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# BUILDING A NUCLEAR BOMB: IDENTIFYING EARLY INDICATORS OF TERRORIST ACTIVITIES

## HEARING

BEFORE THE

## SUBCOMMITTEE ON PREVENTION OF NUCLEAR AND BIOLOGICAL ATTACK

OF THE

## COMMITTEE ON HOMELAND SECURITY HOUSE OF REPRESENTATIVES

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# BUILDING A NUCLEAR BOMB: IDENTIFYING EARLY INDICATORS OF TERRORIST ACTIVITIES

**Thursday, May 26, 2005**

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON PREVENTION OF
NUCLEAR AND BIOLOGICAL ATTACK,
COMMITTEE ON HOMELAND SECURITY,
*Washington, DC.*

The subcommittee met, pursuant to call, at 1:01 p.m., in Room 210, Cannon House Office Building, Hon. John Linder [chairman of the subcommittee] presiding.

Present: Representatives Linder, Shays, Lungren, Gibbons, Simmons, McCaul, Cox, Langevin, Markey, Harman, Norton, Christensen, and Thompson.

Mr. LINDER. The committee will be in order. I would like to welcome and thank our distinguished panelists who I hope will help the members of this subcommittee understand how the Department of Homeland Security, along with other Federal partners, can detect in advance attempts by terrorists to buy, steal, or build a nuclear device.

In recent months I have seen a number of reports from experts that argue that the probability of a terrorist attack involving a nuclear weapon against the United States is low. They cite the reluctance of states to share nuclear secrets and the difficulty for terrorists to obtain nuclear technology and material.

Given the events of 9/11 and the intelligence and evidence collected from Al-Qa'ida documents, it would be highly irresponsible for us to simply disregard the nuclear threat. We are dealing with a thinking enemy that has no limited hatred for our citizens or the liberties that we cherish.

In January of 2004, investigators in Pakistan found that the Nation's top nuclear weapons scientist, A.Q. Kahn, had for decades sold nuclear secrets to Iran and Libya. According to investigators, Kahn and his associates provided information on how to design centrifuges used to make enriched uranium. U.S. officials have also expressed their concern that Pakistani scientists may have collaborated with North Korea on uranium enrichment in exchange for ballistic missile information.

What are the telltale signs that a network of this nature is operating? Could we have stopped A.Q. Kahn in advance from succeeding? This year alone, there have been six publicly documented instances in which nuclear material was seized from persons not

authorized to transport them. The material seizures included small quantities of weapons-usable material. How many other instances have occurred without detection? Do we have the capability to effectively prevent this type of smuggling?

I am a firm believer in pushing this threat as far from our borders as we possibly can. That requires our ability to detect early on the signs that indicate intent to buy nuclear material, to purchase intellectual knowledge and technology to build a nuclear weapon, or simply the intent to steal a nuclear apparatus.

As we look to consider legislation to counter the nuclear threat, I look forward to the testimony of our witnesses, and I am hopeful that their expertise can help members of this subcommittee understand what can and must be done not only by the executive branch but also by Congress to prevent terrorists from obtaining such devastating devices.

PREPARED STATEMENT OF THE HONORABLE JOHN LINDER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF GEORGIA, AND CHAIRMAN, SUBCOMMITTEE ON PREVENTION OF NUCLEAR AND BIOLOGICAL ATTACH

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I now yield to the Ranking Member of the Subcommittee, Mr. Langevin, for the purposes of making an opening statement.

And I will yield to the Ranking Member of the subcommittee Mr. Langevin for the purpose of making a statement.

[The information follows:]

Mr. LANGEVIN. Thank you, Mr. Chairman. And I would like to welcome our witnesses today, and I certainly look forward to hearing this testimony on this most important of topics.

There has been a great deal of debate over the likelihood that terrorists will carry out a attack in the United States. Given that Al-Qa'ida and like-minded groups have publicly stated their intentions to conduct a nuclear attack, combined with the fact that A.Q. Kahn, the former head of Pakistan's nuclear weapons program, ran the largest black market operation in modern times, I believe that the nuclear terrorist threat is real.

After listening to witnesses at previous hearings and briefings held by this subcommittee, I feel that our government must move quickly to build off programs like Nunn-Lugar and the Global Threat Reduction Initiative run by the Department of Energy. I believe that today's hearing certainly will go a long way in helping us understand the relative ease or difficulty a terrorist would have in building a nuclear weapon.

