENT OF DR. RAYMOND ORBACH, DIRECTOR, OFFICE OF SCIENCE, DEPARTMENT OF ENERGY

Dr. ORBACH. Thank you, Mr. Chairman.

I, too, would like to submit my testimony for the record, if I may, and then give a few comments.

The CHAIRMAN. Very good.

Dr. ORBACH. Thank you.

First of all, it's a pleasure to be here again and to discuss title III of the Homeland Security Act as it applies to the Office of Science in the Department of Energy. We believe that the President's plan makes good sense.

Each of you has brought up some important issues associated with the strength of the laboratories and, if I may, the strength of our research program in the United States, because, in my ten laboratories, about half of the research that is carried out that is funded by the laboratories—or, I should say, by my office—goes to universities, the other half to the laboratories.

And what we have done in order to meet some of the issues you raise—namely not leaving the Department of Homeland Security isolated, but rather coupling it to the entire research base of the Nation—is to appoint a point of contact within each of the ten laboratories that are a part of the Office of Science. Those laboratories have a single point of contact. And as we go around the country with our site visits, we are inviting the vice provost or vice presidents for research from all of the universities in the geographic area associated with the laboratory to attend and become part of a national program to assist the new Department of Homeland Security. So we are using the laboratories as a means of outreach to the research community, both in the private and in the public sector. We hope this will, as I say in my testimony, enrich and nourish the research and development programs which are so essential to the new department.

We have also transferred programs from the Office of Science; in particular, in the area of genomics dealing with both pathogens which are lethal and those which are related to them for the purpose of identification of dangerous pathogens, but also to avoid false positives. What we have done is to put together a package that will give a core competency to the Department of Homeland Security in the biological-threat area. It is certainly not sufficient to cover every area and all aspects of biological security. And, indeed, as all of you have pointed out, it's important to use a national research base. But it is also essential for the department to have a competency and its own laboratories to be able to experiment, to be able to match the information that it will receive, and also to inform the research community of the opportunities that are present for contribution to homeland security.

One of my experiences, as I've gone around the country, is one of great patriotism. This entire Nation is committed to the fight against terrorism, and scientists want to contribute to that fight. The creation of this department will give them a targeted vehicle for input, in terms of their own ideas and also information from the

department that they can use for their own information and direction.

Now, the area of dual-use came up with both Senators Cantwell and Senator Feinstein, and this is a tricky issue, because we are dealing with the health and strength of the laboratories as well as the needs for homeland security. And this is one where we believe the Department of Homeland Security has to have its own core—as I called it, a core competency—but it must rely, ultimately, on the laboratories, their strengths, and the university communities.

So in the case, for example, of the 900 megahertz spectrometer at PNNL, that is a device which will be used for both, and, for structural determinations of pathogens, for example, would be available to the Department of Homeland Security. And its very existence, which is based on the entire spread of science that it will accomplish, will be available for homeland-security purposes.

In the programs we have transferred in the biological areas, it is clearly not all of the biological programs, because, within the Department of Energy, we have a mission, as well, using biological approaches. Nevertheless, the relationship between our laboratory programs and the core competency of the Department of Homeland Security ensures that there will be exchange of ideas. There will not be an isolation which would lead to a decay of that competency within the department.

Finally, let me say that I believe we have a important mission. I believe that the creation of the Department of Homeland Security gives us a way to bring science and technology directly into the national arsenal to deal with the threat of terrorism. And, as Ambassador Brooks said, our Office of Science is fully committed to working with the new department and making available to it all the resources that we can provide to assist it in its pursuits.

Mr. Chairman, that concludes my remarks, and I, too, would be pleased to answer any further questions.

[The prepared statement of Dr. Orbach follows:]

PREPARED STATEMENT OF DR. RAYMOND ORBACH, DIRECTOR, OFFICE OF SCIENCE, DEPARTMENT OF ENERGY

Thank you, Mr. Chairman. On behalf of Secretary Abraham it is a pleasure to be here today with Ambassador Linton Brooks to discuss Title lll of the Homeland Security Act as it applies to the Office of Science and the Department of Energy.

The President's proposal to organize the Department of Homeland Security will significantly improve the way the Government responds to threats against the United States. The President's plan simply makes good sense. We at the Department of Energy are proud of our role in the fight against terrorism and we look forward to working with Congress and the Administration to make a smooth transition to a new department.

As the President has said, there are dozens of international terrorist organizations capable of doing harm to the United States. But if we wait for threats to full materialize, we have waited too long. It is clearly in the interest of all Americans to create a new Department of Homeland Security.

The federal agencies with the best access to the nation's sources of scientific, engineering and medical research lie outside the proposed department, and close cooperation will be needed to allow the new department to produce the best to counter terrorism.

The Office of Science and Technology Policy (OSTP) within the Executive Office of the President (EOP) has a critical role with the capability to interact with the science and technology community in support of the Department of Homeland Security.

The present OSTP director has given homeland security a top priority and he has asked the President's Council of Advisors on Science and Technology to give these issues priority as well.

The Office of Science is responsible for some of this nation's most critical and most farsighted scientific research. Our capabilities and assets are currently being applied toward a host of homeland security and counter-terrorism challenges. Several DOE Science-related activities will be transferred to the Department of Homeland Security, including:

DNA SEQUENCING—High throughput DNA sequencing is used to determine the sequences of pathogenic microbes that can be used by bio-terrorists and related microbes. Each pathogen has many close genetic relatives that do not cause disease but that need to be characterized so that more accurate detection methodologies can be developed that avoid unnecessary and alarming false positives.

TECHNOLOGY DEVELOPMENT—We are now using computational tools to compare the gene sequence from an organism to the database of existing gene sequence. This research can be redirected to aid in anti-terrorism research and development.

COMPUTATIONAL TOOLS AND DATABASES—Faster, more robust computational tools are being developed for searching the rapidly expanding databases of microbial (and other) DNA sequence data. In addition, dedicated, secure databases may be needed in some cases to prevent sensitive information on potential biothreat agents or on methods for their detection from falling into the hands of terrorists.

ADVANCED SCIENTIFIC COMPUTING AT LAWRENCE LIVERMORE—The Advanced Scientific Computing Research program supports researchers at LLNL in applied mathematics and computer science to achieve optimal efficiencies from large scale computing systems.

The transfer of these activities to the Department of Homeland Security makes sense because it will provide the new Department with a critical core competence is several area of science that will be necessary for DHS to set the research direction for the Department.

It will allow for the Department of Homeland Security to reach out broadly, to the unclassified, fundamental research community that exists at other laboratories, at our nation's universities and in industry to tap the intellect and patriotism of the entire U.S. research community.

I believe this is vitally important—no single agency or research group will provide all the answers we will need to fight terrorism and protect our country. Instead, we need a strong research arm within the new agency that can work with the full spectrum of research being performed in this country to get the best from the best, and in doing this maintain the vitality of science to counter terrorism.

Time and again, we have learned that science conducted in a vacuum suffers, while science subjected to the pollination, and pruning, from a larger community thrives. Further, we have identified a point of contact within each Office of Science laboratory to act as the vehicle for transmitting anti-terrorist research and development needs of DHS to the laboratory, and opportunities within the laboratory to DHS.

To maximize involvement in research technologies a broad dialogue on a variety of topics is needed. An effective approach is to attract the private sector in a dual-use strategy in which security uses and commercial applications rest on a common base of investment.

In addition to providing for creative research, universities also play vital role between federal programs and the needs of state and city governments.

Again, it's a pleasure to be here with you today and I look forward to answering any of the questions you or other Members of the Committee may have.

The CHAIRMAN. Well, thank you very much. Let me start with a few questions.

One concern which I have is that I don't really understand what is meant by this phrase, "proposed transfer." Ambassador Brooks, you've indicated you propose—or "the administration proposes to transfer." Does that mean that the individuals who are working in one wing or one hallway of a particular laboratory somewhere in the country will be physically moved, or does it mean that they just will told they no longer report to the people they used to report to, or what will we be doing with them when once they've been transferred?

Ambassador BROOKS. Mr. Chairman, the individuals working on specific projects, the scientists, quite possibly won't know that they've been transferred. The laboratories function as intellectual and technological scientific research establishments, and people work on particular projects that are assigned them by—or that are assigned to the laboratories by the Department of Energy.

What will happen is that the responsibility and the budget associated with those projects and the relatively small—in the case of chem-bio, less than ten—Federal employees or Federal positions who supervise them will be moved to the new department. But the strength of the national laboratories and of the President's proposal is that the laboratories are a synergistic organization, and we don't propose to build any walls within the laboratories or to paint some of the laboratory employees green and some of them blue. So the laboratory directors will retain the flexibility to assign people to projects as they need.

So what will be happening is the scientists will still be doing the same work, but that work will be for a different Cabinet department and ultimately, as we go on, someone other than me will be setting relative priorities for them.

The CHAIRMAN. Well, given that understanding, then, my impression, as I visited our laboratories, particularly in New Mexico, but also Livermore over many years now, is that they do a great deal of what they call "work for others," where they don't—they're not working for the Department of Energy; they're working for the Navy or they're working for the CIA or they're working for some other Federal agency. And that generally works pretty well. They do the work that the—presumably the laboratory administration contracts to do a certain project or certain research, technology development for one of these other agencies, and that is work for others, and they do it, and everything works fine. Isn't that what you're just describing?

Ambassador BROOKS. Almost, but there are a couple of differences. One is philosophical. The laboratories now see their role—well, let me speak of the NNSA weapons laboratories—as being responsive to the National Nuclear Security Administration. And "work for others" is as available. It's a second priority.

The notion that we have is that the Secretary of Homeland Security and the Secretary of Energy would both be tasking the laboratories. The laboratories have two primary customers. That has both a philosophical aspect—that is, we want to emphasize that this new mission is important—and it also has an administrative aspect that some find the current procedures for "work for others" to be somewhat cumbersome, and the intent is not to adopt those procedures, but to have the work that is done by the—under the auspices of the Department of Homeland Security managed and tasked in a comparable way that the work that's done under the Department of Energy. But, once again, if you're the engineer or the scientists, it's not clear to me that you would see huge differences.

Dr. ORBACH. If I could add to the comments of Ambassador Brooks.

The CHAIRMAN. Dr. Orbach.

Dr. ORBACH. There is also the speed of response. This new department has a tremendous responsibility, and it has to act, and

act quickly. It's not a time to go looking for those who may be available to assist it. So having some core competencies, some strengths of its own in research and development to be able to respond quickly is essential, I believe, for the function of that—the new department. So these programs that we have transferred—and sometimes it's money, most—sometimes it's people; it'll be a combination, as Ambassador Brooks has said—are, in fact, committed to the department and its responsible—or its responsibilities. I think this is the reason why there has to be some element of rapid response associated with the transfer of technologies.

The CHAIRMAN. Well, it still strikes me, frankly, as potentially very confusing. If I'm an engineer, and I've just been transferred to a new department, and the director of the laboratory, who's still working for the Department of Energy, calls me up and says, "Hey, I've got something I want you to do." Is my response supposed to be, "Fine, I'll do whatever you say," which is presumably my response today, or is the new response supposed to be, "Wait a minute. I'm not working for you anymore. I'm working for the new Secretary of Homeland Security, and if you want me to do anything for you, you'd better talk to him or her"?

Ambassador BROOKS. Yes, sir. I didn't make myself clear. There is nothing in the President's proposal that alters the fundamental structure of the laboratories, which are unique entities, but they are private corporations, the weapons laboratories, the people will work for Paul Robinson or John Brown or Mike Anastasio, just like they do now. What is altered is the source of funding and direction to the laboratories. So you shouldn't think of it in terms of individual scientists being transferred to another department. You should think of it as the laboratory, as a whole, having a responsibility to another department that is equal in importance with the responsibility that it has to my department.

The CHAIRMAN. But that is not the—that's not what they're doing now when they do work for others. I mean, they—presumably when they agree to do a project for the Navy or they're requested to something for the CIA or whoever, or the Customs Department, they presumably——

Ambassador BROOKS. That's correct, sir.

The CHAIRMAN [continuing]. Have responsibilities to them and—you know, commit the resources and do that work. But you're saying this is a different situation?

Ambassador BROOKS. I am saying this is different in two respects. One is the philosophic one that that's at least conceptually an "as available." And we are looking to have equal priority for homeland security. And the second is the administrative one that the procedures for getting "work for others" started are believed, by some, to be more cumbersome than is appropriate to the new Department of Homeland Security.

The CHAIRMAN. But they'll still get their paycheck, even this group—the paycheck still comes from that laboratory.

Ambassador BROOKS. Yes, sir, it will.

The CHAIRMAN. It does not come from new department.

Ambassador BROOKS. Yes, sir, that's correct.

The CHAIRMAN. I've used all my time here. Let me defer to Senator Domenici.

Senator DOMENICI. There's a vote up, Mr. Chairman.

The CHAIRMAN. That's correct, we've started a vote. Do you want to go with your questions, and then we'll break?

Senator DOMENICI. [Inaudible.]

The CHAIRMAN. Okay, why don't you ask your questions, and then we'll go vote, and members may want to vote early, whatever.

Senator DOMENICI. Well, Mr. Chairman and fellow Senators and witnesses, not only the two that are there, but those who are waiting, there aren't a lot of us in this room that remember the last major reorganization. We had a minor one, but the major one created the Department of Energy. It had a predecessor named ERDA. I'm old enough to have been here for both of them.

The truth of the matter is, from any standpoint whatsoever, what we reorganized turned out worse than what we organized. And there is no doubt about it. You can go ask anybody that knows. If what I'm seeing around here has any carryover, that will hold true this time, too.

I recall, when you'd go to a room, there would be a few members of Congress, but this room wouldn't hold the staff that wanted to go to every meeting. Well, when you see a note that says, "Staff invited for meeting on new department," peak in. You need to open the air vents. It'll be jammed full. The last one I sent somebody to count, there were 120, Mr. Chairman, staff from probably every committee around. They're wonderful, they're bright. Hopefully we can get it all organized where we can get something out of it.

But let me say, if we make it too complicated, we're going to be inviting tentacles that are going to be all over the place, and you're going to get one senator with all his admiration for this President. I'm going to be trying to find out how we make it not work or how we don't do it, unless we can make it rather simple.

Second point, you know, I have been appropriating the money for now on 6 years as the principal appropriator for all these laboratories, including Lawrence Livermore. And, for the life of me I cannot see why Lawrence Livermore is offered the lead in any respect over the two labs that are its brother labs. None. They had to get this NIF program, which we had to pay for, or they would have fallen off the ladder and been second rate in total when we put that program in—$4 billion NIF.

So for those who are wandering around, they ought to get their marbles straight with reference to this. They did less of the work for the nuclear weapons; thus, more biological research, and somebody looks at it and says, "Woo, biology research, that's what we need for the war—for this new war." So somebody says they're going to lead something. And they're going to lead something just like the other laboratories, it would appear to me. And they may have some particular area where they'll have a lead. And we ought to forget about arguing over that, and we ought to decide how we're going to manage this thing and who is in charge of what.

From what I can tell—from what I can tell, it can be done. And, from what I can tell, everything that I've looked at that you all have put down, there's some interpreting and some working together, I think it will work. It's not going to be easy, because you can have a mixture of the kinds of departments. You're going to have nuclear weapons makers, designers, developers—although

they don't do that now, in terms of building new ones—but we have those mixed in this time not only with all the rest of the research, but now we have it in with the homeland—the homeland terrorism—the anti-terrorism work. So it's not going to be so easy, in my opinion, to do it.

I would hope that we could streamline a suggestion from the laboratories through the Secretary, through you for your share, and just give us what you would recommend as a streamlined way of—coming out of this Department of Energy, what are we going to come out with after we do this, and what's going to be—that's going into the new homeland management episode, whatever it is?

I don't want to prejudice anyone in my discussions, but, frankly, I think I know a little bit about this, not that I will get my way; I don't intend to. But you work awful hard on a laboratory like Sandia National Laboratory, which manages tremendous programs, has no nuclear weapons there, and it seems—talking about the other two laboratories, versus it—and they come along and say Lawrence Livermore is going to "manage" this episode or be the home office or something. Now, that's been mellowed down, and I guess it's not really that anymore. Let's hope it borders on equality when we're finished, and not this other business.

So I didn't have any questions. I'm sorry you——

Ambassador BROOKS. But may I just make one—there's nobody in the Department of Energy who thinks we're going to put one lab in a position of primacy over another lab, and I don't think that's where the homeland security folks are going now. There was some early confusion.

Senator DOMENICI. I thank you very much.

The CHAIRMAN. We'll take about a 15-minute recess and then come back. Thank you very much.

[Recess.]

The CHAIRMAN. The gentleman from Hawaii is recognized.

Senator AKAKA. Yes, I do have some questions for Ambassador Brooks.

Does the NNSA currently have the personnel needed to properly manage the various research programs in NNSA?

Ambassador BROOKS. Yes, sir.

Senator AKAKA. Will the creation of a new set of programs through the Department of Homeland Security potentially drain away managers currently dedicated to run NNSA's research programs?

Ambassador BROOKS. I don't think it will drain away. I do think that those managers who supervise programs to be transferred will be logical candidates to be transferred. For example, the people who supervise the chemical and biological work, I would think it would make the greatest sense if they were to continue to supervise that work in the new department. But that's a decision that has not been made. But I don't expect to lose talent that I can't—by this—the standing up of this new department.

Senator AKAKA. Dr. Orbach, the President proposes to move the Advanced Scientific Computing Research Program in the Office of Science to the new department. Does this office work with other agencies and non-Federal agencies? If so, will these relationships

be maintained over the next 5 or 10 years, or will the facility become more and more focused on homeland security research?

Dr. ORBACH. The actual transfer in the Advanced Scientific Computing Research Program is the component that was invested at Lawrence Livermore National Laboratory. I amounts to about $3 million, whereas, the full program is of the order of $200 million. This particular component is one that we think will give the new department the core competency in advanced scientific computation, which it will need. It will mean that some of the programs that we were supporting at Livermore will be transferred to the new department, in terms of their capacity—computational capacity—but it will not affect the vast majority of the program, which, as you say, is focused in other areas.

Senator AKAKA. Ambassador Brooks, the Nuclear Assessment Program provides technical assistance and training support to help our international partners improve tracking of nuclear threats. Should a domestic security department train and assist foreign law enforcement officials?

Ambassador BROOKS. Probably it should not, but the part that we propose to transfer is not involved in working with foreign officials. The part that we propose to transfer assesses the credibility of extortion and other nuclear threats, and it works with domestic law enforcement officials, domestic—or with intelligence agencies and then with the national laboratories. So it won't affect my continued ability to improve border security in the former Soviet Union.

Senator AKAKA. Dr. Orbach, I have met with scientists and inventors from Hawaii who are confused about who they should approach within the Government with their ideas for homeland security. In their testimony, many of the lab directors state what their facilities are doing to build partnerships with local industry and academia. My question is, how does the office reach out to the private sector, especially smaller businesses, on developing new tools and techniques?

Dr. ORBACH. Well, the proposed structure that I have been discussing is actually set up for that. And, indeed, when I visited Lawrence Berkeley National Laboratory for the first site visit, where we had already a single point of contact, the vice president for research at the University of Hawaii came and was represented there. And we gave him the responsibility to provide the input from the private sector and from the university in Hawaii into the laboratories for—then transformed or transmitted to the new department. So this is our form of outreach to accomplish precisely that.

And I must say that the enthusiasm that we found was quite significant. I think that will work.

Senator AKAKA. Well, thank you for that. I was looking for that point of contact, and I'm glad you mentioned him.

Ambassador Brooks, I'd like to ask you a question about the intelligence program. In his written testimony, the Director of Lawrence Livermore states that the intelligence program needs to maintain its access to raw intelligence and its ability to use nuclear weapons design tools. The question is, will the intelligence program lose these abilities if removed from DOE and, therefore, no longer designated as a "field intelligence element"?

Ambassador BROOKS. I don't expect that it will lose its designation as a field intelligence element. My interpretation of the President's proposed legislation is to transfer the funding that we are now applying from our Department to the intelligence efforts at Livermore so that the new director will have dedicated funding and unambiguous access to that intelligence capability. I expect that, as I look at future budgets, I will find that I'll move money around so I, too, continue to fund that capability. And if this suggests that the intelligence function at Livermore may grow, that's quite possible.

What's crucial, as the Director's testimony makes it clear, is that this asset and comparable assets at other labs have to have access both to the technology and science of the labs and the knowledge of the intelligence community. By doing that, they can produce unique analyses, which are valuable to me in nonproliferation and in other areas, and are valuable to the Director—or the Secretary of Homeland Security.

So I don't expect that I will be—that the field-intelligence element status will be lost, and I don't expect to lose my access. I do expect to lose a certain amount of money in order that the—remember, this whole thing is going to be totally budget-neutral—that the new Secretary has comparable access.

Senator AKAKA. Ambassador Brooks, the Federal Government has a Federal Response Plan to designate lead and support agencies during emergencies and provide an all-hazards approach to disaster preparedness and response. The President has stated that he supports an all-hazards approach, yet the President proposes to legislate a special relationship between the Department of Homeland Security and the Nuclear Incident Response Team, which conflicts with the all-hazards approach. The question is, in order to maintain an all-hazard approach, shouldn't the relationship between the proposed department and the Nuclear Incident Response Team be developed in the Federal Response Plan?

Ambassador BROOKS. Senator, with regard to the specific question of what should be in or out of the Federal Response Plan, I'd like to take that for the record.

With regard to the broader, I don't know whether it's broader or just separate question of our capability for response, we think that the legislation will not hamper, and, indeed, in many ways, will improve our ability to respond. Our forces will continue to be organized, trained, equipped, and manned from within the Department of Energy, but they'll now be responding to the same person who is responsible for all other aspects of response to accidents and incidents in terrorism. So it seems to us that this is a sensible solution.

The training responsibility needs to stay with us, because most of these people are part-time, and they gain their expertise from what they do in their full-time jobs. So I'm quite comfortable.

With regard to the specific question of the Federal Response Plan, I'll have to give you an answer for the record. I'm not knowledgeable.

[The information follows:]

As we understand it, the "special relationship" referred to in the Senator's question refers to the proposal that the Department of Energy's Nuclear Incident Response Teams will be transferred to the operational control of the Department of

Homeland Security (DHS) when deployed in support of the Homeland Security mission. We do not see this as being in conflict with an all-hazard approach, but as an operational necessity based on the unique nature of our response infrastructure. The fact that our response assets are predominantly composed of part time volunteers precludes transferring those personnel to DHS as full time employees.

Under the current Terrorism Incident Annex of the Federal Response Plan (FRP), DOE assets respond in a supporting role to the FBI as the Lead Agency for Crisis Response (CR) and to FEMA as the Lead Agency for Consequence Management (CM). These agencies have the overall lead for management and coordination of the Federal response. Although the specific operational role of DHS has not yet been promulgated, we envision that they will assume the role as the lead agency for both CR and CM (particularly with the absorption of FEMA) and DOE will still be in a supporting role to the designated lead agency. DOE feels that it would be imperative for the roles of all supporting agencies be fully addressed in the new Federal all-hazards response plan.

Senator AKAKA. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

Senator Craig.

Senator CRAIG. Mr. Chairman, thank you. And, gentlemen, I apologize for being late to this hearing. It's an important one. And, Mr. Chairman, I'm pleased you're holding it. And we're examining roles to be played and opportunities to be effectively utilized within DOE.

I think, Director Orbach, this question would be appropriately addressed to you. The United States has, obviously, a large energy infrastructure that is generally not well protected through physical security, such as refineries and petrochemical facilities, oil and natural gas pipelines, and our electrical transmission lines. What role will the Department of Homeland Security play in assuring the physical protection of our energy infrastructure, as you see it?

Dr. ORBACH. I don't know all of the technical details of how we will carry out that mission, but it will have the responsibility of defining the problem and the approach to the solution. I believe the next panel may have more information, in terms of the details.

Senator CRAIG. Yeah.

Dr. ORBACH. For example, in terms of the electrical grid, it is, right now, very vulnerable, as you point out, and there are ways of making it smart and handling distribution in a reactive way that would be self sustaining. And these would be responsibilities of the new department. The Department of Energy will assist, in that regard, very closely.

Senator CRAIG. Well, Dr. Shipp is with us today, who is director of our lab in Idaho, the Idaho National Engineering and Environmental Lab, and I'll be making a pitch later on to the administration as it relates to the role I think we can play in critical infrastructure testing. We have some unique capabilities at that lab that provide us with an opportunity. But, in that context, let me ask this next question, then.

Part of our problem, I sense, in visiting with utilities, are the free flow of information between the private sector and the Government sector is going to be critical in the protection of this energy infrastructure. But industry appears to be reluctant to provide sensitive information to government, because it may become subject to release under the Freedom of Information Act. And government has difficulty providing threat information to industry because much is classified.

Do you think that the Freedom of Information Act should be modified to assure the non-disclosure of critical and sensitive industrial information or industry information?

Dr. ORBACH. Senator, I would prefer to respond on the record on that. I don't have sufficient information to respond here.

[The information follows:]

I believe the current Freedom of Information Act provides for the protection of proprietary information that has been provided to the Federal government by the private sector. This protection has allowed our laboratories to successfully partner with the private sector to assist in resolving difficult and critical technical questions facing an industry sector or individual firm. In light of the many changes occurring as a result of the events on September 11, it might be beneficial to carry out a review of this law to determine whether some changes could provide our nation and ourselves better protection from these new and ever changing threats.

Senator CRAIG. I think it's an important question that deserves to be responded to, and if you would do that, I would appreciate it, because that's part of our problem in this interrelationship that we're attempting to develop in the context of homeland security. So do you think that security clearances should be granted to personnel in critical infrastructure industries so that the Government threat information could be provided to industry?

Dr. ORBACH. That, I can answer. We have asked the heads of each of our laboratories, even though they do not do classified work, in many cases, to have a clearance sufficient to be able to be briefed by counterintelligence if there is a threat against the laboratories. And I assume that in the private sector a very comparable situation would be present, and they would be allowed to apply and, if successful, receive clearance.

Senator CRAIG. Okay. Well, it is an issue that, Mr. Chairman, we're going to have to deal with. One of the uniquenesses I've discovered of recent, a colleague—a former colleague that we all know well, my former colleagues, now the governor of Idaho, Dirk Kempthorne, when he was capable of sitting at this dias, he had certain levels of clearance and access to information that today he is prohibited from having because he's not a U.S. Senator; he's a Governor. He hasn't changed. But the character of his role has changed; and, therefore, his clearance has changed; and, therefore, his flow of information has changed.

Now, I'm not quite sure we can have an effective seamless homeland security system if we don't understand that kind of difficulty and correct it, and it is a problem that will play against the private sector or the public sector as it relates to this, if you will, "seamless relationship," hopefully, that builds a better security system for this country.

Thank you. Gentlemen, thank you.

The CHAIRMAN. Thank you.

Senator Feinstein.

Senator FEINSTEIN. Thanks very much, Mr. Chairman.

I wanted to ask a question, if I might, on the issue of nuclear powerplants and their safety and what role you envision for the Energy Department in this regard, because now that Yucca Mountain is going to become the waste repository, as far as I know there is no real transportation plan that offers the protection that might prevent sabotage. As far as I know, we have no real way of really deterring a plane from crashing into a nuclear powerplant. And I'd

like to know if you—either of you have any thoughts in this direction of how your department is going to proceed in that regard.

Ambassador BROOKS. Senator, it's my understanding that the narrowly defined safety at nuclear powerplants is primarily under the jurisdiction of the Nuclear Regulatory Commission. With regard to transportation, now that the Yucca Mountain decision has been made, I'm not sure that all of those issues have been worked out. I know if they have, I don't know them, and I think I'd be safer providing you a more complete answer for the record.

Senator FEINSTEIN. But will that be part of the responsibility of this agency?

Ambassador BROOKS. That's an excellent question to which, I'm sorry, I can't answer.

Senator FEINSTEIN. All right.

Ambassador BROOKS. I'll get you an answer for the record.

Senator FEINSTEIN. Okay. I don't want to get into a disagreement with Senator Domenici. I heard, while I was out of the room, he made some disparaging comments about what I regard as a premier laboratory, and I've read your written comments with respect to them—with respect to it. Do your comments reflect the policy of the administration?

Ambassador BROOKS. The policy of the administration with regard to the three weapons laboratories is that they're all priceless national assets and it is——

Senator FEINSTEIN. Are you running for public office?

[Laughter.]

Ambassador BROOKS [continuing]. And it is quite possible that there are people dumb enough to try and sit here and rank them relatively, but I'm not one of them, Senator.

[Laughter.]

Senator FEINSTEIN. All right. Then I guess we'll just have to wait and see how this all turns out.

Ambassador BROOKS. No, but I do need to make an important point. It is important for the Department of Homeland Security to have access to all of the capabilities of all of the laboratories. That's one point. It's important that we not build walls within the laboratories. The strength of the laboratories, in part, lies from their ability to work synergistically across disciplines and to draw in different resources.

The reason that the President's proposal keeps the laboratories as discrete units under their present management is precisely so that we don't lose that synergy. So we see that all of the capabilities of—in my case, the weapons laboratories; in Dr. Orbach's case, the other laboratories—are going to need to be brought to bear, and we see this done the same way it's done for me, which is to say with the values of intellectual competition and the benefits of management cooperation. And I would assume that's the culture that we assume will be passed on to the relationship with homeland security.

Senator FEINSTEIN. Thank you very much. Just one other quick question, on my intel question with respect to how you're going to utilize the intelligence function there. I'm a member on the Intelligence Committee, as is Senator Kyl, and one of the things that we've been looking at is whether the community, as set up, is best

able to function in this new milieu of terrorism. And so I am curious how the present intelligence programs will be carried out, as well as how this would fit into homeland defense, what you would take and what you would leave for strategic nuclear defense intelligence for—related intelligence.

Ambassador BROOKS. I think part of the problem is that we're using the language of programs and entities to talk about what is really budgets, at least in this area. Here is our understanding, both of what's important and what's planned. What's important is that the intelligence units, the field-intelligence elements at the labs, continue to have access both to the intelligence community—hence, being field-intelligence elements—and to the rest of the labs in the technology community, because that's their source of leverage. It's the interaction between technology knowledge and intelligence knowledge.

My understanding—my interpretation of the transfer of the intelligence function at Livermore is that the funding that is now going from the Department of Energy to that function will be transferred to the Secretary of Homeland Security. And that will make it clear that the Secretary has the ability to get the same kind of support that I am getting.

I anticipate that, as future NNSA budgets are developed, future DOE budgets are developed, we will find it necessary to put some money against that function, as well. And so the net result will be that both of us will benefit from the resource represented—in the case of Livermore, by Z Division; in the case of the other labs, by comparable elements.

So I am not—if I thought I wasn't going to be able to draw on that capability, I'd be worried. I think I am going to be able to draw on that capability. So is the Secretary of Homeland Security. And I think that this, once again, is a specific example of my point about not building walls within the laboratories. We're not trying to fence off any part of the laboratory from either of the departments.

Senator FEINSTEIN. Thank you very much.

Thanks, Mr. Chairman.

The CHAIRMAN. Thank you very much.

We have six additional witnesses scheduled on panel two. Let me just ask Senator Carper, did you want to ask this panel questions, or would you be willing to wait for the next six witnesses?

Senator CARPER. I'm willing. I'm a willing member of this committee, Mr. Chairman.

The CHAIRMAN. Your cooperation is greatly appreciated.

Senator DOMENICI. Mr. Chairman?

The CHAIRMAN. Yes?

Senator DOMENICI. Very briefly, I would like to address what Senator Feinstein has expressed in her concern about transportation.

We sit on this committee—it really will be the responsibility of this committee to oversight that new licensure process, the Nuclear Regulatory Commission, as a component of that process, and licensing should be a highly integrated directed-transportation system. And that is our responsibility. It isn't in place now, and it shouldn't be until we determine licence.

Lastly, what the Admiral has just said about the department, the new department owning certain capabilities, certain assets, and having access to other assets and not building walls, I think is critically important because of the talent that is spread out across all of these laboratories. And not that the new department should take ownership of them, but have access to them, although a new department has to have ownership of something or it wouldn't exist. And I think that's the role that has to get played out here.

Senator FEINSTEIN. Thank you.

The CHAIRMAN. I thank both witnesses very much.

And let me call panel two to the witness stand, please. This panel will start with Dr. William Happer, who is the Eugene Higgins professor of physics and chair at the University Research Board at Princeton University, and a member of the National Research Council's Committee on Science and Technology for Counter-Terrorism. Following his testimony, we can just go across the line here—Dr. Anastasio, who is the newly appointed head of Lawrence Livermore National Laboratory; Ambassador Robinson, who is the longstanding Director of Sandia National Laboratory; Don Cobb, who is the Associate Director for Threat Reduction at Los Alamos National Laboratory; Dr. Bill Shipp, who is the director of the Idaho National Engineering and Environmental Laboratory; and Dr. Harvey Drucker, who is the associate laboratory director for Energy and Environmental Science and Technology at Argonne. We're very pleased to have all of you here.

We will include all of your statements in the record, of course, so if you could take 5 minutes and give us the main points you think we need to be focused on as we consider how to have input into this issue about establishing a new Department of Homeland Security, we would appreciate it, and then we'll have a few questions.

Dr. Happer, why don't you start?

STATEMENT OF WILLIAM HAPPER, Ph.D., EUGENE HIGGINS PROFESSOR OF PHYSICS AND CHAIR, UNIVERSITY RESEARCH BOARD, PRINCETON UNIVERSITY

Dr. HAPPER. Well, thank you, Mr. Chairman. I'm honored to be here.

I was the chair on the panel of Nuclear and Radiological Terrorism for the National Research Council Academy's report. Actually, one of the members of the panel was Mike Anastasio, who is right here beside me. And I want to thank many of the labs who briefed us during that time.

I have a few observations I'd like to make based on the work of this panel and also on my own experience as director of the Office of Energy Research, the job that Dr. Orbach has now.

So the first point is that, if you look at the academy's report, the first serious chapter is Nuclear and Radiological Terrorism, and I think that represents the consensus that if you really rank potential terrorism, the thing that is most worrisome of all is a nuclear weapon in a U.S. city. And when I look at this country and I say, "Where do I get the capability to counter that," it's clear it's the national laboratories of the Department of Energy and the NNSA. So that's where we have to turn. There are no other organizations

that have the hands-on experience and understanding of nuclear weapons, all aspects—production, maintenance, security, and safeguards. And so we really need them badly for our new agency.

I would point out that the labs also have capabilities that go well beyond the nuclear role. They have played an important role in bioterrorism. It's not by accident that the DOE has been involved in the human genome project, because recognition of the effects of radiation on the human genome started even during World War II, so that it really started at the DOE.

My third observation is that there's a tradition of quality control at the laboratories which is strengthened by the fact that there are competing laboratories. I think it's wonderful that there is Livermore and Los Alamos and Sandia and Oakridge. It's very hard to pull a fast one with that kind of scrutiny on all sides. So if you get work done at the labs, you're likely to get very good work done.

So I have a couple of recommendations that come from our panel. One is that—certainly for radiological and nuclear issues, that the DOE/NNSA laboratories should have the lead role. You know, we don't take a strong position as how you should organize that, but it's clear that it ought to be front and center of that problem.

And then I have a second recommendation goes back to some of my experiences as a Federal bureaucrat here, and that is that the time to get the management straight on this is now.

It's very hard to manage organizations like this. If you look at the chain of bureaucracies involved, it's pretty frightening. There are headquarters here in Washington, there are field organizations, there are management organizations at the lab, the—Mr. Anastasio's paycheck is not from the Department of Energy; it's from the University of California. So this is a very complicated thing. It doesn't necessarily work well.

When I was a bureaucrat, I had a lot of trouble getting other Federal agencies to pay their fair share of overhead charges at some of the labs. So it would be nice to be sure that that is clear right from the start.

So, thank you. I'll stop my testimony here.

[The prepared statement of Dr. Happer follows:]

PREPARED STATEMENT OF WILLIAM HAPPER, PH.D., EUGENE HIGGENS PROFESSOR OF PHYSICS, AND CHAIR, UNIVERSITY RESEARCH BOARD, PRINCETON UNIVERSITY

Chairman Bingaman and members, thank you for the opportunity to appear before the Committee on Energy and Natural Resources to testify on the role of the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) Laboratories in protecting the homeland security of the United States. My name is William Happer, and I am the Eugene Higgens Professor of Physics and chair of the University Research Board at Princeton University. I also served as chair of The National Academies' panel that examined the role of science and technology for countering nuclear and radiological terrorism. I am here today to discuss some of the conclusions of that panel's report, an unclassified extract of which appears as chapter 2 in The National Academies Report entitled *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*, which was released on June 13, 2002. I also want to share some personal views based on my experience as director of DOE's Office of Energy Research (now the Office of Science) from 1991-1993.

In this testimony I offer three observations and two recommendations for the committee's consideration. Except where noted, these represent my personal views, and not necessarily the views of The National Academies.

Observation 1: The DOE/NNSA laboratories have an important and unique role to play in protecting homeland security, especially from acts of nuclear and radio-

logical terrorism. During the course of its deliberations, The National Academies panel I chaired received over a dozen briefings on national laboratory research and development (R&D) projects related to nuclear and radiological counter-terrorism. This work is extensive in scope and appears to be of high quality. The examples given below illustrate the diverse portfolio of work on nuclear and radiological counter-terrorism underway principally at three national laboratories—Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories:

- Deployment of materials protection, control, and accounting technologies to protect nuclear weapons and special nuclear materials in Russia.
- Research to understand current and likely future patterns of terrorist-state cooperation to obtain or develop technologies and special nuclear material (highly enriched uranium and plutonium) for improvised nuclear devices.
- Research, development, and deployment of sensor systems to detect illicit nuclear materials in commerce.
- Modeling studies to understand the consequences of attacks on nuclear power plants using civilian airliners.
- Modeling studies to understand the dispersion of radioactivity from terrorist use of radiological weapons, also known as "dirty bombs."

No other organization in the world has more hands-on experience or understanding of nuclear weapons production, maintenance, security, and safeguards. This knowledge can readily be brought to bear on the homeland defense mission. Other federal agencies appear to recognize these unique capabilities of the national laboratories as well: The U.S. Nuclear Regulatory Commission, for example, has contracted with Sandia National Laboratories for some of its nuclear safety and security R&D work.

Observation 2: The DOE/NNSA laboratories have capabilities and expertise that go well beyond nuclear weapons and radioactive materials. The labs have unique expertise in building sensors and sensor systems. For example, the development of space-deployed "bang-meters" by the national laboratories has given the United States great confidence that clandestine tests of nuclear weapons in the atmosphere are likely to be detected. Both the weapons laboratories and the non-weapons DOE laboratories have a great deal of experience in remote sensing of the atmosphere and oceans, as well as seismic signals that could reveal underground tests of nuclear weapons. They also have strong capabilities for sensing biological, chemical, and explosive agents.

Observation 3: There is a tradition of internal quality control at DOE laboratories that keeps flawed science and technology to a minimum. The DOE/NNSA laboratories have a strong tradition of intellectual independence and freedom to pursue research ideas wherever they lead. The labs also expose the work of their researchers to rigorous review by peers to improve its quality, both at the front end (project conception) and the back end (publication of results) of the R&D cycle. The federal government's practice of providing funding to multiple laboratories has proven to be a good way to increase the competition among research ideas, develop a deep pool of research talent, and thereby promote high-quality work.

The private sector also has much science and technology to contribute to the goal of countering terrorism. But some private-sector proposals violate well-established scientific principles, since there is not the depth of internal quality control that is standard operating procedure at the national laboratories. Additionally, the review of private-sector proposals can be complicated by the need to protect proprietary ideas.

Mr. Chairman, it is my strong personal opinion that the DOE/NNSA labs should play a pre-eminent role in homeland defense R&D, regardless of the organizational form of the new agency that is ultimately created by the Congress. As your committee considers changes to the national laboratory system to improve its capabilities to support the homeland defense effort, I offer the following two recommendations for its consideration:

Recommendation 1: The DOE/NNSA laboratories should be given the lead role for homeland defense R&D. Quite clearly, science and technology are key weapons in the nation's counter-terrorism arsenal, but new organizational approaches will be needed to deploy these weapons effectively in the nation's service. In fact, the National Academies' panel on countering nuclear and radiological terrorism that I chaired noted that, to be effective, the nation's efforts to counter nuclear and radiological terrorism

> must bring to bear the best scientific and technological resources available to the federal government and must be well coordinated with other federal R&D and counter-terrorism activities.

The panel also noted that

> important progress is already being made by the R&D and policy communities to reduce the nation's vulnerability to nuclear and radiological terrorism. There is not much evidence, however, that the R&D activities are being coordinated, that thought is being given to prioritizing the activities against other national counter-terrorism needs, or that effective mechanisms are in place to transfer the results of these activities into application.

The panel concluded that the

> effectiveness of the nation's counter-terrorism efforts could be improved if one agency were given the lead responsibility for coordinating and prioritizing, in consultation with other interested agencies, nuclear and radiological counter-terrorism R&D.

Accordingly, the panel recommended that

> A single federal agency, possibly the Department of Energy's National Nuclear Security Administration, should be designated as the nation's lead research and development agency for nuclear and radiological counter-terrorism. This agency should develop a focused and adequately funded research and development program to fulfill this mission and should work with other federal agencies, the President's science advisor, and the director of the Office of Homeland Security to coordinate this work and ensure that effective mechanisms are in place for the timely transfer of results to the homeland defense effort.

The panel's recommendation that an agency like NNSA should take the lead role for counter-terrorism R&D was based primarily on the recognition that DOE/NNSA national laboratories have scientific and technological talents and capabilities that are unmatched elsewhere in the federal government. Simply put, no other agency has the breadth or depth of scientific and technological capabilities required to execute this role.

Recommendation 2: New funding and management arrangements should be established to help ensure the ultimate success of the counter-terrorism R&D effort. As noted elsewhere in my testimony, the federal government's practice of providing funding to multiple laboratories has worked well to foster competition and improve quality, positive attributes that I hope will be carried over to the counter-terrorism R&D effort. This practice has, however, produced a "not invented here" attitude among some lab personnel that has hampered the effective transfer of R&D ideas and results across and outside of the national laboratory system.

The National Academies' panel on countering nuclear and radiological terrorism recognized that the centralization of R&D responsibilities was not, in itself, sufficient to ensure the success of the counter-terrorism effort:

> The centralization of lead R&D responsibilities into a single federal agency is no guarantee of success absent commitments to certain operating principles. Among these are commitments to appoint technically capable staff to manage the R&D work; to provide sufficient and sustained funding to carry out an adequate program; and to reach across agency boundaries and outside government to obtain the expertise needed to execute the work and to ensure that results are moved expeditiously into application. While the events of September 11 appear to have produced a renewed sense of cooperation among federal agencies, the challenge for whichever agency is selected to lead this important R&D effort will be to nurture and sustain this spirit.

Mr. Chairman, as the Congress considers the future roles of the DOE/NNSA laboratories in the counter-terrorism effort, it will be vitally important to organize the R&D effort in a way that serves to break down walls between the national laboratories to encourage coordination of cross-laboratory R&D work. One key way this objective might be achieved would be to organize the R&D effort into a few key topical areas and to establish cross-laboratory steering groups comprised of researchers and administrators to keep the work focused and coordinated.

Another key issue that needs to be addressed is the appropriate management relationship between the DOE/NNSA laboratories and DOE headquarters. Speaking from my personal experiences as director of the Office of Energy Research, I have observed a penchant among Washington agencies to micromanage contractors. This is very wasteful of resources and results in much less performance per dollar spent than we should expect. Too little management also can be a problem, but to judge by the mood of recent years, the big worry will be too much management. Since the DOE/NNSA owns the laboratories, and the laboratories are managed (in principle)

by contractors like the University of California and Lockheed-Martin, there is a long gauntlet of bureaucracies that can greatly diminish the labs' effectiveness. The time to optimize management strategies is now—before bad precedents are set.

I believe that DOE headquarters has a legitimate role to play in oversight of R&D work at the DOE/NNSA laboratories to ensure that taxpayer funds are being used effectively. DOE headquarters can best play this role by establishing, in consultation with the laboratories, directions and goals for the R&D work, and also in arranging for periodic programmatic reviews of the effectiveness of the R&D activities so that deficiencies can be identified and corrected. The national laboratories and their contractor management organizations should be left to the day-to-day management of this work and should not have to waste time and resources responding to demands for information from headquarters beyond the activities enumerated above.

Finally, the effectiveness of the homeland defense R&D effort will depend to a large extent on the adequacy, both in terms of magnitude and constancy, of the funding provided to undertake the work deemed to be important to homeland security. The new homeland security agency should recognize that the R&D effort will never end—technological capabilities to inflict massive harm on U.S. populations are becoming increasingly widespread and accessible to terrorists worldwide. It will be necessary for the United States to mount an aggressive, long-term counter-terrorism R&D effort to stay at least one step ahead of terrorist capabilities.

It may prove difficult to maintain funding for an effective R&D effort precisely because it will have improved the nation's success in preventing terrorist acts. As terrorist threats become less visible in the public consciousness, there will likely be less willingness to support the counter-terrorism R&D effort in the face of other national priorities. As an analogy, consider the progressive erosion of support for the Federal Aviation Administration's federal marshals program as the number of airliner hijackings decreased in the 1970s and 1980s.

The funding pressures are likely to be manifested in at least two ways: Outright cutbacks in funding for the R&D work by the contracting agency (presumably the new homeland security agency), or an attempt to shift more of the R&D costs directly to the national laboratories by reducing reimbursements for overhead. I believe that the new homeland security agency should expect to pay its fair share of the costs of the R&D work undertaken for national benefit, including its fair share of the overhead costs.

Whatever the form of this new agency, I personally believe that it should have in its charter an explicit charge to undertake an adequately funded R&D effort through the DOE/NNSA national laboratories to support the homeland defense mission, and that it be required to seek advice periodically from independent advisory groups on both the scope and size of an adequate effort. While this will not ensure that such support is provided, it will provide the agency and the Congress with an independent assessment of the resources needed to sustain an effective national effort.

This concludes my testimony to the committee. I would be happy to clarify my comments or answer committee members' questions. Again, thank you for the opportunity to testify.

The CHAIRMAN. Thank you very much.

Dr. Anastasio.

STATEMENT OF MICHAEL R. ANASTASIO, Ph.D., DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. ANASTASIO. Thank you, Mr. Chairman and members of the committee, for the opportunity to testify on this very important subject.

I support the bold undertaking of the Congress and the administration to form this Department of Homeland Security, and I'd like to make just a few comments in my oral testimony from a technical perspective, especially regarding the science and technology capabilities that were required for this department.

Defending the Nation from terrorism, especially from weapons of mass destruction, as Will Happer alluded to, is a very daunting challenge, and science and technology will be a key weapon in this defense. Now, the success of this endeavor, I believe, requires, as many of us have said, the access to the full spectrum of capabilities

across the country, as represented by all of the organizations here in this panel as well as the universities and industry. And success will also require a sustained investment to meet the country's goals in these areas while we leverage the other investments in these outstanding institutions that have been made by the Government, as we've heard from some of the senators. And also, as Linton Brooks alluded to, it's important that this investment from homeland security also is there to enhance the science base at the institution to best achieve the goals.

But the Department of Homeland Security will be primarily focused on operations and require real products to get put in the hands of the end users. So I think for this organization to be a success, there must be a set of clear goals that are established for the science and technology. And then successful products will result from the integration of an analysis of the threats, the operational needs of the end users, whether they be the State of California or Washington or some local community or a national context of a border, and the science and technology and industrial capabilities of the nation. And then potential components or overall systems that come out of this process must be evaluated against standards in the community-wide set of standards that lead to the ultimate procurement of these products.

When we think about the science and technology, I think it's also important to realize that we need some kind of essential—centralized function that's really directly coupled to the technologists that allows an integration, a focus, and a prioritization of the research development, testing, and evaluation—investments for both the near-term and the long-term, of course, within the context, always, of a finite budget. And if the Department of Homeland Security chooses to locate some of their functions at Livermore, as Linton Brooks alluded to, we would certainly be honored and welcome to have them there.

Well, let me illustrate what I mean by this operational approach with a specific example. And I chose the example of BASIS that Linton Brooks alluded to, the Biological Aerosol Sentry and Information System. And here, a clear goal was established—that is, to have a biological detection and monitoring system that was deployed for the Salt Lake City Olympics. Close interactions of the end users with the technology developers took place, where they considered things like the false alarm rates, response times to any signal they might get, the integration of operations with the federal, regional, and local emergency responders and public-health system. And this was done from the very conception of the ideas all the way through the implementation and ultimate operation of this capability.

And then with an understanding of the requirements, in this case, Livermore and Los Alamos, teamed together in a partnership on the science and technology to develop a system-level solution taking advantage of the best biological detection technology that was available. This happened to be, at the time, PCR technology that was developed at Livermore and already licensed to industry.

And then after we had a product we thought was going to serve our needs, tests and evaluations were done against standards. And then, as an example, the biological assays that were developed

were done in cooperation and collaboration with the Center for Disease Control. And the overall system was tested with local law enforcement and public-health officials to make sure it was well integrated into their system. So, as a result of this process, the deployed system worked exactly as designed and was a successful part of the overall security strategy for the Olympics.

In my written testimony, there's a number of other contributions, capabilities, and assets of Livermore that are appropriate for homeland security and describe some of the connectivity that we've made with both the State of California and other States and local organizations to try to apply this capability, and I won't discuss any more of that detail, to same some time, but to say that, of course, we're, as we've heard many times, also endorsing the notion that this capability that's there for homeland security is also important to be available for our other important missions, and that there needs to be a free flow of access for the people and for the physical assets of the institution to go back and forth.

So let me conclude by saying that we, at Livermore, are fully committed to supporting the Congress and the administration in this difficult and long-term national-security challenge and feel that we, at Livermore, are well positioned to provide effective, development, testing, and evaluation capabilities for the new department.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Anastasio follows:]

PREPARED STATEMENT OF MICHAEL R. ANASTASIO, PH.D., DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

OPENING REMARKS

Mr. Chairman and members of the committee, thank you for the opportunity to appear before you today. I am the Director of the Lawrence Livermore National Laboratory (LLNL), a position I assumed on July 1, 2002. It is an honor and immense responsibility to lead one of the nation's national security laboratories, particularly in the wake of September 11. The events of that day tragically make clear that the United States is not immune to the scourge of terrorism, and they call for the nation's leaders and technical community to take dramatic steps to improve homeland security.

Enactment of legislation to form a Department of Homeland Security an idea supported by the President and the Congress will fundamentally change for the better the nation's approach to preventing terrorist attacks on the United States, reducing the nation's vulnerability to terrorism, and managing the aftermath of any attack. The mission is complex and daunting in scope. One major challenge for the new department will be effective integration of relevant activities, which are currently dispersed among many government organizations. Another challenge will be focusing the unsurpassed scientific and technical talent of this nation to improve capabilities to deal effectively with threats, those most critical today and as well as those emerging in the future.

I support formation of a Department of Homeland Security and I am here to comment from a technical perspective on both the needs of the new department to pursue a sustained research, development, testing, and evaluation (RDT&E) program and the capabilities available to it to do so. Currently, RDT&E capabilities are dispersed, but there is an important concentration of them particularly related to chemical, biological, radiological and nuclear threats in the Department of Energy's National Nuclear Security Administration (NNSA) and its laboratories and other sites. I will discuss relevant capabilities at LLNL and some of the important programs and partnerships we have in place. They illustrate LLNL's approach to developing and deploying technologies and systems to strengthen homeland security and the success we are having in placing the right tools in the hands of the right people.

Effective partnerships among the various sources of expertise and with the users of new capabilities are required to make necessary improvements in homeland de-

fense to cope with today's dangers and prepare for the threats of tomorrow. Focus on the most effective approaches to the highest priority issues is also required. To that end, the Administration's proposal prudently includes the formation of a "center" to ensure that all needed science and technology elements are being addressed to deal in particular with the weapons of mass destruction threats, without unnecessary duplication of effort, and that the best use is made of the nation's technical and fiscal resources. As Governor Ridge has testified (June 25, 2002), there needs to be "one unit . . . that deals with research and development, science and technology" and provides "strategic direction for homeland security research and development."

The Administration has made clear that they would like to locate a center of excellence at the Lawrence Livermore National Laboratory and use as well other national labs and other research facilities around the country. General John Gordon, testifying before Congress as NNSA administrator, voiced support for the concept of locating the Department of Homeland Security's main research facility at LLNL with satellite centers of excellence elsewhere. A center at Livermore would not only benefit from the Laboratory's multidisciplinary capabilities and those at Sandia National Laboratories (California), it would be advantageous for the homeland security mission and facilitate partnerships because of the Laboratory's location in the San Francisco Bay/West Coast area, which has many intellectual resources and homeland defense challenges. At LLNL, we are honored by the Administration's proposal, we are anxious to contribute to homeland security to the best of our abilities, and we are confident that we can help make the Department of Homeland Security a success.

LLNL'S CONTRIBUTIONS TO HOMELAND SECURITY

Lawrence Livermore National Laboratory was established 50 years ago to pursue innovative solutions to the nation's pressing needs to advance nuclear weapons science and technology. Since then, the Laboratory has continually adapted to address the evolving challenges of the day and anticipate future needs, keeping a central focus on national security. As one of NNSA's three national laboratories, LLNL is a principal participant in the Stockpile Stewardship Program to maintain and enhance the safety, security, and reliability of the nation's nuclear weapons stockpile. The Laboratory is also engaged in vital national programs to reduce the threat posed by the proliferation of weapons of mass destruction (WMD) and to provide for homeland security. These complementary missions—stockpile stewardship and countering WMD threats—are integrally connected in terms of their overarching goal of enhancing security, and the research activities largely draw on the same base of scientific and technical capabilities and expertise.

Because Livermore and our sister NNSA laboratories (Los Alamos and Sandia) have long been working to develop technical capabilities to detect, counter, and mitigate WMD proliferation and terrorism, we were able to respond rapidly and effectively to the events of September 11 and its aftermath. Although those investments are paying great dividends in the newly declared war on terrorism, substantial sustained investment is needed to develop vastly improved warning and response capabilities to protect the U.S. against these threats, now and in the future. We are fully committed to this long-term national security endeavor and are well positioned to provide RDT&E support to the Department of Homeland Security.

Lawrence Livermore is contributing widely and effectively to the war against terrorism with capabilities and partnerships and through RDT&E programs directly relevant to the Department of Homeland Security's mission. The provided examples illustrate three major points about the Laboratory:

- LLNL has demonstrated the capability to work problems from end-to-end—starting with an understanding of the threat and the users' needs, devising a systems solution, developing the enabling technology advances, testing both the component technologies and systems solution in cooperation with users, moving the new technologies to U.S. industry, and working with the user community to ensure effective deployment and training.
- LLNL has strong capabilities and active programs in each of the WMD areas—chemical, biological, radiological, and nuclear. In addition, the Laboratory has major programmatic activities in threat assessment and intelligence support as well superb supercomputing capabilities. Accordingly, we have a "critical mass" of programs and capabilities that provides the Laboratory an excellent overall perspective of threats, technical opportunities, and user needs.
- LLNL has many strong ties to research partners and the user community—including sister laboratories, the Nevada Test Site for remote testing, a wide range of universities, and many ties at the local- and state-government level.

The Capability to Work Problems from End-To-End—BASIS as an Example

A research and development program particularly focused on the area of WMD terrorist threats is an integral part the legislative proposal for a Department of Homeland Security for good reason—the nation faces a dire immediate threat that unquestionably will grow more sophisticated over time. The nation's vulnerabilities vary widely in their significance and their potential for being ameliorated by new capabilities and/or changes in operations. What is needed is a comprehensive perspective of the issues, a vision where one wants to go, and a pragmatic approach to problem solving to put products in the field expeditiously.

At LLNL, we take a systems approach to the overall problem and determine what priority items can be dealt with expeditiously with existing equipment or modest improvements in technology and where investments in longer-term research and development will be necessary. In those areas where a new system based on existing or emerging technologies can make a substantial difference, it is important to work the problem comprehensively with the end user in mind.

The development of the Biological Aerosol Sentry and Information System (BASIS) by Livermore and Los Alamos exemplifies this approach and serves as model of how the Department of Homeland Security could most rapidly and effectively take technology from the conceptual stage through to actual deployment. The process is more than R&D, it is RDT&E—research, development, testing, and evaluation.

In late 1999 we were challenged by the Secretary of Energy to develop and field a biological detection system in time for the 2002 Salt Lake City Olympics. At the time, there was no system suitable for civilian use for broad-scale biological environmental detection and monitoring. Early detection and rapid response are the keys to reducing the human health consequences of a biological agent attack. Over the next three years, we and our colleagues at Los Alamos developed and demonstrated a successful system to meet this challenge. BASIS was fielded at Salt Lake City in February 2002 as part of the overall security strategy for the Olympic Games where it performed exactly as designed. The goal-oriented approach used in this program greatly contributed to its outstanding achievement. In particular, BASIS benefited from:

- A Clear Objective at the Outset. For BASIS, clear, top-level objective was established at the beginning of the project with respect to the desired cost and performance attributes of the system. The objective was based on an understanding of the threat, technical possibilities, and user needs. After this, the management of the program and the technical details were left to the technical team.
- Close Interactions between Users and Technology Developers. There were extensive direct interactions with the Salt Lake Olympic Committee, local, state, and federal response agencies, the public health system, and the technology developers from conception through implementation and operation.
- Problem-Solving Systems Approach. The sponsors, users, and technologists recognized the need for a system-level solution, not a single technological widget, and for the system to work in conjunction with other equipment (e.g., medical surveillance systems). LLNL and LANL brought together a team of engineers, biologists, computer scientists, and operations specialists to execute the program.
- Advanced Technology Developed by Labs, Transferred to and then Procured from Industry. The system used the most advanced biological detection technologies available (i.e., PCR). The best biological detection instrument for this application was from a commercial entity (Cepheid) that had earlier licensed the technology from LLNL.
- Testing and Evaluation against Standards by Recognized Authority. The biological assays were co-developed by LLNL and the Center for Disease Control's (CDC) Bioterrorism Laboratory. The testing regimen was established with law enforcement and public health, assuring a high level of confidence in the system.
- Transfer of Operations to Contractors. Local contractors provided the bulk of the staff for all aspects of the system operations at the Olympics. LLNL/LANL staff were used in supervisory roles and for technical support.

Strong Capabilities and Active Programs Nuclear and Radiological Threats

As one of NNSA's three national laboratories, LLNL is fully engaged in the Stockpile Stewardship Program and has a very large science and technology base supportive of work on nuclear weapons, nuclear materials, and nonproliferation that can be leveraged to support homeland security. The Laboratory is home to one of the nation's two research facilities for special nuclear materials. It operates a remote

test site and has a close working relationship with the Nevada Test Site where work that requires even greater isolation is carried out. Several activities that contribute to homeland security merit special mention:

Nuclear Threat Assessment Program. The NNSA's Nuclear Assessment Program was established in 1977 to provide a national capability for correctly and expeditiously assessing the credibility of communicated nuclear threats. Shortly after its inception, the Nuclear Assessment Program became the central point of contact and action office within the NNSA for assessing and monitoring illicit nuclear material trafficking incidents worldwide. Selected elements of the program are routinely used to provide NNSA technical support to the law enforcement, diplomatic and intelligence communities. The major support activities include real-time assessments of nuclear threats and black market transactions, participation in FBI designated Special Events, and providing NNSA courses on nuclear crime at various national and international training venues. Since the terrorist attack on September 11, there has been dramatic increase in requests for our services; we have assessed 25 nuclear threats, 90 illicit trafficking cases, and 51 other nuclear related incidents.

The operational capability consists of a small group of professionals who are collectively knowledgeable in nuclear explosives design and fabrication, nuclear reactor operations and safeguards, radioactive materials and hazards, linguistics analysis, behavioral analysis and profiling, as well as terrorist tactics and operations. The assessor teams are organized into specialty teams and operate in secure facilities at the three participating NNSA contractor sites. An Assessment Coordinating Center at LLNL directs credibility assessment operations for the NNSA and provides a single point of contact for federal crisis managers during emergency operations.

Nuclear Incident Response. The Laboratory is a key participant in the national nuclear incident response groups, including the Joint Technical Operations Team (which deals with nuclear terrorism or extortion threats), the Accident Response Group (which responds in the event of an accident involving U.S. nuclear weapons) and the Radiological Assessment Program (which assists state and local agencies). Livermore maintains a deployable response capability, called HOTSPOT, which can be transported to any location by military aircraft to provide local radiological field support.

Specifically, the Radiological Assessment Program (RAP) provides technical and operational expertise to state and local agencies to mitigate the consequences of a radiological incident or emergency. It uses DOE and national laboratory experts with skills in assessing radiological and toxic contamination and the attendant risks to human health. The Livermore RAP teams have primary responsibility for California, Nevada, Hawaii, and the U.S. Pacific Rim territories. They are called upon, on average, three to five times per year. In 2001, they responded to three requests for assistance along with normal exercises and training. Typically, RAP investigates containers suspected of housing radioactive materials, seeks the location of lost industrial or medical radioactive sources, and advises federal, state, and local authorities on the consequences of a radioactive release or personnel contamination. RAP regularly drills with similar teams from other federal agencies, state, local, and tribal governments as well as private companies and organizations.

To deal with the latest emerging threats, LLNL now maintains a home team capability to assist response workers at all levels. The home team is trained to recognize and respond to nuclear terrorism. Included within this umbrella is the ability to supply timely interpretation of signals from field instruments (the so-called "nuclear triage" program being developed at NNSA headquarters).

Search and Inspection Technologies. There is a pressing need for technologies to improve the screening of passengers, baggage, and cargo. Candidate technologies, in various stages of development at Livermore, include computed tomography (CT), x-ray scanning, gamma-ray imaging, neutron interrogation, and ultrasonic and thermal imaging. These efforts build on projects and expertise in the Stockpile Stewardship Program to develop improved sensors for non-destructive evaluation of the condition of weapons and weapon components in the stockpile. NNSA has assigned LLNL the responsibility to establish a national test bed for the inspection of cargo containers (discussed further below).

Two Laboratory-developed search technologies demonstrated their applicability to counter-terrorism response when they were deployed to the World Trade Center. The first, a micropower radar, can "see" many feet into concrete rubble and could be a valuable tool for search and rescue operations. The other, a remote monitoring instrument that uses hyperspectral data to detect and identify trace gas emissions, was flown over Ground Zero to characterize hazardous gases emanating from the rubble.

Sensor Networks. Livermore has developed a concept for correlated sensor networks for detecting and tracking ground-delivered nuclear devices or nuclear mate-

rials, the Detection and Tracking System (DTS). A novel algorithm integrates data from the various sensors, together with information from other sources (e.g., an intelligent traffic system) to identify sources of concern, track their movement through the road network, and guide responders in intercepting the suspect vehicle. Since September 11, DTS development was accelerated and a prototype system was demonstrated in an urban environment. We are preparing for further, larger scaled demonstrations of this system with added capabilities.

Strong Capabilities and Active Programs Biological and Chemical Threats

Bioscience research at the Laboratory traces its root to 1963, when a program was established to study how radiation and chemicals interact to produce adverse consequences to humans. Research activities at LLNL and LANL led to a focus on DNA and technology development that led to DOE's decision to launch its Human Genome Initiative in 1987. Both laboratories are part of DOE's Joint Genome Institute, which includes Lawrence Berkeley National Laboratory and is located in nearby Walnut Creek, California, and have contributed to deciphering the human genetic code. We are applying our expertise in genomics to counter the threat of bioterrorism. In addition, in support of Livermore's national security and other programs, the Laboratory also has outstanding capabilities in chemistry and materials science.

Biological Agent Detectors. The biodefense capabilities that have been deployed in the wake of September 11 have, at their core, advances in biological detection instrumentation developed at Livermore. We have made technology breakthroughs in biodetection instrumentation, pioneering the miniaturization and ruggedization of both flow cytometry and DNA identification devices. Our miniature thermal cycler unit makes possible DNA amplification via polymerase chain reaction (PCR) and identification in minutes rather than the hours and days previously required. Livermore's miniaturized PCR technology has been licensed to private industry and forms the basis of today's most advanced commercial biodetection instruments (e.g., Cepheid's Smart Cycler, Environmental Technology Group's hand-held biodetector).

Cepheid Smart Cyclers are the heart of the field laboratory of the Biological Aerosol Sentry and Information System (BASIS), developed jointly by Livermore and Los Alamos and previously discussed. In developing BASIS, the two laboratories worked closely with the many law enforcement, emergency response, and public health agencies that would be involved in dealing with a bioterrorism event to develop appropriate sample handling (chain of custody), communications, and response protocols.

DNA Signatures. Biodetectors depend on unique antibodies or DNA sequences to identify and characterize biological pathogens. Livermore is developing gold-standard DNA signatures of top-priority threat pathogens (anthrax, plague, etc.) and are working with the Centers for Disease Control and Prevention (CDC) to validate these signatures and distribute them to public health agencies nationwide. We are also working with the Federal Bureau of Investigation, CDC, Department of Defense, and U.S. intelligence agencies to develop detailed biological "fingerprints" and data to support forensic analysis of any act of biological terrorism.

Chemical Analysis for Forensic Attribution. Timely and complete analysis of suspect chemicals can answer important questions related to nonproliferation, counterterrorism, and law enforcement. Our Forensic Science Center has assembled a unique capability for detecting and characterizing ultra-trace levels of virtually any compound in any sample matrix. Expertise and instrumentation are available for complete chemical and isotopic analysis of nuclear materials, inorganic materials, organic materials (e.g., chemical warfare agents, illegal drugs), and biological materials (e.g., toxins, DNA). The Forensic Science Center also develops advanced laboratory and field capabilities for ultra-trace analysis, including a portable (55-pound) gas chromatograph/mass spectrometer, field kits for thin-layer chromatography, and novel sample collectors using solid-phase microextraction.

The Forensic Science Center has begun the rigorous testing required to become the second U.S. laboratory certified by the Organization for the Prohibition of Chemical Weapons (OPCW), which is responsible for implementing the Chemical Weapons Convention (CWC). Under the terms of the CWC, all samples collected from inspected facilities must be analyzed at two OPCW-designated laboratories. The U.S. Congress mandates that all U.S. samples be tested in the U.S. Currently, the U.S. has only one designated laboratory, the Edgewood Chemical and Biological Forensic Analytical Center. Livermore will provide the second required facility.

Strong Capabilities and Active Programs—Underpinning Capabilities and Facilities

Several special capabilities at Livermore merit special mention because they provide broad yet critical support to homeland security: our International Assessments Program, the National Atmospheric Release Advisory Center (NARAC), the

Counterproliferation Analysis and Planning System (CAPS), high-performance computations, and the Computer Incident Advisory Capability.

Intelligence Analysis and Threat Assessment. One of the most critical, yet difficult, elements of homeland security and counter-terrorism is gaining insight into the capabilities, intentions, and plans of persons, groups, or states hostile to the U.S. Our International Assessments Program (Z Division) is one of the strongest capabilities in the country for analysis and research related to foreign nuclear weapons and other weapons of mass destruction, including early-stage foreign technology development and acquisition, patterns of cooperation, and foreign cyber threats. Such intelligence analyses serve as the foundation for homeland defense against WMD threats. Intelligence provides an essential input to threat analyses that, in turn, provide the basis for defining functional requirements for technical homeland security systems. Furthermore, intelligence can provide "indications and warning" of an imminent attack, thus guiding further deployment of defensive assets. Thus there is a critical need for both long-term, in-depth intelligence analysis and timely, responsive indications and warning.

Z Division regularly provides analysis products to our intelligence, defense and policy-making customers. Our assessments of foreign weapons programs and activities provide important input to policy makers and diplomats as they develop strategies for U.S. responses to events affecting national security. The capabilities in Z Division also support our Nuclear Threat Assessment Program (previously discussed), which analyzes nuclear terrorist threats and smuggling incidents.

In addition to filling a critical niche by providing all-source intelligence analyses of foreign nation-state programs to acquire WMD, we develop data analysis tools and data integration methods to aid intelligence collection and assessment and avoid the pitfalls of information stovepiping. Some of these tools are currently being evaluated by our analysts as well as end-users across the Intelligence Community, while many others are under intense development and will be applied to the counter-terrorism problem. In the aftermath of September 11, we provided intelligence analysts and assessments as well as information-operations tools and expert personnel to the U.S. Intelligence Community.

There is tremendous potential for the knowledge and capabilities of Z Division to support Department of Homeland Security needs for threat analyses, and for new analysis tools. However, I want to emphasize that this expansion of scope needs to be accomplished in a way that preserves Z Division's access to raw intelligence, and its ability to use nuclear weapons design tools in its analyses, both of which have historically been enabled by our designation as a Field Intelligence Element of DOE.

Atmospheric Modeling for Consequence Management. The National Atmospheric Release Advisory Center (NARAC), located and operated at the Laboratory, is a national emergency response service for real-time assessment of incidents involving nuclear, chemical, biological, or natural hazardous material. NARAC can map the probable atmospheric spread of contamination in time for an emergency manager to decide whether protective actions are necessary. NARAC is on call to respond to real incidents and can also be used to evaluate specific scenarios for emergency response planning, such as optimizing the siting of bioaerosol samplers or determining evacuation routes.

Since it was established in 1979, NARAC has responded to more than 70 alerts, accidents, and disasters and has supported more than 800 exercises. In addition to accidental radiological releases (e.g., Chernobyl, 1986; Three Mile Island, 1979), NARAC has assessed natural and manmade disasters (Mt. Pinatubo volcanic ash cloud, 1991; Kuwaiti oil fires, 1991). NARAC has also provided assessments to state and local responders to toxic chemical accidents (e.g., Richmond sulfuric acid cloud, 1993; Sacramento River Spill, 1991). State and local agencies can request NARAC support for actual releases or planning by contacting DOE's Office of Emergency Response or the NARAC program office at Livermore.

The Counterproliferation Analysis and Planning System (CAPS). Developed continually updated by LLNL, Counterproliferation Analysis and Planning System (CAPS) is a versatile and powerful modeling system for analyzing, end-to-end, a proliferator's WMD production processes and for assessing interdiction options and their corresponding consequences. CAPS is as easy to use as a Web browser, with its powerful and complex science (spectral analysis, toxic release modeling, etc.) invisible to the user. CAPS is widely accepted by the military's mission planners and is the Department of Defense's preferred counterproliferation planning tool.

High-Performance Computing. With supercomputers acquired as part of NNSA's Advanced Simulation and Computing (ASCI) program and additional institutional investments in massively parallel computers, Livermore is an international leader in high-performance computing. Many groundbreaking applications are being developed. An example directly relevant to homeland security is our computational biol-

ogy work directed at genomics—the development and use of bioinformatics tools and databases.

We have developed computational tools to automatically identify regions of bacterial and viral pathogen genomes that have a high probability of being unique to that genome. We can now process any draft or finished pathogen genome in a few hours and confidently detect all regions that are not "matched" in any other known sequenced genome. This capability has been tested on numerous bacterial and viral pathogens both at LLNL and with collaborators such as the Centers for Disease Control, the U.S. Army Medical Research Institute of Infectious Diseases, and the Department of Agriculture. We are currently using this unique computational capability to satisfy pathogen detection needs of these and other federal and state agencies.

Building on the approach we are taking, we will attempt to tackle more complex problems such as automatically determining all protein signature targets in a genome and determining the "pathomics" of virulence across all pathogens (i.e., the molecular mechanisms of virulence itself). The computational needs to address these problems will require use of cutting-edge supercomputer resources such as those at LLNL.

Computer Incident Response. LLNL is home to DOE's Computer Incident Advisory Capability (CIAC), which was formed in 1989. We assist any DOE facility that experiences a computer security incident with analysis, response, and restoration of operations. CIAC serves as DOE's watch and warning center, notifying the complex of vulnerabilities that are being exploited, specifying countermeasures to apply, and providing a picture of the attack profile. The center also develops science and technology solutions in support of computer network defense and products such as SafePatch, which earned its developers a Government Technology Leadership Award. CIAC's list of clients has grown to encompass other government agencies, and there have been several incidents where the team worked with the Federal Bureau of Investigation.

Strong Ties to Research Partners and the User Community

Many of our various research partners are cited throughout my testimony, and I discuss the vital need for partnerships later. An often overlooked—yet important—aspect of a successful research and development program is understanding the users' needs. Additional examples of our connections and work with the user community follow.

Expert Personnel Assisting in Homeland Security. Livermore scientists serve on various task forces, committees, and advisory groups dealing with aspects of homeland security and counterterrorism. For example, a Livermore expert on x-ray imaging is a member of the National Academy of Science Committee on Assessment of Technology Deployed to Improve Commercial Aviation Security. Other Laboratory scientists serve as technical advisors to the U.S. Customs Service, the National Guard, and the Los Angeles Emergency Operations Center, and as members or advisors to various Defense Science Board task forces addressing homeland defense. Still others are assisting the California Highway Patrol and the California State Office of Emergency Services (OES) with training related to weapons of mass destruction and serving as members of the California Council on Science and Technology, which is providing technical advice to the OES's State Strategic Committee on Terrorism.

Forensic Science Support to Law Enforcement. Over the years, Livermore's Forensic Science Center (previously discussed) has responded to many requests from law enforcement for assistance in forensic analysis of unique samples. Since September 11 and the subsequent anthrax scare, hundreds of samples of concern have been analyzed for local and federal law enforcement and government officials. Previously, the Center has been brought in to analyze Supernote counterfeit bills, methamphetamine samples, biotoxins, suspect chemical-warfare specimens, and nuclear contraband. It has characterized explosive traces from the 1993 World Trade Center bombing, the Unabomber case, and the Fremont serial bomber; performed forensic sleuthing related to the Riverside "mystery fumes" case; analyzed samples for the Glendale "Angel of Death" case; and analyzed Capitol Hill offices as requested following anthrax decontamination. Locally, the Center assisted Livermore police by rapidly identifying a vapor that sickened response personnel at the scene of a suicide; once the chemical was identified (malathion), law enforcement agencies were able to take appropriate personnel-protection measures and complete their investigation.

LINC for Improved Emergency Preparedness. Through the LINC program (Local Integration of the National Atmospheric Release Advisory Center with Cities), we are currently working with local agencies in the Seattle area. A LINC pilot project is testing and evaluating the effectiveness of an approach to emergency prepared-

ness that offers the potential for dramatic improvements. Sponsored by NNSA's Chemical and Biological National Security Program, LINC integrates capabilities at LLNL's NARAC (previously discussed) with local emergency management and response centers. Ultimately, LINC's goal is to provide continuous operation of an integrated, nationalwide system that aids emergency preparedness and response at all levels of government.

A National Test Bed for Standards, Test, and Evaluation. One key function of the Department of Homeland Security will be the setting of standards for technical homeland security systems. To set such standards will require practical, technical judgment, with consideration of the threats that the technology is intended to address, a concept of operations for its use, and the infrastructure necessary to use it effectively. This process must involve the Intelligence Community, end users in federal, state and local government, and technical experts. Candidate technologies must undergo objective testing and evaluation to determine how well they satisfy the standards, as input to acquisition decisions by those with operational responsibilities.

NNSA has assigned LLNL the responsibility to establish a national test bed for the inspection of cargo containers for chemical, biological, radiological, and nuclear weapons and materials. To meet this responsibility, we have initiated threat analyses to establish the range of threat scenarios that such inspection systems should address. We have also begun a research program, based on calculations and experiments, to characterize the relevant "observables" for successful detection. We have engaged federal, state and local organizations with operational responsibilities in this area to factor in their practical, operational constraints. We have set up a test facility where exemplar containers are loaded with surrogate materials, as well as typical cargo, so that commercial equipment and research prototypes can be tested in meaningful scenarios. We believe that this methodology should be extended to other terrorist scenarios of concern.

Risk and Vulnerability Assessments of Critical Facilities. Through our participation in DOE's Vulnerability and Risk Assessment Program, we have made systematic assessments of the threat environment, cyber architecture, physical and operational security, policies and procedures, interdependencies, impact analysis, risk characterization, and possible mitigation measures for the 2002 Winter Olympic Games in Salt Lake City, eleven electric and gas infrastructures, and several independent service operators (ISOs), including the California ISO during the electrical energy crisis. We have also analyzed the vulnerability of buildings, dams, and other structures to catastrophic damage from earthquakes and explosive events. Projects have included evaluation of the earthquake vulnerability of major bridge structures (including the Golden Gate and San Francisco-Oakland Bay bridges), the structural integrity of nuclear material shipping containers for a variety of impact scenarios, and the likely damage resulting from the explosion of natural gas storage tanks in a suburban environment.

More generally, LLNL has applied risk and decision theoretic methodologies to a wide range of hazardous endeavors, both internal to the Laboratory and for the public sector, and we can be considered a major scientific contributor to the discipline of risk assessment and risk management. We have developed methodologies for and conducted risk assessments of nuclear power generation, nuclear explosive operations, information systems, transportation systems and hazardous material protection (called vulnerability analyses) to identify and enhance safety, safeguards and security. In addition, LLNL has assisted other federal agencies in the application of risk management.

Engineering a Novel Truck-Stopping Device. In October 2001, the Governor of California contacted Livermore requesting assistance to develop a means of stopping tanker trucks, to keep hijacked trucks from becoming motorized missiles. The objective was to make it possible to stop these large trucks using equipment readily available to peace officers, namely their vehicles and their weapons. A retired Livermore engineer and consultant teamed with Laboratory engineers, technicians, and heavy equipment operators to develop a simple mechanical device to accomplish this. It can be readily attached to the back of a tanker truck. When bumped from the rear by the patrol vehicle, the device would cause the trailer braking system to lose air pressure automatically locking the trailer brakes. A prototype was demonstrated in Oakland in late November 2001, and testing at high speeds was conducted at the Nevada Test Site in February and March 2002. We are currently developing a portable remote-controlled system and working with the California Highway Patrol and a major California trucking company on implementing a field trial program.

RDT&E WITHIN THE DEPARTMENT OF HOMELAND SECURITY

Securing the U.S. homeland is a formidable undertaking, particularly in light of declared terrorist intentions to acquire and potentially to use weapons of mass destruction against us. Bold steps by the nation are needed including the creation of a Department of Homeland Security. Bold steps are also needed to effectively align RDT&E to meet today's WMD challenges and tomorrow's threats. As the President recently said, "History . . . teaches us that critical security challenges require clear lines of responsibility and the unified effort of the U.S. Government." To this end, I offer the following observations about the science and technology (S&T) element of the Department of Homeland Security.

Science and technology is a key "weapon" in the U.S. arsenal against terrorism—it is critical to this effort. However, many of the S&T challenges that must be met—whether to protect U.S. borders, counter a WMD terrorist attack, protect critical U.S. infrastructure, or improve data mining and analysis of intelligence information—are extremely difficult. They require the efforts of the nation's best technical talent and the involvement of the entire relevant national S&T community. Since the problem space is large and fiscal resources are always limited, thoughtful prioritization of threats, potential solutions, and RDT&E investments are necessary.

A Center for Homeland Security RDT&E. An appropriate degree of central coordination is essential to ensure that all the needed WMD S&T elements are being addressed, without unnecessary duplication of effort, and that best use is made of the nation's technical and fiscal resources. As Governor Ridge recently testified (June 25), there needs to be "one unit . . . that deals with research and development, science and technology" and provides "strategic direction for homeland security research and development."

As we understand it, this unit would provide overall RDT&E program management and facilitate interagency coordination. It would assist users in implementing new capabilities and evaluating their effectiveness. In addition, it would work with experts, whether located at government laboratories, universities, or industry, to define the appropriate portfolio of advanced technologies and concepts for the department to pursue. These efforts would include defining systems architectures and requirements for development programs based on threat assessments, vulnerabilities, and user needs and, from these, component specifications. Clearly such a function would need a sustained level of funding for adequate staff with required expertise and facilities to carry out these activities as well as some portion of the technical RDT&E program.

The highly successful BASIS program that I discussed provides an example how such a unit or center would be expected to structure a major program effort for the Department of Homeland Security—first establishing a clear top-level objective; ensuring that a systems-level approach is taken; fostering close interactions between technology developers, commercial producers, and users; testing and evaluating new systems; and helping in the transfer of operations to customers or their contractors.

Our experience is that to succeed the center should:

- Have a mission-oriented, problem-solving focus and structure, with technical and organizational agility and the ability to integrate multiple technical disciplines.
- Work closely with the end users at the national, regional and local levels.
- Be a recognized leader in RDT&E, prototyping, and implementation of technologies and systems to counter WMD terrorism.
- Be managed by leaders with the ability and credibility to interact effectively at top levels of government.
- Provide a "critical mass" of top scientists and engineers, with long-term ability to attract, retain, and effectively use technical talent.
- Have extensive and effective connectivity with the broad homeland security community (Intelligence Community, other national labs, government agencies, industry, universities, operational entities).

Center Location. The Administration has made clear that they would like to develop a center at the Lawrence Livermore National Laboratory. As stated in the White House press release on June 18, 2002, "The President's legislation . . . has in mind a system where there will be a substantial facility based at Lawrence Livermore that will be a Department of Homeland Security facility, and it will manage a R&D and science and technology program related to homeland security that will occur in many different places, in many different national laboratories." General John Gordon, testifying before Congress as NNSA Administrator, voiced support for the concept of locating the Department of Homeland Security's main research facility at LLNL with satellite centers of excellence elsewhere.

A center at Livermore would benefit from Lawrence Livermore's multidisciplinary capabilities and those at the adjacent Sandia National Laboratories (California). Our existing mission responsibilities and demonstrated track record of working with a wide range of partners and bringing technologies from concept to prototype development make Lawrence Livermore a suitable choice for the center's location. We are honored to have the designated center here and we will manage whatever implementation hurdles emerge. Also, very importantly, I believe Livermore has the ability to meet its homeland security objectives while continuing to meet its many other important programmatic commitments, especially those relating to the nuclear defense posture of the nation.

One strong advantage of locating the center at Livermore is the Laboratory's proximity to important assets—potential major partners in RDT&E and commercialization as well as key customers for homeland security. The San Francisco Bay Area is home to three international airports, two seaports, an FBI field office, Customs and INS headquarters, Silicon Valley, area biotechnology firms and health-care providers, mass transit and rail systems, and high-visibility targets (e.g., Golden Gate Bridge). In addition, as part of University of California, LLNL has close ties with the many UC campuses in the area (Berkeley, San Francisco, Davis, and Santa Cruz) as well as Stanford University (and associated medical schools). Examples of almost every aspect of the homeland security equation are just minutes away from Livermore.

The Need for Partnerships. I firmly support Governor Ridge and Dr. Marburger as to the need for a center for homeland security S&T. According to Dr. John Marburger, the President's Science Advisor, one of the functions of this center would be to represent science to the rest of the department. Very important will be the need for effective partnerships between this center and other key members of the homeland security RDT&E community with satellite centers of excellence. The long-standing partnership of the three NNSA laboratories—LLNL, LANL, and SNL—and the Nevada Test Site, which has successfully focused for decades on national security issues, can be extraordinarily useful to homeland security. There are other DOE national laboratories and research facilities as well with special expertise and capabilities that should be part of the team.

The center for homeland security RDT&E would also need to facilitate effective partnerships with the Department of Health and Human Services (DHHS) and its system of laboratories, especially to feed in new DNA signatures, assay protocols, and detection technologies developed by the NNSA laboratories and others for DHHS validation and dissemination to the public health community. Likewise, the center would need to draw on private industry, especially in the field of information technology, and on universities for their special expertise, integrating these S&T contributions into robust, responsive system architectures for homeland security.

CLOSING REMARKS

In its efforts to combat terrorism and ensure homeland security, the nation can build on an attribute that has made the United States the world leader that it is the remarkable capability of the American people to focus extraordinary energy on achieving important objectives in a time of need. Establishing a Department of Homeland Security can fundamentally change for the better the nation's approach to preventing terrorist attacks on the United States, reducing the nation's vulnerability to terrorism, and managing the aftermath of any attack.

As the Administration and many leaders in Congress have already stated, to succeed the new department will need to pursue a sustained RDT&E program particularly related to chemical, biological, radiological and nuclear threats that is prioritized to meet prudently established objectives. These threats are significant and will grow more sophisticated over time. At Livermore, we are fully committed to this long-term national security endeavor to improve homeland security and are well positioned to provide effective RDT&E support to the department. LLNL brings to the Department of Homeland Security relevant existing mission responsibilities and programs, experience working with a wide range of research partners and users, and a track record of taking technologies from concept to prototype development and deployment.

The CHAIRMAN. Thank you very much.

Ambassador Robinson, we're glad to have you here.

STATEMENT OF AMBASSADOR C. PAUL ROBINSON, DIRECTOR, SANDIA NATIONAL LABORATORIES

Ambassador ROBINSON. Thank you very much, Senator. Members of the committee, thank you very much for the opportunity to appear.

In my written statement I focused on three areas, the contributions we've made to countering terrorism prior to September 11 and some of the efforts since then. The question of how best to allow the national labs to participate with the new homeland security Department, and then a very few thoughts on organizing the government in the best way to take on this challenging mission.

Some of the contributions I wanted to mention are for the purpose of your realizing that the work the labs have done is not new and is not just theoretical. We started a lot of these efforts several years ago, or the technology would not have been available when it was needed.

First, if the decontaminant foam which kills biological weapon agents and chemical-warfare agents in minutes. It was developed at Sandia by the Army, and they carried out a competition head to head with a lot of technologies for doing either chemical or biology weapons in the year 2000. We then licensed the formulation to U.S. firms. And when it was needed to decontaminate both the buildings here in Washington, the post offices, and several private offices, our scientists suited up and went into harm's way themselves with the material to effect the clean up.

Bomb disablement technology, now the primary tools which bomb squads use in the United States and allied countries, was developed in our lab. These tools disrupt and render safe bombs of all sizes and types—backpacks, truck bombs, car bombs, even large truck bombs as were applied Oklahoma City. It does this without initiating the explosive itself or destroying forensic information.

We've developed a lot of detectors for explosives for nuclear devises and materials, for chemical warfare and biological warfare agents, also under a variety of circumstances. And we've deployed these systems not as individual scientific items, but as full warning systems, and they're deployed in the metro system here, in subways in other cities, and in major airports. And each month more and more of those system go up.

We developed a synthetic-aperture radar imager, which has exceptional clarity and special capabilities—for example, to tell you if a change has taken place from any previous time. The system is all-weather, works day and night from a great variety of platforms, either manned or unmanned platforms, and had just tremendous use in Afghanistan.

Partnering with Los Alamos, we developed the National Infrastructure Simulation and Analysis Center to analyze and assess the risk to the critical infrastructures, which Senator Craig had just mentioned, both the electrical grids, now pipeline grids, transportation systems, as well as beginning to model what are the linkages and interactions between those two, which will be an important part for us to understand.

We've always been active in cyber-defense systems, because of the responsibility to protect nuclear-weapon codes, but our own important government networks, including classified networks be-

tween our laboratories, have to be protected. We've done this work now for many agencies of the Government, including the systems that control major utilities—power, water, et cetera.

We've continued the work in water systems security and have worked increasingly with the Department of the Interior to protect reservoirs and dams as well as State and local municipalities, their water systems, against attack.

The next major area of focus in the testimony is, how can we ensure that we can make our best contributions to solving this homeland security challenge and thwarting the terrorism we face as a nation? I must echo the statements that Dr. Happer made. I've been around this community a long time, and I think there are enormous hurdles to surmount. Many different ways of bringing science to bear on government problems have been tried. And, unfortunately, the record of failure is far greater than the record of successes in the past. Government R&D generally has been characterized as overly bureaucratic and stifling of new ideas.

On the heels of the Manhattan Project, which was one of the great triumphs of science for the national interest, President Truman tasked Vandever Bush to establish a science and technology infrastructure and plan that might keep the United States ahead in these critical areas and be sure that science was being applied to national needs. One conclusion he made was that, quote, "There are few things the American citizenry can do to further the cause of science other than to pick men and women of brilliance, back them heavily, and leave them alone to do their work."

Now, unfortunately, I think you would find little evidence today that any government agency has chosen that route. On the whole, things have become very bureaucratic. It's that red tape that slows down the process the most of getting from idea to fielded application. We need new processes to successfully move from prototypes to manufactured hardware. And I think science and technology in this new agency will not be successful unless you are willing to give them great powers of simplifying and streamlining and cutting through a lot of the red tape that's plagued so many attempts in the past.

I would suggest some routes for consideration. First, is giving mission assignments to laboratories, to different laboratories, not just task orders to the scientists and engineers. When people have a missions, they try and solve the whole problem and give you a system solution.

Hold competitions for ideas, not just competitions for money. And when you've gotten the best ideas—we're all in this Nation together—assign them to the labs as you need to and keep things moving instead of stalling.

I strongly believe in the principle of end-to-end responsibility. Cradle-to-grave is what we've often referred to the phrase—an obligation to make sure that the ideas you come up with successfully operate in the field and meet the needs of the user.

Lastly, I give a few thoughts on how to organize the homeland security department for science and technology, but I would draw your attention to what I think is the most important sentence in my statement. It's at the top of page two. Our experience is that any thoughtful organizational structure can work if well-meaning

and empowered people carry out that work. It's our intention to do everything we can, whatever the organizational structure is, to be sure and make the homeland-security mission successful.

I thank you for your attention.

[The prepared statement of Ambassador Robinson follows:]

PREPARED STATEMENT OF C. PAUL ROBINSON, DIRECTOR, SANDIA NATIONAL LABORATORIES

INTRODUCTION

Mr. Chairman and distinguished members of the committee, thank you for the opportunity to testify on the present and future roles of the National Nuclear Security Administration's national laboratories in homeland security. I am Paul Robinson, director of Sandia National Laboratories.

Sandia National Laboratories is managed and operated for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy (DOE) by Sandia Corporation, a subsidiary of the Lockheed Martin Corporation. Sandia's unique role in the nation's nuclear weapons program is the design, development, qualification, and certification of nearly all of the nonnuclear subsystems of nuclear warheads. We perform substantial work in programs closely related to nuclear weapons, including intelligence, nonproliferation, and treaty verification technologies. As a multiprogram national laboratory, Sandia also conducts research and development for other national security agencies when our special capabilities can make significant contributions.

At Sandia National Laboratories, we perform scientific and engineering work with our missions in mind—never solely for its own sake. Even the fundamental scientific work that we do and we do a great deal of it—is strategic for the mission needs of our sponsors. Sandia's management philosophy has always stressed the ultimate linkage of research to application. When someone refers to Sandia as "the nation's premier engineering laboratory," that statement does not tell the whole story: We are an applied science and engineering laboratory with a focus on developing technical solutions to the most challenging problems that threaten peace and freedom.

My statement will give an overview of Sandia's contributions to homeland security in recent months, followed by a discussion of the major laboratory capabilities of importance to the homeland security mission in the future. I will also share my thoughts on how best to structure a science and technology capability for homeland security in order to have maximum success, including suggestions for how legislation can ensure access to the research and development (R&D) resources that the new Department of Homeland Security will require to support its missions. Let me stress at the outset, however, that our experience has been that almost any thoughtful organizational structure can work, if well-meaning and empowered people carry out the work of the organization.[1]

SANDIA'S CONTRIBUTIONS TO HOMELAND SECURITY AND THE WAR AGAINST TERRORISM

Like most Americans, the people of Sandia National Laboratories responded to the atrocities of September 11, 2001, with newfound resolve on both a personal and professional level. As a result of our own strategic planning and the foresight of sponsors to invest resources toward emerging threats, Sandia was in a position to immediately address some urgent needs.

For example, by September 15, a small Sandia team had instrumented the K-9 rescue units at the World Trade Center site to allow the search dogs to enter spaces inaccessible to humans while transmitting live video and audio to their handlers. This relatively low-tech but timely adaptation was possible because of previous work we had done for the National Institute of Justice on instrumenting K-9 units for SWAT situations.

You may perhaps be aware that a formulation developed by Sandia chemists was one of the processes used to help eliminate anthrax in this very building (Dirksen), as well as in the Hart and Ford buildings here on Capitol Hill and at contaminated sites in New York City and in the Postal Service. We developed the non-toxic formulation as a foam several years ago and licensed it to two firms for industrial production in 2000. The formulation neutralizes both chemical and biological agents in minutes.

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[1] This conclusion is one of the observations made by the authors of *Built to Last: Successful Habits of Visionary Companies*, by James C. Collins and Jerry I. Porras, who made a landmark study of America's most successful companies.

Special devices invented by explosives experts at Sandia have proved to be effective for safely disarming several types of terrorist bombs. For the past several years, our experts have conducted training for police bomb squads around the country in the techniques for using these devices for safe bomb disablement. The shoe bombs that Richard Reid allegedly attempted to detonate onboard a trans-Atlantic flight from Paris to Miami were surgically disabled with an advanced bomb-squad tool originally developed at Sandia. That device, which we licensed to industry, has become the primary tool used by bomb squads nationwide to remotely disable handmade terrorist bombs while preserving them for forensic analysis.

Sandia is a partner with Argonne National Laboratory in the PROTECT program (Program for Response Options and Technology Enhancements for Chemical/Biological Terrorism), jointly funded by DOE and the Department of Justice. PROTECT's goal is to demonstrate systems to protect against chemical attacks in public facilities, such as subway stations and airports. For more than a year, a Sandia-designed chemical detector test bed has been operating in the Washington D.C. Metro. The system can rapidly detect chemical agents and transmit readings to an emergency management information system. We successfully completed a demonstration of the PROTECT system at a single station on the Washington Metro. The program has since been funded to accelerate deployment in multiple Metro stations. DOE has also been requested to implement a PROTECT system for the Metropolitan Boston Transit Authority.

Another major worry for homeland security is the potential for acts of sabotage against municipal water supplies. In cooperation with the American Water Works Association Research Foundation and the Environmental Protection Agency, Sandia developed a security risk assessment methodology for city water utilities. This tool has been employed to evaluate security and mitigate risks at several large water utilities. We have used similar methodologies to evaluate risks for other critical infrastructures such as nuclear power-generation plants, chemical storage sites, and dams.

As a result of our sustained program of research and development on Synthetic Aperture Radar (SAR), several state-of-the-art systems have recently been provided to various DoD operational units, either through Sandia directly or by a corporate partner. These systems are deployed in various critical and time-urgent national security missions, including direct support of Joint Forge, Enduring Freedom, and homeland defense activities, and they have earned recognition for their exceptional performance and utility. Unlike more conventional electro-optical systems, SAR provides a day/night, all-weather imaging capability. Sandia has performed research and development on SARs since the early 1980s, an activity that grew from roots in nuclear weapon radar fuzing and has continued under the sponsorship of both DOE and DoD and some corporate partners.

These and other contributions to homeland security and the war against terror are possible because of strategic planning we conducted years ago and early investment in the capabilities that were needed to respond to emerging threats. The outstanding technology base supported by NNSA for its core missions is the primary source of this capability. We also made strategic decisions to invest Laboratory-Directed Research and Development (LDRD) funds in the very things that we judged were likely to become future needs: items to the Afghanistan theater, the decontamination foam, the sensors we have deployed, and special-purpose robotics we developed. In recent months, requests for Sandia's services from federal agencies other than DOE for work in emerging areas of need have increased. Approximately twenty-eight percent of our total laboratory operating budget is now provided by federal agencies other than DOE.

SANDIA'S CAPABILITIES FOR HOMELAND SECURITY

Sandia National Laboratories and the other NNSA laboratories constitute a broad, multidisciplinary technology base in nearly all the physical sciences and engineering disciplines. We are eager to leverage those capabilities to support other national security needs germane to our missions, including homeland security, when our capabilities can make significant contributions. Following are a few areas of expertise at Sandia that are directly applicable to the homeland security mission.

Nuclear Sensing

As part of Sandia's mission for stockpile stewardship, we have long been committed to safeguarding nuclear weapons from terrorists and actively supporting nonproliferation. The terrorist attack at the 1972 Munich Olympics focused our awareness on vulnerabilities to terrorist attacks abroad and, in particular, on the need to protect our stored nuclear weapons. This led to our work on access delay and denial systems at weapons storage sites and improving the security of weapon storage

vaults. More recently, we have turned our physical protection expertise to protection and control of nuclear materials in Russia and the former Soviet Union.

One important tool in the war against nuclear terrorism is the Department of Energy's Second Line of Defense (SLD) program. Its purpose is to minimize the risk of nuclear proliferation and terrorism through cooperative efforts with foreign governments to strengthen their capability to detect and deter illicit trafficking of nuclear material across their borders. The NNSA laboratories' expertise has been essential in this program. Short-term, the Second Line of Defense program has adapted commercially available radiation detection equipment, security systems, and communications equipment to work comprehensively with Russian Customs and other foreign agencies to stop nuclear smuggling. It is effective in detecting both weapons material and radiological dispersal devices (RDDs) or so-called "dirty bombs." Long-term, the Second Line of Defense program will deploy radiation detection equipment optimized for border use, integrate it with local, regional, and national-level communication systems geared for quick response, and cooperatively train foreign officials in use of the systems.

Sandia National Laboratories produces radiation sensors for a variety of government customers. One of our specialties is spectral sensor systems that provide automatic radioactive material identification using special algorithms developed by Sandia. These systems detect and analyze nuclear materials quickly, in real time, in indoor or outdoor environments, and with a high degree of precision that provides high confidence. We have produced a wide variety of sensor systems, from very large, fixed installations to small, rugged, portable battery-powered units.

Sandia's Radiation Assessment Identification and Detection (RAID) System was originally conceived, built, and tested before the tragic events of September 11, 2001. However, it meets the post 9/11 need to help safeguard our nation from nuclear terrorism. This system is designed to detect and identify radioactive materials transported through portals at passenger and package terminals at international ports of entry. RAID uses a commercial sodium iodide scintillation spectrometer and associated electronics, along with Sandia-developed analysis algorithms, to detect and identify radioactive materials passing within several meters of the sensor. A video image of the detection scene is displayed on a base-station computer. The system automatically and continuously updates and recalibrates for background phenomena and can identify a radioactive source even if the source is shielded.

Based on our experience with RAID and other more advanced nuclear sensing systems, we believe the state of development of our nuclear sensors is such that the technology could be quickly transferred to commercial producers and widely and rapidly deployed at a cost of less than $50,000 per unit. These deployed systems would have a very high probability of detecting a smuggled nuclear weapon or an RDD if properly deployed. Nuclear sensing systems could be placed at ports of entry, around likely targets, or even scattered throughout a city to scan people, packages, and vehicles. Since these sensors are passive devices, they don't emit a signal and, consequently, are very difficult to detect. In other words, a terrorist can't use a radar detector to determine if one of these sensors is present. Unbeknownst to a terrorist, an alarm from one of these sensors could alert law enforcement personnel to the presence or movement of a weapon that employs radioactive material.

Of course, significant challenges exist in transitioning any technology from the laboratory to mass-produced industrial products. However, as we have demonstrated many times with technologies that we have transferred to industry in the past, Sandia works closely with industrial partners to work through the design challenges associated with manufacturing engineering and commercialization.

Chemical and Biological Agent Sensing

Sandia is researching a variety of technical solutions to counter the threat posed by chemical and biological agents. This activity is supported by the DOE Chemical/Biological Nonproliferation Program (CBNP) and the Department of Defense and includes threat and response analysis, environmental sensing and monitoring, facility protection, advance chem/bio-terror warning systems, reagent design, and decontamination technology.

Sandia is developing a portable bio-sensor called "microChemlab" to put into the hands of first responders. Configured to detect toxins such as ricin and botulinum, the device uses micro-fabricated "chips" as a miniature chemical analysis lab to isolate and identify biological agents. This system has been demonstrated to also reliably and rapidly detect a variety of chemical weapon agents in realistic situations where obscurants to mask the signature are present. The system is being modified to analyze viruses and bacteria.

We are identifying commercial partners to produce and market the unit. We are also exploring a process for identifying anthrax in a period of minutes, rather than

hours. In the laboratory, we are analyzing fatty acid esters vaporized from the cell walls of bacteria and comparing them to cataloged signatures indicative of anthrax or other pathogens. If successful, these signatures can be incorporated into the hand-held microChemlab unit described above. The ability to identify a biological agent quickly is a crucial step toward developing bio-attack warning systems and defenses. Sandia's Laboratory-Directed Research and Development (LDRD) program supports this work.

Sandia is engaged in an accelerated development effort for a standoff biological weapons detection system to provide advance warning of a biological weapon threat. The system will employ ultraviolet laser-induced fluorescence to scan for and to discriminate clouds of biological agents over a broad field of view. Prototypes of this system have been demonstrated on various mobile and fixed platforms and have demonstrated excellent standoff range and sensitivity. Under NNSA sponsorship, we are moving toward the demonstration phase of the system development in the next several months.

As critical as sensor technology is to an effective biodefense, an even more overriding question is, What should an integrated biodefense system look like? For the past several years, Sandia has been working with partners to understand the issues associated with defending cities against biological attack. Starting with the basic objectives of limiting casualties and minimizing the impact of an attack on the health care system, we have evolved system concepts that combine early medical surveillance with environmental monitoring. Early medical surveillance looks for patterns in the population for earlier indications of an attack than would be possible if we waited for definitive patient diagnoses. Environmental monitoring aims for still earlier detection by using sensors, such as those described above, to detect dispersal of a disease agent. An urban environmental monitoring system would likely consist of a wide-area monitoring component in combination with facility monitoring for high-value facilities such as government buildings, subways, and airports.

Even with a good defensive system, knowing what to do in the "fog" of a biological attack is extremely difficult, especially when information may trickle in over the course of days, where "no action" may be a decision with serious consequences, and where multiple jurisdictions complicate decision making. To better understand the real-world factors affecting such decisions and to help prepare decision makers, Sandia has developed a multi-player interactive simulation that we call, "Weapons of Mass Destruction—Decision Analysis Center" (WMD-DAC). We are currently applying this simulation capability to both biological and nuclear defense scenarios.

Explosives Detection

Today, a commercially produced, walk-through portal for detecting trace amounts of explosive compounds on a person is available for purchase and installation at airports and other public facilities. The technology for this device was developed, prototyped, and demonstrated by Sandia National Laboratories over a period of several years and licensed to Barringer Instruments of Warren, New Jersey, for commercialization and manufacture. The instrument is so sensitive that microscopic quantities of explosive compounds are detected in a few seconds.

Using similar technology, we have developed and successfully tested a prototype vehicle portal that detects minute amounts of common explosives in cars and trucks. Detecting explosives in vehicles is a major concern at airports, military bases, government facilities, and border crossings. The system uses Sandia's patented sample collection and preconcentrator technology that has previously been licensed to Barringer for use in screening airline passengers. The same technology has been incorporated into Sandia's line of "Hound" portable and hand-held sensors, capable of detecting parts-per-trillion explosives and other compounds.

These devices could be of great value to customs and border agents at ports of entry. You will recall the incident in December 1999 when a terrorist attempted to cross into the United States from Canada at Port Angeles in Washington State. An alert border agent noticed his suspicious behavior and inspected the trunk of the vehicle, which was packed with explosives. A less alert agent might easily have allowed the vehicle to proceed. If we could install vehicle inspection portals at ports of entry to scan for explosives and radiological materials quickly and efficiently, we would greatly improve our homeland security.

Bomb Disablement Technology and Training

As first responders, American firefighters, police, and emergency personnel will be called upon to be America's first line of defense against terrorist attacks. These men and women must be prepared for the full range of terrorist threats, from improvised explosive devices to chemical, biological, radiological, and nuclear weapons of mass

destruction. It will be the responsibility of the Department of Homeland Security to ensure they have access to the training and tools they need to do their jobs.

Sandia National Laboratories began holding advanced bomb-disablement technology workshops for bomb squad technicians in 1994. Since then, Sandia has transferred advanced bomb-disablement technology to more than 750 workshop participants through *Operation America* and its predecessors, *Operation Riverside* and *Operation Albuquerque. Operation America* is a series of ongoing regional workshops hosted by a local police department in the state where the event is held and supported by regional FBI offices. Participants come from bomb squads, police and fire departments, and emergency response organizations throughout the United States, including most of our major metropolitan cities and the U.S. Capitol Police. They also come from other government agencies, all branches of the U.S. military, and, internationally, from our allies in some of the world's terrorism hot spots. Participants learn applied explosives technology and advanced bomb-disablement logic, tools, and techniques. Technical classroom presentations, live-range demonstrations, hands-on training, and special high-risk scenarios give them the knowledge and technology they need to respond to terrorist threats involving explosives.

Most of the bomb-disablement technologies demonstrated in Operation America were developed by Sandia National Laboratories as part of the DOE Laboratory-Directed Research and Development (LDRD) program and our work for other federal agencies. These tools include the Percussion-Actuated Nonelectric (PAN) Disrupter used to dismantle suspected explosive devices and preserve forensic evidence. The device was used at the Unabomber's cabin in Montana and was available at the 1996 Summer and 2002 Winter Olympic Games. More recently, Massachusetts State Police, with the assistance of the FBI, used the Sandia-developed PAN Disrupter to disable the alleged shoe bombs removed from an American Airlines flight from Paris to Miami.

The PAN disrupter, as well as other advanced disablement tools developed by Sandia, are currently in use by local bomb squads and could be used against terrorist threats such as radiological dispersal devices (RDDs) and other weapons of mass destruction. Most of these bomb-disablement tools are relatively simple to assemble in the field, can be used safely from a distance, and are affordable, and they are currently in use throughout the bomb-disablement community. These tools disrupt and "render-safe" explosive packages without initiating the explosives or destroying forensic evidence.

Once Sandia has researched, developed, and tested a bomb-disablement tool, it begins the process of transferring the technology to the first-responders community, putting the technology in the hands of the men and women who need it. Operation America sponsors include Sandia National Laboratories, the National Institute of Justice, and DOE.

Critical Infrastructure Protection

National security and the quality of life in the United States depend on the continuous, reliable operation of a complex set of interdependent infrastructures consisting of electric power, oil and gas, transportation, water, communications, banking and finance, emergency services, law enforcement, government continuity, agriculture, health services, and others. Today, they are heavily dependent on one another and becoming more so. Disruptions in any one of them could jeopardize the continued operation of the entire infrastructure system. Many of these systems are known to be vulnerable to physical and cyber threats and to failures induced by system complexity.

In the past, the nation's critical infrastructures operated fairly independently. Today, however, they are increasingly linked, automated, and interdependent. What previously would have been an isolated failure, today could cascade into a widespread, crippling, multi-infrastructure disruption. As the documented cases of attacks on vital portions of the nation's infrastructure grow, there is a sense of urgency within industry and government to understand the vulnerabilities.

The National Infrastructure Simulation and Analysis Center (NISAC), which would be transferred to the Department of Homeland Security under the Administration's bill, is a comprehensive capability to assess the nation's system of infrastructures and their interdependencies. NISAC's partners are Sandia National Laboratories and Los Alamos National Laboratory, both of which possess extensive supercomputer resources and software expertise. NISAC will provide reliable decision support analysis for policy makers, government leaders, and infrastructure operators. It will perform modeling, simulation, and analysis of the nation's infrastructures, with emphasis on the interdependencies.

Sandia pioneered Probabilistic Risk Assessment (PRA) as a tool for evaluating the risks associated with high-consequence systems such as nuclear weapons and nu-

clear power generation plants. We apply this tool to risk assessments for critical infrastructures such as dams, water utilities, chemical plants, and power plants. Combined with our expertise in security systems for nuclear facilities, we have helped utilities and industrial associations create security assessment methodologies that can guide owners and operators through the assessment process to determine vulnerabilities and identify mitigation options. Methodologies have been developed for water utilities, chemical storage facilities, dams, power plants, and electrical power transmission systems.

Cyber Sciences

Computer systems and networks are attractive targets of attack for high-tech criminals, foreign governments, and, increasingly, terrorists. Government, commerce, and the military increasingly rely on cyber networks in their operations. Computerized Supervisory Control And Data Acquisition (SCADA) systems often control the operations of critical infrastructure systems such as power utilities and distribution networks and municipal water supplies.

Sandia conducts significant research in the technologies intended to protect cyber and network resources and the information that resides on such systems. Programs that assess the vulnerabilities associated with these systems are in place for our own resources as well as for those at other federal government agencies. Sandia operates a SCADA laboratory to study such cyber control systems and to determine effective protection strategies. We conduct red-teaming to challenge cyber and information systems and identify and remove vulnerabilities. Our objectives are to enhance the resistance of cyber systems and critical information systems to attack and to develop solutions for survivability and response options. Our understanding of the issues associated with computer and network vulnerabilities is enhanced by the microelectronic design and fabrication capability resident at Sandia as well as the state-of-the-art work performed as part of NNSA's Advanced Simulation and Computing (ASC) campaign.

Nuclear Incident Response

The President's bill to establish a Department of Homeland Security defines a Nuclear Incident Response Team that includes entities of the Department of Energy and the Environmental Protection Agency that perform nuclear and/or radiological emergency support functions (Section 504).

NNSA plays a vital support role in combating acts of nuclear terrorism through its Nuclear Emergency Support Team (NEST). NEST provides the FBI and other federal and state agencies with technical assistance in response to terrorist use or threat of use of a nuclear or radiological device in the United States. NEST also supports the Department of State in a similar role for incidents overseas. Another NNSA team, the Accident Response Group (ARG), has the different mission of providing technical support in response to accidents involving U.S. nuclear weapons while they are either in the custody of DOE or the military services. The ARG and NEST teams draw from the same pool of experts at the NNSA laboratories, all of whom are volunteers.

NEST maintains a fast-response capability for a radiological emergency involving dispersal of radioactive debris—for example, from the detonation of a so-called "dirty bomb" or radiological dispersal device (RDD). NNSA's Radiological Assistance Program (RAP) provides initial responders who can be on the scene in a matter of hours. Their support role is to characterize the radiological environment, provide technical advice to the FBI, FEMA, and other emergency response agencies, and to assist with decontamination and material recovery. NNSA is in the process of enhancing the Radiological Assistance Program to perform radiological weapons detection and device characterization missions on a regional basis consistent with the FEMA response regions.

The Joint Technical Operations Teams (JTOTs) are major operational elements of NEST that directly assist military units and crisis response operations. These teams are trained and equipped to support render-safe operations and advise on stabilization, packaging, and disposition procedures.

In addition to the NEST and ARG capabilities, NNSA maintains Consequence Management Teams that are available to provide assistance to federal and state agencies that require radiological emergency assistance after a detonation has occurred. The teams are trained and equipped to support assessment, monitoring and sampling activities, laboratory analysis, and health and safety support to incident responders.

Sandia National Laboratories contributes more than one hundred team members to the various elements of NEST, ARG, RAP, and Consequence Management. Sandia's role focuses largely on RAP incident response, device characterization,

render-safe techniques, assessment and prediction of consequences from radiological incidents and accidents, and methods for containment of radiological materials. Sandia is the only NNSA laboratory that maintains the capability for containment of particulates that would be released in an RDD explosion.

U.S./Russian Nuclear Security Programs

Sandia supports a broad range of cooperative programs with Russia in nuclear security. These programs, funded by NNSA, DoD's Cooperative Threat Reduction program, and the Department of State, address the safety and security of nuclear weapons, the security of fissile materials, verification of fissile materials, and defense conversion.

I want to make special note of the importance of the activities with Russia. The terrorist attacks last September have made us all acutely aware of the catastrophic potential of weapons of mass destruction should they end up in the wrong hands. The cooperative efforts to protect nuclear materials and maintain state control over nuclear capabilities and assets in Russia are important initiatives that must continue.

We promote a vision called "Global Nuclear Management" that, if realized, would systematize the control of all nuclear materials in the world. However, the current state of protection for nuclear materials in Russia, while improved through the past efforts of this program, is an important indication of the potential for nuclear material proliferation. We must continue these efforts with Russia.

ENSURING ACCESS TO THE NNSA AND DOE LABORATORIES FOR HOMELAND SECURITY MISSIONS

The national laboratories of the NNSA and DOE are widely regarded as the premier science and technology laboratories in the federal government. These institutions have a long history of excellence in research and development for nuclear weapons and other national security applications. They are uniquely able to deploy multidisciplinary teams on complex problems in a way that integrates science, engineering, and design with product realization. These labs already have the scientists and engineers in place to contribute to the counterterrorism program, and most of them already handle classified research projects, which will be a requirement in dealing with terrorism threats issues and responses.

In a world where threats are increasingly insidious—with worrisome developments in chemical and biological weapons, cyber warfare, and proliferation of radiological and nuclear capabilities—it is important that the NNSA and DOE laboratories be major contributors in the national effort to address these threats. These national laboratories can provide enormous value to homeland security challenges. They are also the logical entities to perform technology evaluation on the many products and proposals that will inevitably be advocated to the Department of Homeland Security from countless vendors.

I would recommend that the new Homeland Security Department operate initially with the nation's existing research and development centers. It is unlikely that a new "stand-alone" science and technology laboratory could be created from scratch in time to make significant contributions. The United States is at war, and we must be bring technology to bear as rapidly as possible. There is no luxury of time to organize, build, or bring a new laboratory into successful operation.

The natural desire for a new agency to have organic laboratory assets that it "owns" can be addressed in the longer term. However, it makes eminent sense to begin with the assets that exist now at national laboratories and other appropriate research providers, then evolve over time to a future state where separate labs could be pulled out and designated as homeland security laboratories. Ultimately, it may prove desirable for existing elements of the national laboratories (at least those which demonstrate that they are particularly important for homeland security) to be spun-off into independent Federally Funded Research and Development Centers (FFRDCs) for homeland security.

Any new FFRDCs that might be created at some future time should always have "permeable membranes" that allow sharing of expertise from other parts and programs of sister laboratories in the NNSA, DOE, or other research centers. Placing a bureaucratic wall around a homeland security laboratory would reduce rather than enhance its effectiveness.

It has long been my opinion that the nation would be better served if the national laboratories that were created by acts of Congress could in fact become true national laboratories, with simplified procedures in place to allow their unique resources to be rapidly and efficiently applied to support any agency of the federal government with responsibility for important national missions. The current homeland security crisis easily qualifies as an appropriate case for this approach.

Unfortunately, established bureaucratic structures and regulations that keep agencies at arm's length from one another will stand in the way of effective utilization of the NNSA or other DOE laboratories for homeland security unless legislative action is taken to remove the barriers. As a first step, it would be helpful to explicitly authorize NNSA to carry out research and development for homeland security by adding that activity to the NNSA's list of authorized activities at Title 42, Section 2121, of the United States Code. Similar action was taken by the 101st Congress when it added technology transfer to the NNSA's authorized activities with the Department of Energy National Competitiveness Technology Transfer Act of 1989.[2]

Next, the Homeland Security Act should give the Department of Homeland Security the power to task the NNSA laboratories directly, just as the Science, Energy, Environmental, and other non-NNSA offices of DOE are able to do. Similarly, using the Joint Sponsorship provisions already within the Federal Acquisition Regulations would allow NNSA and the Homeland Security Department to embrace these missions and to jointly undertake research and development activities under mutual agreement. These authorities would eliminate the bureaucratic red tape and additional costs associated with the Work-for-Others (WFO) process that could otherwise inhibit access and utilization of the laboratories by non-DOE sponsors.

ORGANIZING THE RESEARCH AND DEVELOPMENT FUNCTION IN THE DEPARTMENT OF HOMELAND SECURITY

It will be important for the Homeland Security Department to have the authority to determine for itself how and where to make its research and development (R&D) investments to support its mission goals. There will be some laboratories and institutions that will lobby to be designated as homeland security laboratories or as centers of excellence for this or that homeland security mission area. The Department will need to look beyond labels to demonstrated capabilities and a track record of deliverables. Its R&D program should encourage a competition of ideas among many performers, including industrial firms, universities, and federal laboratories, and then fund the development of the best ideas based on considerations of technical merit and not on who the performer is.

The Department of Homeland Security must adopt a two-track strategy for R&D that addresses both near-term and long-term needs. DHS must quickly demonstrate and deploy applied technology for threats that exist now. In the near term, the Department's R&D program must stress deployment of technologies for which a research base already exists. It will need to rely on laboratories that can work effectively with industry and perform Advanced Concepts Technology Demonstrations in an expedited fashion under programs managed at the Under Secretary level.

DHS will also require a strategic research program to address longer-term issues. This program should commission research in areas that hold potential for breakthrough technologies of importance to homeland security. It may perhaps function like the Defense Advanced Research Projects Agency (DARPA) or be staffed as a small Federally Funded Research and Development Center (FFRDC) reporting to the Office of the Secretary, as recommended by the National Research Council report.[3]

I believe it will also be important to establish some research programs that are funded at the mission level, not just at the task level, within key laboratories. Our experience is that laboratory staff become far more likely to produce important results in support of their missions when they can devote themselves in a streamlined and focused way with the most knowledgeable and most qualified individuals having the freedom to pursue new ideas, choose the best approaches, and act on new research results with a minimum of bureaucracy. What has made this model so successful in the past for both our military and other sponsors has been the way in which we have integrated new technologies by placing the emphasis on technology solutions. Whenever we have been given cradle-to-grave responsibility for bringing "leap-frog science" to bear in the shortest possible time, our technical staff have worked in close teamwork with the end users of the technology to assure that what is delivered to the field will be successful. This unique approach to marrying "technology-push" with "requirements-pull" is a hallmark of Sandia's R&D philosophy.

Each Under Secretary of Homeland Security will have unique R&D requirements. Clearly, the Under Secretary for Chemical, Biological, Radiological, and Nuclear Countermeasures will need access to a substantially different set of R&D resources

[2] Pub. L. 101-189, div. C, title XXXI, Sec. 3157, Nov. 29, 1989, 103 Stat. 1684.

[3] *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism*, National Research Council, June 25, 2002, p 12-7.

than the Under Secretary for Border and Transportation Security. But the needs for improved technology are widespread.

We recommend that each Under Secretary create a laboratory network tailored for his or her missions by directly tasking existing institutions that possess the competencies required. We call this entity a "virtual national laboratory," and it has already been tried and proven in the NNSA laboratory system and elsewhere as an effective model for multi-institutional programs involving research and technology development. Virtual national laboratories may be of permanent or limited duration and can be reconfigured as necessary for evolving requirements.

To illustrate, the Under Secretary for Chemical, Biological, Radiologcial, and Nuclear Countermeasures may design one or more matrixed laboratory systems that include representation from the National Institutes of Health, some DOE/NNSA labs, leading research universities, and the pharmaceutical industry. The Under Secretary for Border and Transportation Security may design one or more matrixed laboratory systems for his or her needs that include representation from the Naval Research Laboratory and other DoD labs, DOE/NNSA, industry, and universities.

Each of these "virtual national laboratories" would have a defined organizational structure with a laboratory director and program directors, although it would own no real property. The laboratory director would manage a Laboratory Liaison Council (LLC) with representation from the constituent institutions. The LLC would be the Under Secretary's vehicle for direct access to the national laboratory system. There would be no requirement to go through each institution's sponsoring federal agency in a "work-for-others" procurement process.

A significant advantage of this concept is that it encourages competition of the right sort—competition of ideas (not direct competition of labs for money)—and cooperation on results, pulling together the right resources for a particular mission focus. It encourages rapid transition of the fruits of research into development and application and helps avoid the "valley of death" that often prevents promising research from moving from development to deployment.

Specific recommendations to implement this concept in the DHS legislation are attached in the appendix to my statement.

SUMMARY AND CONCLUSION

Sandia National Laboratories and the other NNSA and DOE laboratories constitute a broad, multidisciplinary technology base in nearly all the physical sciences and engineering disciplines. We are eager to leverage our capabilities to support the science and technology needs of the new Department of Homeland Security.

Sandia possesses strong competencies in nuclear, chemical, and biological sensors and engineered systems suitable for transfer to industry and deployment in homeland security applications. We have been proactive in supporting our nation's first responders and addressing the challenges of infrastructure protection. We have a track record of anticipating emerging homeland security threats and investing in technology development to counter them through our Laboratory-Directed Research and Development (LDRD) program and sponsor-directed programs. We are the premier national laboratory for working with industry to transition technologies into deployable commercial applications.

Bureaucratic and regulatory roadblocks exist that limit access to the DOE/NNSA national laboratories by other federal agencies, and those obstacles should be removed by the homeland security legislation in order to facilitate direct access to those resources. The Homeland Security Department needs the authority to manage a research and development program that encourages competition of ideas among many performers—including industrial firms, universities, and federal laboratories—and then fund the development of the best ideas based on technical merit and applicability to mission needs.

On behalf of the dedicated and talented people who constitute Sandia National Laboratories, I want to emphasize our commitment to strengthening United States security and combating the threat to our homeland from terrorism and weapons of mass destruction. It is our highest goal to be a national laboratory that delivers technology solutions to the most challenging problems that threaten peace and freedom.

APPENDIX

Recommendations for Structuring Research and Development in the Department of Homeland Security

- Each Under Secretary should have authority for "conducting a national scientific research and development program to support the missions of the De-

partment" for which he or she is responsible, ". . . including directing, funding, and conducting research and development relating to the same" (as per Sec. 301 (2) of the President's bill).

- In addition, each Under Secretary should appoint a Director of Research and Development with authority to immediately create networked laboratory systems (virtual national laboratories) through cooperative arrangements with federal, academic, and private research institutions. Appropriate funding will be required.
- Directors of Research and Development will be assisted by Laboratory Liaison Councils with representation from the institutions of the virtual national laboratory.
- Directors of Research and Development should have authority and appropriated funding to originate and award Cooperative R&D Agreements (CRADAs) and other technology transfer mechanisms between virtual national laboratories and industry on an expedited basis.
- DHS legislation should authorize all relevant federally funded R&D institutions to accept direct tasking from the DHS and should instruct "landlord" agencies to facilitate DHS taskings of institutions under their sponsorship.
- At least initially, DHS should rely on the established great laboratories of the nation, rather than creating new ones for its science and technology (S&T) program. There is insufficient time to establish a "green field" laboratory that can make contributions on the scale required in a timely manner.
- Congress should add homeland security to the NNSA's list of authorized activities at Title 42, Section 2121 of the United States Code.
- Thought must be given to ensuring that S&T activities are not encumbered with bureaucratic processes that stifle the imaginative and innovative work required if we are to be successful. New processes will be required in some cases, rather than importing existing ones from organizations brought into the new department.
- As recommended by the National Research Council,[4] an office of "Under Secretary for Technology" should be created, reporting to the Secretary of Homeland Security. This office will manage a strategic, peer-reviewed research program with universities, national laboratories, and industry. Sustained funding at the mission level will be required.
- Also as recommended by the National Research Council,[5] a Homeland Security Institute should be established as a Federally Funded Research and Development Center (FFRDC) under the direction of the Under Secretary for Technology. This entity should perform policy and systems analysis, help define standards and metrics, and assist agencies with evaluating technologies for deployment.

The CHAIRMAN. Thank you very much.

Dr. Cobb, go right ahead.

STATEMENT OF DON COBB, Ph.D., ASSOCIATE DIRECTOR, THREAT REDUCTION, LOS ALAMOS NATIONAL LABORATORY

Dr. COBB. Thank you, Mr. Chairman and distinguished members of the committee, for inviting me here today. It's a privilege for me to appear here with my colleagues from the other laboratories and to discuss an opportunity that I think is really historic, creating a new department to carry on a mission of protecting our homeland. It's also a special honor for me to represent not only Los Alamos, but also my boss, John Brown.

I'm Don Cobb. I'm the Associate Director for Threat Reduction. My responsibilities include the science and technology programs we carry out at the laboratory that are primarily geared toward reducing threats associated with the proliferation of weapons of mass destruction—nuclear, chemical, and biological.

Threat reduction at Los Alamos is one of the three major mission areas of the laboratory, and it's about one-fifth of the laboratory's

[4] Ibid., p. 12-6.
[5] Ibid., p. 12-7.

work. I bring that up because it was based on several decades of research in these areas that we were able to respond to the call after 9/11 with our fellow laboratories.

So I would maintain that the national labs, including Los Alamos, are already committed and contributing important research and technology products in the fields to protect our homeland. We're building on decades of experience countering the threats of weapons of mass destruction to do that.

So it's important not to separate these missions so terribly apart that we lose in one area at the expense of the other. I think we need to look at a balanced approach that fosters homeland security, but, at the same time, we don't lose the work that we've been doing in proliferation and counter-terrorism in the past.

I believe that the national labs will and have to play an important role in reducing the danger of terrorism, because we have the multiple capabilities, and we also have the classified secure environment to handle the kinds of information that it's going to take to meet this challenge.

Now, my written testimony has a lot of examples. I hope you will see from the written testimony that the people at Los Alamos, and I know at the other labs, are very dedicated to this new mission. I mean, we really care about it. Since 9/11, people want to engage, and we're eager to do more.

I want to talk about a couple of the areas where we're involved, and it's not just Los Alamos, but it's areas where we contribute in working with universities and industry and the other labs. The first one I wanted to talk about, and I think Dr. Orbach talked about it in his testimony, Los Alamos and Livermore labs are charter members of the original effort to sequence the human genome. And recently we've embarked on an effort to sequence the DNA from pathogens that are believed to be of the greatest concern from a bioterrorism perspective. We're doing that with the Office of Science support, as well as from the NNSA. And the sequencing effort is really important in the fact that it provides the data that you're going to need in order to go to the field and get early warning against bioterrorism attack. So it's a combination of the biosciences and then the technology that goes to the field to provide early warning, which I think is the signal capability of the kinds of work that the labs bring. For example, this will be important in expanding the BASIS capability that was discussed—that was mentioned earlier.

The second one is—I want to just say a few words about controlling and monitoring our borders for the passage of nuclear materials and in terms of packages and cargo and so on entering the country. This is an area where we have a great deal of capability yet to be brought to bear, and I believe it's one of the areas where before we can claim that we have done what is needed to do, we need to engage our collective capabilities at the labs and industry, because many of these technologies for radiation detection have already been commercialized, and we need to get these out into the field. So I wanted to mention that one as one that I think is particularly important.

And then the last one, I won't say too much about, because—actually Ambassador Robinson mentioned, the joint Los Alamos,

Sandia, NISAC work, but I would like to say that this is really based on 10 years of development of advanced modeling and simulation. The U.S. Government has invested $150 million at these two labs to put these capabilities together. It's time now to pull this together and apply this to critical infrastructure. And division—and the reality of NISAC is you'll be able to look at the operations with valid models of the operations of each element of our critical infrastructure and the interdependencies that they have amongst themselves, so we can look at vulnerabilities and then help guide decision makers on the investments that they'll be making in the future.

So, with that, I would—I'll stop and am happy to answer questions.

[The prepared statement of Dr. Cobb follows:]

PREPARED STATEMENT OF DON COBB, PH.D., ASSOCIATE DIRECTOR, THREAT REDUCTION, LOS ALAMOS NATIONAL LABORATORY

Thank you Mr. Chairman and distinguished members of the Senate Energy and Natural Resources Committee for inviting me here today to discuss the present and future roles of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) national laboratories in protecting our homeland security. I am Don Cobb, Associate Director for Threat Reduction at Los Alamos National Laboratory. At Los Alamos, I am responsible for all programs directed at reducing threats associated with weapons of mass destruction. I personally have more than 30 years experience working to reduce these threats.

Los Alamos is operated by the University of California for the DOE/NNSA and is one of three NNSA laboratories, along with Lawrence Livermore National Laboratory and Sandia National Laboratories, responsible for maintaining the nation's nuclear stockpile. In addition to our stockpile responsibilities, the three NNSA laboratories have been involved for decades in technology development and problem solving in the realm of arms control and nonproliferation. Through our work in these areas, Los Alamos has developed a skill and technology base that enabled us to respond immediately following the September 11 attacks, to calls for assistance in counter terrorism and homeland security. With the President's call for a new Department of Homeland Security, Los Alamos stands ready to focus its capabilities in support of this new department.

Today, I would like to discuss with you the broad set of capabilities that Los Alamos brings to U.S. efforts to protect our homeland from future terrorist attacks. While my testimony is Los Alamos centric, progress in science and technology depends on collaboration among the national laboratories, government, industry and academia.

Los Alamos National Laboratory firmly supports the creation of a Department of Homeland Security (DHS). Consolidation of federal homeland security agencies has the potential to protect the nation against terrorism.

The President's proposal would give the Department four divisions: Information Analysis and Infrastructure Protection; Chemical, Biological, Radiological, and Nuclear Countermeasures; Border and Transportation Security; and Emergency Preparedness and Response. Each of these mission areas will require focused research and development (R&D). My statement will describe some of the key contributions Los Alamos and the other national laboratories can make to homeland security in each of these areas.

ENGAGING THE SCIENCE AND TECHNOLOGY (S&T) COMMUNITY

"The government will need mechanisms to engage the technical capabilities of the government and the nation's scientific, engineering, and medical communities in pursuit of homeland security goals," says a new National Academies report.[1] Every division of the DHS will require research, development, testing, and evaluation (RDT&E) to solve the technical challenges it will face. At Los Alamos, we have asked the question, "How can a newly formed DHS best engage with the S&T com-

[1] National Research Council Committee on Science and Technology for Countering Terrorism, *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism* (Washington, DC: National Academy Press, June 2002).

munity, including the national laboratories, universities and industry?" I believe that in order to succeed, DHS requires a single, focused S&T office that serves as the central R&D organization for the Department. As suggested by the House and Senate bills, this office could be placed under a separate Director of Science and Technology. The best and brightest human resources, including federal staff augmented by scientists and engineers assigned from national laboratories, industry and academia, must staff this S&T office. Boundaries with other organizations must be "permeable," enabling people to move back and forth easily.

The S&T office would be responsible for the planning and oversight of focused RDT&E, including both rapid technology acquisition and long-term, high-risk, high-payoff research. Functional responsibilities for the agency would therefore include:

- Threat and vulnerability assessment;
- Identification of needs through interactions with other agencies, and with state and local governments;
- Strategic planning and prioritization for RDT&E investments;
- Program planning, budgeting, funding and oversight;
- Systems architectures;
- Science and technology acquisition from universities, industry and national laboratories;
- Technology integration;
- Evaluation of technologies and systems effectiveness; and
- Close coordination with end-users during initial system deployments.

The office should be established quickly, in place and functioning concurrently with the establishment of the DHS—we want to maintain, and even accelerate, the momentum which has built since September 11. I now will describe some of the key contributions Los Alamos is making to homeland security.

INFORMATION ANALYSIS AND INFRASTRUCTURE PROTECTION

National Infrastructure Simulation and Analysis Center (NISAC). Los Alamos is partnering with Sandia National Laboratories to establish NISAC. NISAC is intended to provide improved technical planning, simulation, and decision support for the analysis of critical infrastructures, their interdependencies, and vulnerabilities for policy analysis and emergency planning. This technology is based on a decade long, $150M investment in basic research and software development, supported by the world's largest secure, scientific computing environment. NISAC will provide the type, scale, and comprehensive level of information that will enable the nation's senior leadership proactively to deny terrorist attack options against potentially high-value targets, instead of simply reacting to the latest threat scenarios. NISAC will provide essential analytic support for discovering and overcoming gaps in our homeland security.

NISAC was created as part of the U.S.A. Patriot Act of 2001 (P.L. 107-56). The President's proposal calls for the transfer of NISAC to the DHS. Because NISAC has responsibility across all infrastructure sectors, it is appropriate that NISAC should directly support the agency charged with cross-infrastructure responsibilities. NISAC is part of a broader portfolio of infrastructure modeling and simulation work at the two laboratories. This is significant. The technical and programmatic synergies that accrue to NISAC as a result of this association allow for immediate application of the R&D efforts to real problems today. From vulnerability assessments of actual infrastructures to "what if" simulations of biological event scenarios, NISAC is providing insights and information to senior decision makers now. As this capability matures, we will do more.

National Transportation Modeling and Analysis Program (NATMAP). NATMAP, currently being developed for the Department of Transportation, builds on Los Alamos' transportation modeling technology developed over the past decade. NATMAP simulates individual carriers—trucks, trains, planes, and waterborne vessels—and the transportation infrastructures used by these carriers to simulate freight commodity shipments of the U.S. transportation network. It moves individual freight shipments from production areas, through intermodal transfer facilities and distribution centers, to points of consumption. The advantage of the NATMAP is that the nation's system can be represented at any level of detail—from trucks and goods moving among counties and within regions, to national multi-modal traffic flows including cross border trade with Mexico and Canada. This strength can be exploited for transportation policy, security and infrastructure investment purposes.

Vulnerability/Threat Assessments: Nuclear Facilities. Over the last 20 years, Los Alamos and Sandia have analyzed physical security and identified vulnerabilities at numerous nuclear facilities throughout DOE, DoD, and U.S. Nuclear Regulatory Commission (NRC) facilities. These facilities include nuclear reactors, plutonium-

handling facilities, nuclear weapons storage facilities, commercial nuclear power plants, and spent nuclear fuel facilities. We routinely train external agencies on developing protection strategies for low-probability/high-consequence scenarios, such as aircraft crash, sabotage, and fire. Fundamental to these activities are the unique facilities and capabilities that Los Alamos brings to these analyses. We are the only site where highly radioactive materials can be studied experimentally for their response to postulated threat scenarios. Such an understanding is essential for analyzing threats and their potential consequences.

Threat Analysis and Warning. Following the September 11 attacks, we established a multidisciplinary team of analysts searching for evidence of terrorist activity. Such analysis requires the latest information management technologies, advanced computational methods, and automated pattern identification to search enormous amounts of electronic information. This tremendous task is complicated by the fact that the vast majority of data represents completely innocent activity. Under the new Department, a major effort will be needed to develop the tools that will provide the ability to accurately synthesize information from intelligence, law enforcement, and open sources. Using our experience in solving related problems over the years, for example in identifying activities indicating WMD proliferation, Los Alamos will continue to provide analytic capability in this area.

Immigration and Naturalization Service: Entry/Exit System. The Immigration and Naturalization Service Data Management Improvement Act (DMIA) of 2000 (P.L 106-215) created a Task Force to evaluate how the flow of traffic at United States ports of entry can be improved while enhancing security and implementing systems for data collection and data sharing. The Task Force is advisory in nature, and as such, will develop recommendations regarding the development and deployment of an integrated, automated entry/exit system. A team of experts from Los Alamos is working with the Task Force to provide advice and objective recommendations regarding the design and development of the system.

GENetic Imagery Exploitation (GENIE). Los Alamos has developed a sophisticated image analysis technology called GENIE to create high-resolution maps. Current sensor platforms collect a flood of high-quality imagery. Automatic feature extraction is key to enabling human analysts to keep up with the flow. Machine learning tools, such as the genetic algorithm-based GENIE, have been successfully used in military and intelligence applications of broad area search and object detection, evaluation of environmental disasters, space imaging, and diagnosis from medical imagery. GENIE has been quickly deployed on a wide range of processing systems across the nation, and was recently recognized with an R&D 100 award.

Gigabit Computer Network Traffic Monitoring. Los Alamos has recently developed technology that can monitor computer network traffic at gigabit/gigabyte rates, which could be applied to the problem of terrorist activity detection. By being able to scan network traffic at gigabit rates, both for trends as well as between specific sources and destinations, our tools can be used to provide indicators or early warning of suspicious communications. While many of these traffic analysis techniques are well known, they have been limited until now by the inability to collect and process data at gigabit rates.

Geographic Information Systems (GIS). Los Alamos has high-end computer systems capable of assembling, storing, manipulating, and displaying geographically referenced information. Our GIS make it possible to link, or integrate, information that is difficult to associate through any other means. For example, a GIS might allow emergency planners to easily calculate emergency response times in the event of a disaster; we can predict water quality, air quality, contaminant transport, wildfires and other natural hazards based on defined threat scenarios. A critical component of Los Alamos' GIS is our 3D modeling and visualization capability. We can produce wall maps and other graphics, allowing the viewer to visualize and thereby understand the results of analyses or simulations of potential events.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

The response to chemical, biological, radiological and nuclear threats necessarily take very different approaches. The dual-use nature of chemical and biological materials makes them easily accessible. For instance, feritlizer can be used to help plants grow, but the same chemicals can also be used in the construction of a bomb. In addition, hazardous microorganisms can be grown from very small starting samples. Given the prevalence of these materials, the primary focus in countering chemical and biological threats is on early detection of attack, early warning to authorities and first responders, and rapid characterization of the agent to guide response. Radiological and nuclear materials, on the other hand, have a much longer history of being regulated and safeguarded at their source. Consequently, the best way to re-

spond to this variety of threat is to prevent terrorists from ever acquiring the necessary materials, protecting them at their source. Thus, we have an opportunity for a layered protection strategy to counter nuclear terrorism.

Chemical and Biological Countermeasures

Los Alamos has a long history of working in the biological sciences, born out of initial work done on the effects of radiation on humans. Over the years, this has developed into a significant expertise, including leadership in the international Human Genome Project and the development of now widely used biomedical technologies, based on our expertise in lasers and isotope chemistry. For example, Los Alamos created the field of flow cytometry, which allows researchers to flow objects past a laser that can rapidly answer questions about individual cells or molecules, like DNA. Thanks to this strong foundation in the biosciences, Los Alamos was able to make contributions during the recent anthrax attacks, as well as in the broader area of biothreat reduction, primarily through our work for NNSA's Chemical and Biological National Security Program (CBNP).

Field Detection and Early Identification of Pathogens

The Biological Aerosol Sentry and Information System (BASIS), a joint Los Alamos-Livermore project, provides early warning of airborne biological weapons attacks for special events such as the Olympics. Planned for use in civilian settings, BASIS can detect a biological attack within a few hours, early enough to treat exposed victims and limit casualties significantly. It was deployed at the 2002 Winter Olympics in Salt Lake City. The BASIS system incorporates distributed sampling units (sensors), a re-locatable field laboratory, and an operations center that employs a secure web-based communications system.

Advanced BASIS technology is currently being integrated into the Biosurveillance Defense Initiative. The Initiative, which is sponsored by the Defense Threat Reduction Agency of the Department of Defense and the NNSA, is a joint Los Alamos, Livermore, and Sandia program. The tri-lab effort will establish an urban test bed for biosurveillance in a U.S. metropolitan area this fall. Technologies developed by the three NNSA laboratories for early detection of biological incidents, as well as Department of Defense systems, will be included in the test bed.

Pathogen Characterization for Forensics, Attribution and Response

Once an attack has occurred, it is up to the biological science and medical communities to respond to the aftermath. These communities, Los Alamos included, responded to the challenge posed by the fall 2001 anthrax attacks. Los Alamos assisted the federal response to the attacks from the beginning, providing DNA forensics expertise to the investigation, determining what strain of anthrax was used, as well as other characteristics important for response (e.g., antibiotic resistance or genetic manipulation).

Los Alamos was able to respond to the attacks as we did because we have been working for the past ten years on analyzing the DNA of anthrax and building a comprehensive database of strains from around the world. Beyond just anthrax, the Laboratory is working on a variety of pathogen strain analysis approaches for detection, characterization and attribution of threat pathogens. This work, along with that of our colleagues at Livermore and Northern Arizona University, has provided the assays being used in BASIS. Sophisticated analysis capability resides at Los Alamos for more comprehensive pathogen characterization and, importantly, for the identification of unknown microbes.

Los Alamos works with a broad range of characterization and identification technologies. For instance, Los Alamos has established a DNA fingerprinting method for rapidly identifying the "genetic barcode" for each threat agent species. We have established an archive of such "barcodes" so that, when we conduct an analysis on a new sample, we can rapidly compare its signature to all those in the database. Additionally, if a threat pathogen is known, Los Alamos can use our DNA analysis methods to detect a broad range of agent properties that are important for understanding the attack and guiding prophylaxis and treatment; including evidence of genetic manipulation and antibiotic resistance. We can also differentiate strains of the known threat agents and can, for some species, determine their original geographic origin.

Biological Demonstration and Application Program. The forensic technologies described above, as well as routine analytical techniques, are being evaluated and standardized in the Biological Demonstration and Application Program (BDAP). BDAP is a collaborative NNSA-sponsored effort between Los Alamos, Livermore and the Northern Arizona University. The BDAP will facilitate rapid transition of NNSA-developed forensic technology into use by the public health, law enforcement and intelligence communities.

Biological Toxin Detection. We have developed a prototype of a simple, compact sensor system for detection of biological toxins, viruses, and bacteria. The prototype has been sent to a customer for use and evaluation. Our initial efforts have been focused on the development of a single-channel, hand-held, battery operated instrument for detection of cholera and ricin toxins within environmental samples. This sensor approach offers high sensitivity and specificity, simplicity of use, and rapid response time (5-10 minutes).

Chemical Detection. Los Alamos has also developed sensors for detecting chemical threats. For instance, the Swept Frequency Acoustic Interferometer (SFAI) can be used to determine the composition of suspected chemical weapons without opening up the weapon or disturbing it. These devices are hand-carried and have been tested extensively. The technology is so sensitive that it can easily distinguish between the contents of cans of Coke® and Diet Coke®. Research is also moving forward employing fuel cell technology for development of an inexpensive, small and highly sensitive chemical agent vapor detector.

Nuclear and Radiological Countermeasures

As described earlier, the radiological and nuclear threat must be dealt with in marked contrast to how the chemical and biological threat is managed. For example, if you wait to detect the use of a radiological or nuclear device, in most cases, it's too late. Instead, what is critical in this area is making every effort possible to secure materials at their source and ensure that terrorists cannot access them.

Securing Materials at Their Source

The DOE/NNSA Materials Protection, Control and Accounting (MPC&A) program is the first line of defense against nuclear terrorism. With the dissolution of the Soviet Union, NNSA/DOE estimates that Russia inherited approximately 850 tons of highly enriched uranium (HEU) and plutonium. Considering the International Atomic Energy Agency definition of significant quantities, this is enough material to make more than 50,000 nuclear explosive devices. MPC&A security upgrades are complete for about 1/3 of the fissile material identified as being at risk of theft or diversion in Russia. Rapid progress is being made to increase the security of the remaining materials, but completing the effort will take several more years of intensive work.

Whereas in the past nonproliferation efforts were focused on weapons-usable materials, today there is a recognition that other radiological materials (used for industrial, medical and research purposes) pose a threat in the form of radiological dispersal devices (RDDs), or "dirty bombs." Los Alamos is actively working with DOE/NNSA and counterparts in Russia to develop strategies to secure radiological sources that pose a threat in the form of a dirty bomb.

Thousands of radiological sources are used in the U.S. for research, medical and industrial applications. The Nuclear Regulatory Commission plans to strengthen control of the sources it licenses for these uses. The DOE and its predecessor agencies originally produced radiological sources for a variety of defense and civilian applications. These so-called "orphan sources" are being recovered by Los Alamos and repackaged as transuranic waste. More than 3,000 sources have been recovered to date. The pace of this recovery effort will likely increase to cover the more than 5,000 sources remaining.

Second Line of Defense

The Second Line of Defense (SLD) program has the mission to detect and recover any nuclear material that may slip through the first line of defense described above. The program works to strengthen Russia's overall capability to prevent the illegal transfer of nuclear materials, equipment, and technology to would-be proliferators. The immediate goal of the program is to equip Russia's most vulnerable border sites with nuclear detection equipment. A future goal is to establish a sustainable counter-nuclear smuggling capability in Russia. SLD provides training programs for front-line inspectors, and purchases detection equipment that can "sniff" out nuclear materials.

Protecting U.S. Borders, Bases and Cities

This area, in effect the third line of defense, strives to detect radiological or nuclear materials at U.S. ports of entry. For several federal agencies, including the U.S. Coast Guard and the U.S. Customs Service, we are providing information on handheld radiation detectors and isotope identifiers. We are providing advice on what instruments to buy, and instructing operators in their use. Los Alamos is actively involved in a maritime surveillance study that analyzes potential vulnerabilities of commercial shipping.

Los Alamos is also playing a role in helping to protect U.S. military bases. One example of this is a joint NNSA and Defense Threat Reduction Agency effort. Its goal is to improve the Department of Defense's ability to detect, identify, respond, and prevent unconventional nuclear attacks by national, sub-national, or terrorist entities. The project combines technology and resources from both agencies to develop, deploy, test and demonstrate nuclear protection systems and networks at four different U.S. military installations. This effort is currently underway and involves Los Alamos and several other NNSA and DOE laboratories. If successful, the systems will be applicable to civilian urban areas.

Radiation Sensors and Detection Systems

Handheld Search Instruments. Handheld instruments are those that a police officer, customs inspector, or similar official can use to search for radioactive material on a person or in a suspicious package. They can identify the isotope emitting the radiation—an enhancement that allows a user to distinguish between benign radiation emitters such as radiopharmaceuticals or smoke alarms, and the weapons-usable material that we want to interdict. Los Alamos has developed a new handheld instrument with a Palm interface that enables users to distinguish between radiation sources within seconds. The Palm unit can provide data about the nature of the nuclear source at hand and the isotopes present. Los Alamos is exploring commercial licensing and production for this handheld search instrument. Earlier versions, the so-called GN (gamma-neutron) series of handheld instruments have already been commercialized.

Package Monitor. The Laboratory has developed systems to detect nuclear materials, particularly hard-to-detect ones such as uranium-235, which might be missed by regular search instruments. An example of this is a newly developed package monitor that detects nuclear material in parcels via neutron interrogation. A prototype of the package monitor is currently being field-tested at a U.S. Customs facility.

Portal Monitors. Portal monitors are specialized radiation sensors in physical packages that are optimized for detecting radiation from nuclear materials as a pedestrian or vehicle passes through a choke point. Los Alamos is the DOE repository of portal-monitoring expertise and has helped developed the technical standards for portal monitor performance. LANL has placed portal monitors around the world in support of the nuclear Second Line of Defense program as well as domestic and international safeguards programs. Currently, LANL is involved in the technical evaluation of portal monitors from all U.S. vendors against the technical standards.

Active Interrogation of Cargo Containers. Los Alamos is working with Idaho National Engineering and Environmental Laboratory and commercial partner ARACOR to develop and test a system that actively interrogates large cargo containers (air, sea, rail, and road) to determine if there is any nuclear material present. The system, a large U-shaped structure with a linear accelerator on one side and x-ray detectors on the other, can be driven over a cargo container to produce an x-ray image. The image shows neutron emissions, which are a signature of nuclear material.

Long-Range Alpha Detector. The LRAD is potentially valuable for sampling volumes of air or extensive surfaces where an alpha emitter may have been dispersed, and thus might be used in response to radiation-dispersal attacks. LRADs have been used for environmental monitoring at places where dispersed uranium is a problem. An LRAD implementation for radon monitoring has been commercialized by Eberline and could be rapidly adapted to the contamination-monitoring role.

EMERGENCY PREPAREDNESS AND RESPONSE

Los Alamos plays an important role within the area of nuclear emergency response. The largest and the most well-known team in this area is the DOE-managed NEST team. NEST was created in 1975 in response to concerns over nuclear terrorism activity. Its effectiveness is due to well-established interagency relationships including significant Department of Defense and FBI collaboration. NEST is focused on responding to a threatened act involving radiological or nuclear materials or devices. Among the range of potential terrorist threats involving weapons of mass destruction, the nuclear response infrastructure and capabilities are the most mature and capable of addressing the threat. NEST includes the capabilities to search for, diagnose, and disable an improvised nuclear device.

NEST depends on a team of highly dedicated individuals at the national laboratories and facilities throughout the DOE-complex who volunteer their expertise to this program. Los Alamos' NEST and related activities are funded at approximately $10 million in fiscal year 2002. More than 100 Los Alamos scientists and engineers are involved in various aspects of the NEST program. Nearly all are involved in

other parts of the Laboratory's research in nuclear weapons or threat reduction. Many of the employees who work part-time on NEST are involved with more than one team within the NEST program.

It is important to note that NEST is more than a group of scientists who stand at the ready with pagers on their belts, waiting to be contacted to respond to a crisis. NEST team members at the DOE and NNSA laboratories, including Los Alamos, are involved in a wide range of related activities including research and development into diagnostic tools, disablement techniques, and computer simulations and modeling; working with the intelligence and law enforcement communities on the analysis of threats and the development of analytical tools; training of employees from other government agencies in environments that allow hands-on work with the actual nuclear materials that they might encounter in the field; and providing subject-matter experts when required. Los Alamos has the lead within NEST for development of nuclear diagnostic tools to help determine the nature of the suspected threat device and for maintenance of what is called the "home team," a group of experts parallel to those that would be deployed in the field who can provide analysis, advice and technical support.

Los Alamos is involved to varying degrees in all aspects of the national NEST program. The activities of the national team, and Los Alamos' role, are as follows.

Search Activities. Los Alamos is primarily involved in research and evaluation of detectors used for search.

Joint Tactical Operations Team (JTOT). JTOT is a partnering of DOE and DoD expertise that provides advice or direct assistance to render safe a suspect malevolent employment of a nuclear device by terrorists or others and to perform a nuclear safety assessment for the eventual safe disposition of the device. Los Alamos plays a major role in the JTOT mission and is involved in maintaining management oversight, render-safe capability, diagnostics capability, emergency response home-team capability, a watchbill (a group of experts who are on call 24 hours-a-day, seven days-a-week, year-round), communications support and deployable equipment, and contingency planning.

Real Time Radiography. This system uses a portable source of x-rays to look at a suspect object in real time, without moving or disturbing the object. Using this technique, we can identify electronic components within the object, yielding important data for action decisions. Just as a dentist uses an x-ray to locate a cavity, we can use this system to locate where to drill a suspect object, disrupting its electronics and disabling other components. This system was adapted from commercially available equipment and enhances what is available to most emergency responder units.

Accident Response Group (ARG). ARG is responsible for dealing with incidents involving a U.S. weapon, commonly referred to as a "Broken Arrow." Los Alamos has experts on the ARG roster that may be called upon if their particular set of knowledge is necessary to deal with the given situation.

Disposition. These assets support both the JTOT and the ARG team, making decisions about the ultimate disassembly and disposition of a device after it has been made safe to move and ship to a remote location.

Consequence Management. Following an incident, this team is involved in the immediate monitoring of any potential radiological dispersal and in monitoring and forecasting that can advise responders on issues of evacuation and treatment.

Attribution. This area involves drawing upon capabilities from the U.S. weapons testing program to analyze samples and draw forensic inferences about a threat device. In the case of a nuclear detonation or seizure of a weapon (or precursor material) it will be necessary to attribute quickly and accurately the material/item/incident to the perpetrators through an understanding of the materials used, type of device, yield produced or anticipated, the source of the technology and the pathway(s) that lead to the event. This requires an integrated national security program that draws on the broad based technical expertise available in NNSA as well as key NNSA facilities and analytical capabilities.

Radiological Assistance Program (RAP). Related to but separate from NEST, DOE and Los Alamos maintain response plans and resources to provide radiological assistance to other federal agencies; state local, and tribal governments; and private groups requesting such assistance in the event of a real or potential radiological emergency. The Los Alamos RAP organization provides trained personnel and equipment to evaluate, assess, advise, and assist in the mitigation of actual or perceived radiological hazards or risks to workers, the public, and the environment. This Los Alamos capability supports associated activities throughout RAP Region Four: Kansas, Oklahoma, Texas, Arizona, and New Mexico.

CONCLUSION

Los Alamos is a national laboratory with a broad set of capabilities in the area of homeland security and a long history of serving the nation in this area. As President Bush stated in his June 6, 2002, address to the nation, "In the war against terrorism, America's vast science and technology base provides us with a key advantage." Our capabilities will continue to be at the service of the nation.

The CHAIRMAN. Thank you very much.

Dr. Shipp.

STATEMENT OF BILLY D. SHIPP, Ph.D., PRESIDENT AND LABORATORY DIRECTOR, IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Dr. SHIPP. Thank you, Mr. Chairman, distinguished members of the committee. Thank you very much for the opportunity to be able to address you today on this very important item.

Before I go on, Mr. Chairman, I'd like to acknowledge and thank you and the committee for your longstanding support for the national laboratories and recognize the senior Senator from Idaho, Mr. Larry Craig, for his longstanding support, as well.

I'd like to take just a slightly different approach, and back up and look at what I consider as the three overarching roles for the national laboratory system and the national laboratories individually, as well. And those being to innovate; the second is to integrate; and the third is to evaluate.

Let me deal first with innovation, because that's certainly the hallmark of the national laboratory system. We've heard Dr. Orbach and a number of the colleagues across the table already speak to the many accomplishments that their laboratories and the laboratory systems have created. If you want to look at a quantitative kind of approach to that, all we have to do is look at the recent DOE's Energy 100 list, the annual R&D 100 list, MIT's technology review 100 list, and you'll find that those are populated—perhaps dominated, but certainly populated substantially with scientists and scientific contributions from the national laboratory systems. This powerhouse of innovation is now being brought to bear on our national security and homeland-security issues, as well, here.

Now, I'd like to just recognize what's happened over our history of 50 years. Senator Domenici talked about the evolution from the AEC to ERDA to DOE. A number of us have lived through that, Senator, as well. But recognizing, during that time, the national laboratories have evolved to meet the needs of the public, to meet the needs of the United States. And certainly that's what the case is today. The needs of the public and the country has evolved to the point that bringing to bear the innovation capabilities of the national laboratories is very appropriate.

Back in mid-November of this past year, the DOE laboratories showcased a number of their innovations to the Homeland Security Director Tom Ridge in D.C. And, of course, the INEL was among those. And I certainly won't list all of the things that we have talked about, but I would like to highlight just a couple of them. One of them was what we call PINS, Portable Isotopic Neutron Spectroscopy system. It's a field-deployable system that allows you

to determine the contents of unmarked containers. Even chemical weapons can be identified in this manner.

A second is the weapons-detection system. It's developed for the National Institute of Justice. The technology can be built into doorways and frames and so forth to identify weapons on individuals and can actually project those onto a security agent's monitor and tell, not only what it is, but where it is on the person.

And, finally, as an example, the highly enriched uranium system that we've been working with colleagues from Los Alamos National Laboratory, to look at highly enriched uranium that could be contained in cargo containers, a very difficult technical task itself.

The second key role that's inherent to the national laboratories is integration. And in homeland security, integration becomes very, very important. And this really deals with the issue of bringing the best and brightest to bear on the most difficult and intractable problems that we have. And integration, in effect, does just that. It means leveraging the physical and human assets from the locations, wherever they may be. And I can just echo what my colleagues have said, and the panel previous to us, as well, as a number of the committee members have acknowledged—to be able to integrate, you've got to be able to draw up on all of the assets, whether they be in the universities, whether they be in the national laboratories, and certainly across our whole system to be able to effect solutions to those very intractable problems. The DOE laboratories and the NNSA laboratories all have relationships with the universities, private industry, and so forth. They can facilitate that. It's a routine part of our business.

Finally, I'd like to deal with the issue of evaluation, because the DOE laboratories and national laboratories have unique systems out there, and we have the ability to deal with the complexity of issues that private industry simply cannot do.

And if I can turn just a bit parochial for a moment with the Idaho National Engineering and Environmental Laboratory, we are the largest continuous geographic laboratory, occupying some 890 square miles, about 85 percent of the size of the State of Rhode Island. We have a completely secure and isolatable power and communications systems. We have many other considerations, acknowledging what Mr. Craig—Senator Craig said earlier about the—our view that it would be a wonderful choice as—for a critical infrastructure test range that we've been working with Sandia and the Pacific Northwest Laboratory on, as well. With our existing infracture as a secure, remote location and the workforce that we have, we believe it would be a natural candidate for a center of excellence in the proposed Homeland Security Department.

In conclusion, Mr. Chairman, it is my belief that DOE's and NNSA national laboratories have and certainly will continue to provide the kind of support to this country that we have in the past in securing both our security—our energy security as well as our national security. And, as one of the laboratory directors, I can assure you that we will bring those to bear, and we'll bring them to bear in a seamless kind of organization. And, as you consider the new legislation, I hope you will continue as you have to consider the role of the national laboratories and the direct accountability and the direct access from this new department into them.

Thank you very much.
[The prepared statement of Dr. Shipp follows:]

PREPARED STATEMENT OF BILLY D. SHIPP, PH.D., PRESIDENT AND LABORATORY DIRECTOR, IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Mr. Chairman and distinguished members of the committee, good afternoon and thank you for giving me the opportunity to speak with you on a subject of such great importance to our nation—the present and future roles of U.S. Department of Energy and NNSA (National Nuclear Security Administration) national laboratories in protecting homeland security.

As the director of the Idaho National Engineering and Environmental Laboratory, the former associate director of Pacific Northwest National Laboratory and as the state of Idaho's Science Advisor, I've committed most of my adult life to the advancement of science and feel personally responsible for helping chart a prudent course into a safer, more technologically assured future.

As I seek to fulfill that responsibility, I thank you, Mr. Chairman, for the support we receive from this committee and Idaho's senior senator, Larry Craig.

Before I get into the core of my remarks today, I would like to add my voice to the chorus of those who champion the overall Department of Energy National Lab System. Whether focusing on national security, energy security, environmental quality or the basic science that underpins life itself, the national labs are a national treasure of nearly incalculable value. The lab system is home to a critical mass of unique facilities and unparalleled human resources that is the envy of the world, and must be preserved and strengthened. The investment this nation has made in its lab system must be leveraged now, as never before, to both maximize return on taxpayers' hard-earned dollars and to improve the safety and quality of all of our lives.

That said, let me now share my view on the roles of the DOE's and NNSA's national labs in the specific area of protecting homeland security. From where I sit, I see three overarching roles that our labs are uniquely suited to fulfill. The first is to INNOVATE. The second is to INTEGRATE. And the third is to EVALUATE.

INNOVATE

The national lab system is a powerhouse of innovation, as has been proven over many years and verified by a multitude of external entities. The Energy 100 list compiled last year by the Department of Energy and judged by an outside panel of experts offers an excellent example of the breadth of innovation resident in the DOE system of labs. From energy-efficient electronic ballasts for fluorescent lighting to development of advanced cancer radiotherapy treatment systems, the contributions of the labs have been life-enhancing and expansive. The annual Research and Development 100 competition that seeks to identify the world's 100 most significant technological developments of the year is routinely populated with the work of DOE/NNSA and INEEL scientists. And MIT's Technology Review 100—assessing our nation's best and brightest young scientists under age 35—this year acknowledged more DOE lab scientists, including one from the INEEL.

And this innovative powerhouse that is the national lab system has focused on the new national challenge of enhancing homeland security. In mid-November of last year, the DOE labs showcased their national security tool chests for Homeland Security Director Tom Ridge . . . and many of you.

My lab, the INEEL, was among the research centers displaying wares at the event. We showcased our Portable Isotopic Neutron Spectroscopy system. PINS is a mobile, readily field-deployable system for the identification of the contents of unmarked or unknown objects. In fact, PINS was used extensively here in Spring Valley, when abandoned and buried World War I-era chemical weapons were discovered in suburban yards. The U.S. Army has integrated PINS with other technologies into a complete system to identify or verify the contents of chemical weapons that are being prepared for destruction. The system also has been used numerous times throughout the United States to identify the contents of unknown objects uncovered at construction or demolition sites or at industrial plants. The Army has ably demonstrated its use for homeland security.

Though not showcased last November, the INEEL's labs have developed and continue to develop a wealth of other homeland security-enhancing technologies. Notable among these is a weapons detection system—developed with the support of the National Institute of Justice—that can be built into existing doorways, can find and measure weapons on a person and then display the locations of those weapons on a security guard's TV screen. The technology has already been licensed to the pri-

vate sector, creating jobs and getting an important technology out into the field. But more importantly, our concealed weapons detector offers greater protection for children and adults wherever it is installed—schools, courthouses or public buildings.

Another significant technology addressing a national issue is our unique solution to detect smuggled weapons-grade uranium buried in cargo containers. Our scientists—working with researchers at Los Alamos—have proven that electron accelerators cannot only identify small amounts of special nuclear material, they can differentiate between HEU (Highly Enriched Uranium) and legally shipped medical or commercial isotopes.

INTEGRATE

A key role and inherent capability of the national lab system is INTEGRATION. In homeland security, rapid progress depends on putting our best and brightest to work in a collaborative environment . . . to encourage synergy and avoid redundancy.

Integration means leveraging physical and human assets in multiple locations and from the public and private sectors. The DOE labs have strong pre-existing relationships with non-DOE federal and private-sector organizations and universities.

At the INEEL, we are co-managed by the Inland Northwest Research Alliance—a consortium of eight universities stretching from Alaska to Utah—with significant capabilities in homeland security-enhancing research. Specific centers or specialties include Utah State's Center for Microbe Detection and Physiology, University of Idaho's Center for Secure and Dependable Software and Idaho State University's Idaho Accelerator Center.

We are collaborating with Sandia National Laboratories on SCADA (supervisory control and data acquisition) systems research and testing, using INEEL's secure and isolatable power generation and delivery systems.

We do integration work for not only DOE but also other agencies, such as command and control systems for the Air Force and munitions assessment systems for the Army. The AN/TSQ-209 Communication Central was designed and deployed by the INEEL to automate requests for air support. It incorporated defense-wide communication software developed by Lockheed Martin. We are analyzing its considerable potential for emergency response communications.

EVALUATE

Finally, DOE labs have unique facilities needed to put promising homeland security-enhancing technologies to the test. The private sector simply doesn't have anything in scale and capability close to what the DOE labs offer the nation.

At the INEEL, we excel in this area of evaluation. That's why the Navy depends on us so heavily to support its nuclear propulsion program. It is why the Air Force has come to us for everything from the nuclear-powered airplane in the 1950's to precision measuring systems today.

We, at the INEEL, offer the largest continuous geographic area of any of the national labs. We have completely secure and isolatable power and communications systems, and many other considerations that make us the nation's top choice for a CRITICAL INFRASTRUCTURE TEST RANGE.

As new protective technologies are developed, we must conduct an extensive independent test and evaluation process to validate the capabilities and, ultimately, to define standards by which infrastructure protection technologies are certified. Computer modeling and simulation alone are not enough. The interdependencies of complex systems must be tested and validated on a scalable basis from bench-top to full-scale real-world conditions.

The INEEL proved this concept in the nuclear industry when we conducted the Loss of Fluid Test and the Semi-Scale programs that helped define nuclear safety codes. The Critical Infrastructure Test Range will complement efforts to model equipment, systems, and interdependencies with numerical simulations.

Critical infrastructure "consequence management" is as significant a homeland security tool as any sensor or detector. Much effort is being placed on the development of mitigating actions to protect our people from attacks involving chemical, biological, or nuclear weapons. I would suggest it is imperative that we have a 'consequences control' program to mitigate the impacts of these kinds of attacks on our critical infrastructures. The INEEL is addressing this issue within its Test Range program.

With its existing complex infrastructure, secure and remote location, and experienced work force, the INEEL Critical Infrastructure Test Range is a key element of the nation's homeland security and a natural candidate for consideration as a Center of Excellence for the proposed Homeland Security Department.

CONCLUSION

Today, we are major contributors, but even more so tomorrow, DOE's and NNSA's national labs will play essential roles in enhancing homeland security. Combating those who harbor ill will toward the United States will require constant vigilance and considerable investment. Our foes are, right now, seeking new technologies and avenues to assault us. We must press on in our efforts to stay ahead of them. As laboratory director of the INEEL, I assure you that my facility is on the job today, as it has been for over a half-century . . . and we're up to the challenges of tomorrow. We will innovate, integrate and evaluate technology-based solutions that will advance our common national interest in enhanced homeland security.

As you respond to the call to create the Department of Homeland Security, it is vital that this new Department access the great strengths of the national laboratories. Thank you.

The CHAIRMAN. Thank you very much.

Dr. Drucker?

STATEMENT OF HARVEY DRUCKER, Ph.D., ASSOCIATE LABORATORY DIRECTOR, ARGONNE NATIONAL LABORATORY

Dr. DRUCKER. Mr. Chairman, committee, thank you so much for the opportunity to address you today.

The risks of terrorism in the 21st century really pose a new set of concerns and challenges to an open, democratic, technology-based society. In science and technology, that means we have to do something that we did a long time ago. We have to respond with something equivalent to the Manhattan Project. We need to draw on the best and the brightest, on the broadest cross-section and the most diverse blend of disciplines we can, in national laboratories and academe and industry. We need to look for a number of different methodologies to combat those who wish to harm us. There will not be any magic one cure—there will not be any one magic technology in the chemical and biological area, in area of nuclear—dispersion of nuclear materials.

Let me give you a few examples of what a non-weapons lab can do in this effort. In the nuclear area, really going back to Enrico Fermi and stag field—we're kind of proud of that—okay, we have been involved in the fuel cycle. We understand it. We believe better than probably any lab in the world, again, going back to our total history. We are not a weapons lab, but we understand how commercial nuclear energy works. We understand the processes, the materials associated with it, the issues of not just products produced, but of waste produced. We, in the process of working in this area, have become quite expert at detection of nuclear materials at every level, from finding something kilometers away to finding something in a cache in a stairwell. That is of particular importance when you consider the threat of radiation dispersal devices, the so-called "dirty bomb."

We can, in addition to detecting these materials, analyze them. If we think that there is something there, we can begin to do the sorts of chemical and radiologic analysis that will allow us to attribute and will allow us to determine—and I hope this doesn't happen—what is the risk of such a device to the public after it's been used. We have broad expertise and a number of different methodologies that we've developed for decontaminating areas that have been contaminated with radioactive materials and returning them to service.

In the infrastructure area, going back to the days of the National Acid Precipitation Assessment Program, we've looked at energy generation, we've looked at its transmission and its distribution. We've looked at this for natural gas, liquid fuels, electricity. We know what these systems look like.

Working with our colleagues at Sandia and Los Alamos, we're not looking at how these systems intertwine. A cutoff of natural gas, as most of you know, can mean a cutoff of electricity, especially cutoff at peaker plants. We need to know, not only how these systems intertwine each with the other, but how the cyber systems which operate them interface with them if we are to develop a defense against attacks on our energy infrastructure. We need all that information, and we need to take it and put it in such a fashion that those who would respond to emergencies would be able to route power effectively after an incident involving the energy infrastructure. And I believe that we've got a good chance of doing that.

The third area that I want to spend some time on is this really new one for the world, comprehensive bio-defense, defense against biological and chemical weapons. Let me give you a few factlets. Five years ago if you wanted to know the full molecular basis of a protein structure, it took you 910 days, almost three years. We can now get you a protein structure—full, high-level protein structure, every little bit molecule in it dancing—in about 38 days. That's a 24-fold acceleration.

Is this an academic fact? No. It turns out that proteins are the targets for chemical and biological weapons. If we understand their structure, if we understand what renders them—what are the causes of harm to them from chemical—what are the mechanisms of harm from chemical and biological agents, we can develop prophylactics, things that will prevent such effects—drugs that will prevent the effects of these agents. We can develop therapeutics, materials that will alleviate the symptoms. And, more importantly, we can develop vaccines that are specific and less harmful than the existing vaccines.

What is the basis of this? Well, there are a lot of different bases, a lot of which does arise from the work of the Department of Energy and its national laboratories. Primarily this is a result of new light sources, synchrotron light sources that are capable working—pardon me—of providing tremendous amounts of data on protein structures faster than anything we've been able to do before. It's also a function of developing new robots that are capable of essentially starting from genetic material and taking that genetic material and going through all the way through to protein crystals which can get placed in these new powerful light sources.

I guess what I'd like to conclude with, I think it's very clear that we, at Argon, and at other non-weapons laboratories, are ready and willing to serve our country and to provide capabilities that really will be of more than moderate service against the present threats.

Thank you.

[The prepared statement of Dr. Drucker follows:]

PREPARED STATEMENT OF HARVEY DRUCKER, PH.D., ASSOCIATE DIRECTOR, ARGONNE NATIONAL LABORATORY

INTRODUCTION

This presentation is intended to make two key points with regard to the current and potential contribution of the Department of Energy's (DOE's) multiprogram laboratories to the achievement of national homeland security objectives. These are:

- The broad and diverse base of technical expertise, capabilities, and facilities developed by the non-weapons national laboratories places them in a unique position to address the non-traditional and unconventional domestic threats posed by international terrorism.
- Because bioterror weapons appear to present the greatest long-term domestic threat, a coalition of federal laboratories, government agencies, and private industry can and should implement a national biodefense initiative that is sufficiently effective to make bioweapons essentially irrelevant.

A brief discussion of the capabilities resident at Argonne National Laboratory will help to indicate the validity of these assertions. Argonne is one of DOE's government-owned, contractor-operated, multi-program research facilities. It is operated for the DOE by the University of Chicago. The laboratory has an annual budget of about $480 million and employs approximately 4,000 people. It occupies two sites—in Illinois and Idaho—that total 2,400 acres.

Argonne is the DOE lead laboratory for nuclear fuel cycle research. It builds and operates major national user facilities, and it conducts basic and applied research, development, and assessment programs for and with DOE, other federal agencies, and state and local government. The Laboratory collaborates extensively with university and private-sector research partners.

LABORATORY CAPABILITIES DERIVED FROM NON-DEFENSE RESEARCH AND DEVELOPMENT MISSIONS

Multidisciplinary, multiprogram, non-weapons laboratories like Argonne have developed a very broad base of scientific and technical capability. We have found that basic research and technology development performed for DOE and other sponsors can, and, we believe, will make major contributions to homeland security. As a nation, terrorism poses an incredible number of threats to a multitude of targets. Our defense and response to unconventional nuclear, biological, and chemical threats will require different ways of thinking, and a range of technologies yet undeveloped that can provide us information, response, amelioration, and prevention. It will require the integration and re-synthesis of existing science and technology to fit these new needs. For example, as the DOE lead laboratory for civilian nuclear fuel cycle research, Argonne is a national center of excellence for the detection, management, decontamination, and disposal of nuclear materials, radioisotopes, and other sources of radiation. For that same reason, the Laboratory has developed a significant base of expertise to address the health and environmental impacts of exposure to these hazards, and the staff is knowledgeable about techniques for minimizing their effects. The Laboratory is therefore well positioned to provide effective technical support for the process of detecting, communicating, reacting, responding, mitigating, preventing, and neutralizing the threat of domestic nuclear or radiological terrorist attacks.

As a major DOE physical science research facility, Argonne is also positioned to address non-traditional, security-related research and development problems that are technically complex and require specialized, and possibly unique equipment and facilities. For instance, the Structural Biology Center at Argonne's Advanced Photon Source is equipped to play a key role in characterizing new or unknown bioagents and can provide biomolecular information needed to develop prophylactic and remedial drugs or vaccines. Core basic research programs at non-weapons laboratories, such as Argonne, have a dual value. They not only support peacetime applications, but can also have significant potential value in countering terrorism. Thus, a current Argonne program to develop a biohazards detector has relevance for both human health diagnostics and homeland security.

ARGONNE'S NATIONAL SECURITY RESEARCH AND DEVELOPMENT PROGRAM

Although it is not the Laboratory's primary mission, the expertise of Argonne's staff and the Laboratory's research and engineering facilities are also applied in direct support of the national security goals of the Department of Energy, the Department of Defense, and other public agencies. These activities aim to reduce threats that result from the proliferation or use of weapons of mass destruction, and from

nuclear, biological, or chemical attacks on critical components of our domestic infrastructure. The current annual budget of the Laboratory's national security research and development effort is approximately $42 million. It includes three key components:

- Nuclear non-proliferation, treaty verification, and arms control
- Domestic infrastructure assurance
- Chemical and biological counter-terrorism science and technology

NUCLEAR NON-PROLIFERATION, TREATY VERIFICATION, AND ARMS CONTROL

This program is based on the Laboratory's recognized expertise in nuclear fuel cycles and nuclear materials. It aims to reduce the threat to U.S. national security by limiting the spread of nuclear, biological, and chemical weapons of mass destruction. Among the more pressing problems that face the United States is assuring the integrity of systems for controlling nuclear materials in the independent states that resulted from the dissolution of the former Soviet Union and in the nuclear-capable nations of south and southeast Asia. Argonne supports the U.S. effort to provide technical assistance to these nations to help improve their systems for monitoring, control, and export of nuclear materials; for decontamination and decommissioning; and for assuring the security and safe disposal of reactor fuels and other materials that might be used in the manufacture of weapons.

The capabilities that the Laboratory brings to this international program are equally applicable to homeland nuclear security (Figure 1).* Thus, for example, Argonne is equipped to develop and apply sensitive detectors for identifying facilities, equipment, and containers used to make, handle, or conceal nuclear materials. As a participant in the DOE Region V Radiological Assistance Program (RAP), Argonne currently collaborates with local and federal authorities. In this association, the Laboratory provides technical advice, training, expert personnel and equipment, and monitoring and assessment support for the mitigation of immediate radiation hazards and risks to workers, the public, and the environment due to radiation emergencies and incidents (Figure 2). In this regard, the Laboratory has been working with Chicago-area emergency providers from city to suburbs at levels from senior executive to first responder. We are active in the Antiterrorism Task Force for Northern Illinois and are communicating with the FBI teams responsible for incident management relative to their needs and our capabilities for providing immediate aid. The goal is to provide our relevant skills commensurate with events in the field.

The Laboratory can do this because it maintains substantial capabilities for nuclear-related field and lab measurements, radiation dose estimation, decontamination, emergency construction, radioactive materials handling, nuclear risk management, and domestic nuclear threat attribution. For example, Argonne operates a facility specifically designed to receive and encapsulate actinides for their subsequent safe characterization at a normal Advanced Photon Source beamline. This capability bears directly on the attribution of potential terrorist acts involving nuclear materials. Exhibit 1 provides a more detailed summary of Argonne's major facilities for applying science and technology to nuclear and radiological counter-terrorism.

DOMESTIC INFRASTRUCTURE ASSURANCE

Argonne's infrastructure research, technology, and assessment program aims to assure the security and reliability of critical U.S. infrastructures and the safety of associated populations. The program develops and evaluates technologies and methods for detecting, combating, and recovering from nuclear, biological, or chemical, terrorism. The current effort includes vulnerability assessments focused on physical, operational, and cyber security, and the interdependencies of critical infrastructural elements, such as electricity, natural gas, transportation, and telecommunication systems. It considers the potential for cascading impacts resulting from disruptions to one or more types of infrastructure; methods of detecting events affected by interdependencies; and improved technology and procedures for preventing and recovering from such events. An important component of the program is an infrastructure outreach project that aims to increase the security awareness of infrastructure owners and operators and promote sharing of best practices and lessons learned. Argonne's community critical infrastructure protection project collaborates with communities and local utilities to develop plans and procedures for municipalities to prevent or recover from major disruptions to energy infrastructure (e.g., natural gas supply systems). The Laboratory recently led a study of the infrastructure inter-

*All figures and exhibits have been retained in committee files.

dependencies associated with the attack on the World Trade Center and provided infrastructure assurance support for the Olympic Games in Utah. In the Chicago Metropolitan Area, Argonne, in partnership with the Commonwealth Edison Company, the City of Chicago, 270 surrounding municipalities, and three pilot communities, has developed comprehensive guidelines for addressing electrical power system disruptions. The results are currently being applied in California, Utah, and other regions. Figures 3 and 4 summarize some of the more critical needs for analytical techniques and technologies to support domestic infrastructure protection efforts, and Figures 5a through 5f illustrate some of Argonne's recent technical support activities in this area.

CHEMICAL AND BIOLOGICAL COUNTER-TERRORISM SCIENCE AND TECHNOLOGY

Within the framework of its basic and applied science programs, the Laboratory maintains substantial expertise and facilities for addressing potential chemical and biological threats. These capabilities include instruments and sensors for detection of chemical and biological threats in air, water, and soil, whether dispersed over kilometers or hidden within sites and caches. Facilities are also available for evaluating the effectiveness of chemical and biological monitoring methods at both the Laboratory and field scales. The Laboratory can provide technical assistance in emergency situations and deploy fast-response systems for protecting first responders, decreasing exposure times, estimating population exposures and reducing risk. Under the sponsorship of the Departments of Energy and Defense, the Laboratory has developed portable biochip microarrays capable of detecting and identifying anthrax and other bioagents (Figure 6). For the Joint Chemical Aid Detector Program (JCAD), the Laboratory developed a hand-held, cyanide gas microsensor. (Figure 7). With the Sandia and Livermore laboratories, Argonne is now demonstrating technologies for mitigating impacts from chemical and biological attacks on interior infrastructures deemed to be at high risk, such as subways, airports, and public buildings (Figure 8). Argonne also participates in the U.S. Army program for assessing environmental risks associated with chemical agents (Figure 9).

At the Advanced Photon Source (Figure 10), the Laboratory operates a unique structural biology facility that can provide information required to support the development of drugs, vaccines, and other pharmaceuticals for treatment of exposure. Other available facilities include capabilities for determining the health and environmental risk from the dispersion of chemical and biological agents, and expertise for evaluating the potential effect of such agents on populations and materials. Argonne is also equipped to develop appropriate protective materials and methods of decontamination. Expertise, equipment, and facilities are available to conduct laboratory and field analyses for attribution of chemical and biological attacks.

Among the relevant special-purpose facilities that are currently operational at the Laboratory are: an electron microscopy center capable of examining and characterizing nanoscale embodiments likely to be used in chemical and biological detectors; a multi-bay robotics laboratory capable of developing remote manipulators for use in hazardous situations; a mobile laboratory for chemical agent detection and confirmation of onsite decontamination subsequent to cleanup operations; and a certified level 2 dilute chemical agent facility for development of analytical methods, detector testing, development of decontamination technologies, and validation of transport models. Exhibit 2 provides a more detailed summary of Argonne's major facilities for applying science and technology to chemical and biological counter-terrorism.

PATHWAY TO A NATIONAL BIODEFENSE INITIATIVE

A recent study of the potential impact of attacking American cities with nuclear, chemical, and biological weapons indicated that bioterror weapons represent the most dangerous domestic threat. This study simulated nuclear, chemical, and biological attacks on three American cities. What is most striking is that a biological attack can be expected to produce many more casualties than either a nuclear or a chemical weapon.

The effectiveness of biological weapons is highly dependent on the rapidity of the defensive response. If efficient mechanisms for early detection, communication, reaction, response, mitigation, and prevention are in place, the potential impact of an attack can be reduced enormously. In principle, a sufficiently effective biodefense system could make biological weapons irrelevant in the same sense that an effective strategic defense initiative can deter the ballistic missile threat—because the probability of success would be too low to justify the use of the weapon.

Speed at every stage of a biodefense system is key to its success. This includes the ability to detect and identify an unknown bioagent; analyze it to determine what

countermeasures (vaccines, drugs, anti-toxins, etc.) would be effective; and then engineer, produce, and distribute an appropriate preventive or curative pharmaceutical or disinfectant. In this regard the news is promising: Five years ago the total time required to produce a useful characterization of a protein structure was about 910 days. Advances in bioengineering since then have reduced the time to about 38 days—an acceleration factor of 24. Further progress can be expected at each stage of the process as analytical techniques and technology in the fields of genomics, structural biology, and computation continue to improve. It is now possible to visualize the elements of a technological pathway that could support the development of an effective national biodefense initiative. The technical underpinnings of such a system would include:

- Instruments and laboratories capable of detecting and identifying unknown bioagents.
- Facilities and expertise equipped to analyze a bioagent at the cellular level.
- Facilities and expertise required to produce and purify bioagent proteins.
- Facilities and expertise required to crystallize bioagent proteins.
- X-ray facilities required to determine the structure of bioagent proteins.
- Expertise and computational resources required to analyze bioagent protein structure.
- Expertise and computational facilities required to design and bioengineer proteins.
- The capacity to design and develop pharmaceuticals and predict their potential effects.
- The capacity to rapidly produce designer pharmaceuticals. The organization, authority, and facilities required to evaluate and certify new pharmaceuticals.
- The capacity for rapid, high-volume distribution of pharmaceutical agents to targeted populations.

Of these elements, the first six to seven exist in some form in the DOE national laboratories that participate in the genomics and structural biology programs. The last four to five exist in some form in the pharmaceutical industry and in public agencies, such as the U.S. Food and Drug Administration. These resources are not, for the most part, presently organized and equipped to deliver the kind of rapid response required to support an effective biodefense program, but the components are present and technical progress continues. Figures 11 and 12 indicate how a fully developed biodefense system might function to produce a pharmaceutical needed to counter a bioterror attack.

Given the gravity of the bioterror threat, the state of the art, and the availability of public and private resources, two initial steps deserve serious consideration:

- Definition in detail of a technical and organizational pathway that would lead to the establishment of a cost-effective national biodefense system.
- Initiation of a limited-scale government-industry pilot project designed to serve as a proof-of-concept.

Figures 13 through 15 summarize the case for a biodefense initiative and suggest a possible first-stage course of action. It is worth noting that such an initiative can be expected to produce substantial spinoff benefits for medical science, public health, and the pharmaceutical industry.

CONCLUSION

We respectfully suggest that:

1. Because of the exceptional breadth and depth of the technical capabilities developed during the course of conducting peacetime research and development programs, non-weapons, multiprogram laboratories like Argonne are in a position to make a uniquely valuable contribution to the attainment of homeland security objectives that involve defense against unconventional nuclear, chemical, and biological attacks by a non-traditional enemy. We further suggest that the multiprogram laboratories have already provided a significant body of evidence to confirm this assertion through the successful contributions to nuclear, chemical, and biological counter-terrorism that they have already made under the direct sponsorship of public agencies responsible for national security. It remains to organize these laboratories and their interactions in ways that will enable them to optimize their capacity to contribute to the new, high-priority national goal of homeland security.

2. Appropriate exploratory and initial steps should be taken immediately to establish a national biodefense initiative that takes full advantage of the resources available through an effective collaboration of federal laboratories, government agencies, and the private sector. Minimum steps are a detailed specification of the technical

and organizational pathway to this objective and initiation of a proof-of-principle pilot project.

The CHAIRMAN. Well, thank you all very much. The main thrust of the testimony has been that this panel has been that laboratories have a great deal to contribute to solving the security problems we face here from terrorism or potential terrorism. And I certainly agree with all of that.

Let me just ask a few questions, though, about how we should best try to structure this new department. Let me ask Dr. Happer first. The proposal, as I understand it from the department for managing the research and development responsibilities in this new agency is to have one of the programmatic elements assigned that responsibility—that is, this undersecretary for chemical, biological, radiological, and nuclear countermeasures would be responsible for the R&D activities.

An alternative to that would be to have someone in the nature of a chief technology officer, who would have a department-wide responsibility and would work for the Secretary and be able to sort of oversee R&D-related activities, department-wide. Do you have a point of view as to what makes the most sense?

Dr. HAPPER. Well, I think that, to really make an impact, whoever is given charge of this has to have a budget, so to—the idea that some sort of distinguished advisor is going to tell the Secretary, you know, wise things to do without actual budget authority, I just don't think will work. So I think it has to be set up so that——

The CHAIRMAN. So it's going to be line authority. Whoever is in charge of R&D has to have the budget related to R&D, in your opinion.

Dr. HAPPER. I feel strongly that way. You know, I've watched a lot of chief scientists in this town, and they're very smart people, but they can't make things happen without money.

The CHAIRMAN. Okay. Let me ask the same type of question I was asking Ambassador Brooks. I'm not clear in my own mind how this new department would interface with these national laboratories in a concrete way in the sense that we're saying we're taking some elements that are now in the Department of Energy in NNSA, and we're transferring those to this new department and presumably transferring the budget for those to this new department. And whoever this person in charge of R&D in the new department turns out to be, they would presumably be able to do it—what they wanted with that budget, within limits. How would that work? I mean, this is not the same as is going on now at the national laboratories, as I understand it. I think the national laboratories are now essential Department of Energy laboratories operated on—by contractors——

Dr. HAPPER. Right.

The CHAIRMAN. And they do work for whatever agency they are tasked to do work for, in addition to what they're doing for the Department of Energy. Am I right about that?

Dr. HAPPER. That's right. And in previous testimony, it was clear that "work for others" has a lower priority. It's whatever is available. And so I think that this new agency will have to something better than "work for others" pecking order.

Now, maybe something similar to it would be, you know, DTRA, the Defense Threat Reduction Agency—it used to have another name—that did a lot of work at the national laboratories. It was a big part of their program. I should let the labs speak for themselves, but it seemed to me that that worked fairly well.

The CHAIRMAN. Okay. Do any of the other witnesses have a point of view on this second—this question I'm asking about how this new department would interface with the laboratories? Ambassador Robinson, did you have a point of view?

Ambassador ROBINSON. I believe they're still working out the details for how it would take place. When I urged that you streamline the procedures, these are some of the things I had in mind.

Now, we have found a relationship called "joint sponsorship," at which one agency and another agency can agree that work is crucial to them both and that they will provide joint sponsorship. From that point, you don't have to go through the rather cumbersome work for others, and there are taxes on work for others and a lot of other players in the game that slow down progress, and that you can interchangeably agree to use the procedures of either agency. So it's a trust relationship. Fine. We know there are procurement regulations that have to apply, but we don't have to apply both sets under joint sponsorship. One of them will be good enough, and you can move forward with the work.

I believe the Office of Homeland Security is considering having the President declare the status of this S&T work to be a joint activity between several departments, and particularly the National Nuclear Security Administration, and that would be very helpful, in my view, in allowing us to move forward together.

The CHAIRMAN. Well, the question that would occur to me is why don't we have this joint sponsorship arrangement with the Department of Defense and with the intelligence community or agencies, as well as with the new Department of Homeland Security? I mean, if it works well, which, as you describe, I have no reason to doubt that——

Ambassador ROBINSON. It's provided for under the Federal acquisition regulations, but you know this town as well as I do. Surrender of sovereignty is always a tough thing to get someone to agree to——

The CHAIRMAN. Well, maybe we could solve a lot of problems and just have everything that goes on at the labs be done under this procedure. I mean, everything that's done for any of the Federal agencies and that way eliminate some of the problems that currently exist.

Ambassador ROBINSON. I suggested that in my testimony, and we have talked about, as groups of laboratories directors together——

The CHAIRMAN. Great.

Ambassador ROBINSON. Many years ago, you gave us the title "national laboratories," as opposed to "energy laboratories" or "security laboratories." You gave us "national laboratories." But the rest of the apparatus didn't keep up with that and catch up with that.

I believe what is needed is to make us national laboratories. In fact, and if any problem within the government that requires

science and technology to solve should be able to use any of these laboratories in the same seamless way that the National Security—National Nuclear Security Administration or the DOE can today. We had a discussion prior to this hearing with Ambassador Brooks. He would support that.

Dr. ANASTASIO. Can I just add a comment to that?

The CHAIRMAN. Certainly.

Dr. ANASTASIO. I think, especially these kinds of mechanisms are appropriate when the programmatic activity, the mission goal, is a sustained mission over a significant period of time. Sometimes the "work for others" mechanisms are appropriate when you have just a project that's done that's a finite, you know, short period of time, and you need to come in and get some work done and get out. But for something like homeland security, where you would expect this is going to require a sustained investment, these kinds of mechanisms, I think, are very appropriate.

Dr. DRUCKER. Let me also comment on that.

The CHAIRMAN. Dr. Drucker.

Dr. DRUCKER. We have been doing work for a number of years for the Nuclear Regulatory Commission. We've got a division of people that are supported by them—about 80 people. We don't have any particular difficulty working for NRC. We don't have any particular difficulty working for the Environmental Protection Agency or NIH. Where there is a match between what the agency needs and what we are capable of doing and what DOE needs, there is no real difficulty in working together.

The CHAIRMAN. Very good.

Dr. DRUCKER. So I'm pretty much saying what we're all saying.

The CHAIRMAN. Well, let me defer to Senator Domenici, and let me just advise folks we have started a couple of votes, and there are two votes in a row, so I will defer to Senator Domenici, and then when he is finished with his questions, he can adjourn the hearing. Thank you all very much.

Senator DOMENICI. Senator Bingaman, thank you very much for the meeting today, for your patience, and for your sitting throughout the entire afternoon. I almost said "episode," but——

[Laughter.]

Senator DOMENICI. Let me say, now, just before you leave, the bill that I put in that—on homeland security that had to do with the eight Senators that sponsored this bill with me, we have joint sponsorship in that, and it's been thoroughly looked at. They've looked at it, and maybe we can at least get it to our staffs and think of applying it broader. We have applied it in this particular one, but it's just a little piece of working overseas.

Let me just talk a minute. First, to those who originally put together a plan, as loose as it has to be, I think a very serious mistake was made, Dr. Happer. I don't think they should have put any laboratory's name in as being the lead, because we can get 75 people of high scientific persuasion, and we can give them the three laboratories and say, "Take a week each and tell us which is best," and it just depends, but I can tell you they all wouldn't come down for one, no matter what, and so you've got these marvelous people—some have been working 20 years, 30 years, some at Argon on a different keel, but clearly great people wondering, you know, "Are

we going to have a laboratory that is super to us?" So I wish they would never had put it on. So I think it's gone, whether people think it is or not. We'll just be working on it in due course.

But let me tell you all that some very strange things happened as I've listened here. You know, Dr. Robinson, I could almost say the laboratory that sits before us that least followed the mandate of their mission in the past 20 years, or had missions that were not military, probably come out as laboratories that, at the beginning, might be best able to serve in this new capacity. Now, I say that because the laboratories that are run for the Department of Energy's nuclear activities—nuclear-weapons activities are challenged at, more than once a year, officially, for exceeding their mission—their mission being, no matter what great scientists you have, here's your mission. You make bombs, you make sure they're safe, and stay out of everybody else's business.

Now, it's been impossible to do that, right? They're just—the ventures are too good—are too diverse, diffuse—and then you have rightfully told us, "Give us 6 to 10 percent money that is loose. If ever the 10-percent money, the LDRD money, will come to the surface, it's when we now inventory our laboratories and find out what are they doing that might help in this venture because they did not have to apply their great scientists to laboratory activities for nuclear weapons. It was to use their scientists where their scientists went with something great, as you saw it great.

So I would think that you're going to find many of those activities, the things that have pushed you in areas that you're going to find when they come and say, "Can you do this," you're going to say, "Yes, we weren't doing it to build a bomb, but we were doing it because of such and such." So I do hope you chose well, because I do believe that's going to have something to do with the end product.

And, last, we had a—one little project that Sandia and Los Alamos did, the National Infracture Simulation and Analysis Center. I guess we are finally calling it NISAC. A fantastic gadget. That's too small a word. But am I right that the administration is finally beginning to put that somewhere with an office to use it? Can you tell me, Dr. Cobb?

Dr. COBB. Senator, that's correct. That's one of the things that they have earmarked that they will need in support of their new critical infrastructure programs.

Ambassador ROBINSON. Well, they do have it report to a different undersecretary than the rest of the R&D, and I believe that's appropriate.

Senator DOMENICI. Two last comments. Everybody says yes. I don't say yes yet. To assume there would be no additional money needed because everybody's going to move people around, and when we're finished we're going to have the same number of people we now have, and it shouldn't cost any more. Well, let me tell you, I—that seems to me to say that we have a lot of people that aren't doing their work today, or you're being asked to do a very big mission that's—amounts to little or nothing. And I think neither are true.

So I haven't—I haven't come close to saying it won't come close to saying it won't cost any more for the science, that you can keep

all the functions of the laboratories intact, and you can do this other little job for us on the side.

Ambassador ROBINSON. Let me give you a third alternative, Senator.

Senator DOMENICI. Sure.

Ambassador ROBINSON. The talent with technical degrees, you can do this work is the rate-limiting part.

Senator DOMENICI. Yeah.

Ambassador ROBINSON. We can't create a Ph.D. physicist or engineer for 8 years if you started us today with a pot of money. And so we believe you've got to redirect work of people.

Senator DOMENICI. Sure.

Ambassador ROBINSON. I think there will be extra money needed in the steps following what we do to get the—field with the hardware. That's going to involve industry folks. We already work with university folks at the front end, but we're rate-limited by scientifically trained people.

Senator DOMENICI. Let me also say to all of you with so much talent around in so many places you can bring to bear good things. One of the difficult problems is going to be to determine what things we ought to be doing when, and which are short-term, which are long-term. And I suggest that you ought to be very careful as to what you end up agreeing to in terms of how that's most apt to be right. That's a very tough problem. You could sit down with 25 smart people for how long—One week? Two weeks? Ten days?—and say, "What are the issues?" I'm just putting something on that you can understand—that we can all understand. But it's going to be tough.

Dr. COBB. Could I just make a short comment?

Senator DOMENICI. Of course.

Dr. COBB. I think the National Academy's study was a good start. It didn't solve all the problems, but it did set priorities, so it was helpful.

Senator DOMENICI. And we are going to adjourn until the call of the chair. Thank you.

[Whereupon, at 4:55 p.m., the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

DEPARTMENT OF ENERGY,
CONGRESSIONAL AND INTERGOVERNMENTAL AFFAIRS,
Washington, DC, September 20, 2002.

Hon. JEFF BINGAMAN,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: On July 10, 2002, Linton Brooks, Acting Administrator, National Nuclear Security Administration, and Dr. Raymond Orbach, Director, Office of Science, testified regarding the present and future roles of the Department of Energy and National Nuclear Security Administration National Laboratories in protecting our homeland security.

Enclosed are the answers to 14 questions submitted by Senators Schumer and Murkowski to complete the hearing record.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Lillian Owen, at (202) 586-2031.

Sincerely,

DAN BROUILLETTE,
Assistant Secretary.

[Enclosures]

RESPONSES TO QUESTIONS FROM SENATOR SCHUMER

Question 1. Though most of the work that goes on at Brookhaven is non-security related scientific research, Brookhaven Scientists do play an important role in creating the technology used for security technology. In your opinion, are the portions of labs like Brookhaven that work on national security technology better situated under DOE or DHS jurisdiction?

Answer. The Department of Energy (DOE) should retain responsibility for the national laboratories, such as Brookhaven National Laboratory (BNL) that carry out R&D not only for the DOE, but also for several other agencies in the government. Over 65 percent of the work at BNL directly supports Office of Science programs. Some work at Brookhaven that supports national security and is currently being funded by DOE, may in the future be funded by the Department of Homeland Security (DHS). This work could be done under existing mechanisms.

Question 2. If Homeland Security, what happens to the role Brookhaven plays in civilian research and projects? Will that role be discontinued? Can we count on Homeland Security to pay attention to that role?

Answer. The establishment of a Department of Homeland Security will not disrupt the important role that BNL plays in carrying out civilian research. If there are important potential applications of that civilian research to DHS needs, we will develop mechanisms, such as partnerships or direct DHS funding, to accommodate those needs without disrupting BNL's mission.

Question 3. If the Department of Energy, will labs like Brookhaven be part of the homeland security process?

Answer. DOE and DHS will work together to ensure the resources of laboratories like Brookhaven are available to carry out research for DHS.

Question 4. How can we ensure that their work is used in the war on terrorism? For example, Brookhaven is the leader in developing nuclear detection devices that we could install at ports and at our borders.

Answer. The President's proposal recognizes that the responsibilities and authorities to fight the war against terrorism and to ensure our national security are currently spread among many agencies. The establishment of the DHS will bring these together. DOE and DHS will work together to ensure that DHS will be able to fully

use the capabilities of DOE laboratories in contributing to the war on terrorism; and that they can continue to carry out important national security related work for DOE and other agencies. This partnership could be implemented through existing mechanisms.

Question 5. How will the Department of Energy work with the Department of Homeland Security to ensure that technology coming out to labs like Brookhaven is used for Homeland Security purposes?

Answer. The DOE laboratories, especially after September 11, have already demonstrated the ability of our scientists and engineers to respond quickly and effectively to the challenges posed by terrorism. We will work closely with DHS to ensure that laboratory technology will be used for Homeland Security purposes. We expect that in carrying out our core missions we will produce technologies that also may be leveraged for homeland security.

Question 6. Is it possible for our labs to exist under dual jurisdiction? If so, who would control what? Is there any precedent for this type of arrangement?

Answer. As Secretary Abraham testified before the Select Committee on Homeland Security on July 16, 2002, at each DOE facility "a portion of the laboratory would be dedicated to DHS activities, and the DHS would assume responsibility for the management of domestic security R&D through joint sponsorship agreements to include direct tasking. Current contracting relationships between the operating organization and the workforce will not be disrupted. DHS would control funding for homeland security programs, and allocate it as necessary to meet homeland security goals." It is expected that some of the workforce at the laboratories may be dedicated to DHS activities, but that they will be available to support DOE's activities.

Question 7. How have DOE and White House officials worked together to decide which labs go where? How can we prevent turf battles from taking place?

Answer. DOE and DHS are working together to outline options for ensuring the best distribution of our respective responsibilities, and have sought corporate options and identified alternative mechanisms for ensuring full and open access to the Department's laboratories.

DOE is committed to continuing this communication to ensure an ongoing partnership with DHS to avoid turf battles that distract the labs from meeting the needs of the country.

DIRTY BOMBS

Question 1. Is the current nuclear Emergency Operations System designed for and funded to interdict and prevent a nuclear or large radiological attack against major urban metropolitan regions like New York?

Answer. In the event of a threatened or potential nuclear/radiological attack in the U.S., the Federal Bureau of Investigation would be the lead federal agency. The FBI would request DOE assets be deployed in order to assist in the prevention of, or response to, a nuclear/radiological incident. DOE has unique capabilities to search for nuclear/radiological devices and to prevent or minimize their detonation. These capabilities are fully funded and staffed, and are available on a round-the-clock basis.

Question 2. How will the Department of Homeland Security fund and organize its Weapons of Mass Destruction outreach to state and local entities?

Answer. Inquiries about any aspect of the Administration-proposed Department of Homeland Security should be directed to the existing Office of Homeland Security.

RESPONSES TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. The United States has a large energy infrastructure that is generally not well protected through physical security such as refineries and petrochemical facilities, oil and natural gas pipelines, and electric transmission lines. What role will the Department of Homeland Security play in assuring the physical protection of our energy infrastructure?

Answer. The new Department of Homeland Security (DHS) would be responsible for comprehensively evaluating the vulnerabilities of and coordinating a national effort to secure the nations's energy infrastructure. Protecting the nation's critical energy infrastructure is the shared responsibility of the federal, state and local governments and the private sector, which owns most of the energy infrastructure. The Administration's homeland security bill would transfer to DHS the energy assurance functions of DOE, which is actively engaged in addressing critical energy infrastructure issues. We expect that DHS would work closely with industry to develop and maintain a comprehensive assessment of the energy infrastructure and to develop and implement security standards for protecting critical energy infrastructures. Spe-

cifically, in discharging its responsibility for assuring the physical protection of the nation's energy infrastructure, we expect that DHS would, among other things:

- collect comprehensive information on potential threats to the national energy infrastructure;
- develop with industry analyses of physical and cyber vulnerabilities of the national infrastructure and scientific and technological solutions to correct or minimize system vulnerabilities;
- develop contingency plans to minimize risks to the economy and public health and safety through analysis of interdependencies and modeling of the cascading effects of events that affect the energy infrastructure;
- provide industry information necessary to implement security plans that effect or deter terrorist acts through target hardening and implementation of procedures that complicate terrorist's attack planning; and
- coordinate national, state and industry response and recovery capabilities to ensure seamless integration of plans and procedures.

Question 2. Our electric power industry is really an integrated North-American system. Since an electrical disturbance in Canada or Mexico could affect power in the U.S.—and the other way around as well—it would seem to me that we need to include both Canada and Mexico in our homeland security efforts. What plans are there to cooperate & coordinate with the Governments of Canada and Mexico as we develop our homeland security program?

Answer. The Department is actively coordinating with representatives of the governments of Mexico and Canada on our energy critical infrastructure protection and homeland security efforts. DOE's Offices of Energy Assurance (EA) and Policy and International Affairs (PI) are participating in the ad hoc Critical Infrastructure Protection Forum of the U.S.-Canada-Mexico North American Energy Working Group. The Critical Infrastructure Protection Forum was established to provide a vehicle for consultation and information exchange among the governments of the three countries on energy critical infrastructure vulnerabilities and mitigation strategies. On April 12, 2002, DOE hosted a meeting of the Group for presentations by DOE national laboratory staff on DOE's vulnerability assessment methodologies. At the request of representatives of the Government of Mexico, OEA and PI are planning a trilateral meeting in Mexico in the August-September time frame for deliberations on the application of DOE vulnerability assessment methodologies to specific types of energy infrastructures.

DOE is the energy sector lead on the standing committees of the President's Critical Infrastructure Protection Board (PCIPB), established by Executive Order 13231, "Critical Infrastructure Protection in the Information Age." Pursuant to the Executive Order, DOE is engaged in cooperation with representatives of the governments of Mexico and Canada under the auspices of the PCIPB International Interdependencies Working Committee, which was established to support the Department of State efforts to coordinate with the governments of other countries, including Mexico and Canada, U.S. initiatives and programs for physical and cyber critical infrastructure protection.

On June 17-19, 2002, DOE participated along with representatives of other agencies in a meeting with representatives of the Mexican government to consider and develop strategies to implement the Smart Border Declaration signed by Presidents Bush and Fox. The U.S. and Canada signed a similar document. These declarations commit the U.S., Mexico and Canada to cooperative efforts to secure cross-border critical infrastructures.

Question 3. Our energy infrastructure is run by computers, many of which are accessible through the internet. Our electric utilities are increasingly the target of computer hackers—possibly including foreign powers—who have already on occasion managed to penetrate their control networks. What role will the Department of Homeland Security play in assuring the cyber-protection of our energy infrastructure?

Answer. The Administration's proposed legislation to create a new Department of Homeland Security recognizes that cyber security is a very important element of critical infrastructure protection and, consequently, cyber security will be a key function of the new Department's Division of Information Analysis and Infrastructure Protection.

The nation's telecommunications systems are connected directly to many critical infrastructure sectors. The speed, virulence, and maliciousness of cyber attacks have increased dramatically in recent years. Accordingly, the Department of Homeland Security would place a high priority on protecting our cyber infrastructure from terrorist attack by unifying and focusing the key cyber security activities performed by the Critical Infrastructure Assurance Office (now in the Department of Commerce)

and the National Infrastructure Protection Center (now in the FBI). In addition, the response functions of the Federal Computer Incident Response Center (now in General Services Administration) and the functions and assets of the National Communications System (now in the Department of Defense) would augment the infrastructure protection capabilities.

Question 4. The free flow of information between the private sector and the Government is critical to the protection of our energy infrastructure, but industry is reluctant to provide sensitive information to government because it may become subject to release under the Freedom of Information Act and government has difficulty providing threat information to industry because much is classified. Do you think that the Freedom of Information Act should be modified to assure the non-disclosure of critical and sensitive industry information? Do you think that security clearances should be granted to personnel in critical infrastructure industries so that government threat information can be provided to industry?

Answer. DOE supports section 204 of the Administration's homeland security bill, the "Homeland Security Act of 2002," which would exempt from the Freedom of Information Act, section 552 of title V, United States Code, critical infrastructure and vulnerability information voluntarily provided by non-Federal entities or individuals and which is or has been in the possession of the Department of Homeland Security. Regarding security clearances for employees of critical infrastructure industries, DOE in the past has granted security clearances to certain industry personnel who require access to classified information pertaining to threats and is prepared to do so in the future in appropriate circumstances. For example, DOE has granted security clearances to certain personnel employed by the Trans Alaska Pipeline to permit the DOE to provide them classified information pertaining to threats against the pipeline.

Question 5. One key impediment to infrastructure protection are our Federal antitrust laws. Industry is concerned that if they try to jointly act to protect their infrastructure—either through R&D or through joint physical and cyber protection efforts—they may run afoul of the antitrust laws. Do you think that some sort of antitrust exemption should be provided for joint industry infrastructure protection efforts?

Answer. The Department defers to the views of the Department of Justice on this question.

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