I am going to be brief, but I hope the witnesses can address the following issues for me: First, given the National Intelligence Council's disturbing report that undetected smuggling of nuclear materials has occurred at Russian weapons facilities, what improvements are needed at our nonproliferation programs to eliminate future smuggling incidents?

Next, what are the lessons learned from the A.Q. Kahn case? In particular, what surprised us? What caught us off guard other than the fact that it happened in the first place? I am especially interested in the type of technology that was used in producing nuclear weapons and what, if any, surprises were there?

In addition, and finally, how do we deal with scientists from rogue states such as North Korea who will sell nuclear secrets to the highest bidder?

As I have said in previous hearings, we must begin to move with a sense of urgency to prevent terrorists from executing a nuclear attack on our soil or against our interests.

Mr. Chairman, I thank you for holding this hearing today and I look forward to hearing from our witnesses. Thank you.

Mr. LINDER. Other members of the subcommittee are reminded that opening statements may be submitted for the record.

I would like to now introduce today's witnesses. Dr. Ronald Lehman is the Director of the Center for Global Security Research at the Department of Energy's Lawrence Livermore National Laboratory, and is also the Chairman of the Governing Board of the International Science and Technology Center. Dr. Lehman has served as the Director of the U.S. Arms Control and Disarmament Agency, and as Assistant Secretary for International Security Policy with the U.S. Department of Defense.

Mr. David Albright is the President of the Institute for Science and International Security in Washington, D.C. Prior to working at ISIS, Mr. Albright served as a consultant to the International Task Force on Prevention of Nuclear Terrorism at the Los Alamos National Laboratory and the International Atomic Energy Agency.

Ms. Laura Holgate is the Vice President for Russia and New Independent States Programs at the Nuclear Threat Initiative, which was created in 2001 by two old friends of mine, Sam Nunn and Ted Turner. Prior to working at NTI, Ms. Holgate directed the Department of Energy's Office of Fissile Materials Disposition, and

served as a Special Coordinator for Cooperative Threat Reduction at the Department of Defense.

Welcome you all. All of your written statements will be made part of the record, without objection, and I would welcome a summary and would like to try and keep within 5 minutes as best you can.

PREPARED STATEMENT OF THE HONORABLE CHRISTOPHER COX, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA, AND CHAIRMAN, COMMITTEE ON HOMELAND SECURITY

Thank you, Chairman Linder, for holding this hearing on this very important topic. I join you in welcoming our panel of witnesses today who I hope will help us understand how we might recognize indicators of terrorist attempts to obtain and use a nuclear weapon, and more importantly provide us with suggestions as to how we might pre-empt such an attempt.

Many have said that the detonation of a nuclear device by terrorists is a low probability event with high consequences. But we must calculate the level of effort we should commit to any particular threat by discounting its consequences by its likelihood. And the consequences that would follow terrorist use of a nuclear weapon are unimaginably horrific—scores or hundreds of thousands of dead and injured, countless tens of billions of dollars in damage, and a likely permanent change in our way of life, governance, civil liberties, and economy. Even discounted for probability, it necessarily follows that prevention of this type of terrorism is the highest priority to protect the security and economic well-being of our Nation.

The interest of terrorists in obtaining and using a nuclear weapon is established by both intelligence and simple common sense. Intelligence has demonstrated that the terrorists are well aware of the value of such a weapon—and little wonder. It is the ultimate terrorist device, as it would accomplish the goal of killing tens or hundreds of thousands of people, devastating the economy, and spreading terror. The imperative of detecting and preventing such an attack, therefore, is a given. This hearing will explore how to detect the efforts to buy, steal, or build such weapons before they can be deployed.

During the past two hearings in this subcommittee, the Members were told about the concept of a "layered" defense against the nuclear threat. In principle, this seems a prudent approach. From what we can gather, however, in practice this effort appears to be an uncoordinated and duplicative layering of bureaucracies. We need to have a coordinated effort to identify and act upon the indicators that can be gathered from deployed technologies and integrating that information with products from our intelligence community. We must focus on determining what these indicators are—what are the phenomena we could observe that would indicate that terrorists are seeking to buy, steal, or build a nuclear device.

To give an analogous example: all day every day, the U.S. military in South Korea tracks dozens of indicators that would provide clues that North Korea was preparing to launch a military assault. The United States must assemble and track, all day every day, a similar catalogue of telltale indicators that terrorists are seeking to acquire or create nuclear weapons.

The long-undetected illicit proliferation activities of AQ Khan leave us with little assurance as to whether or not our enemies overseas might have obtained nuclear weapons technology, materials, or know-how from Khan or his associates. This uncertainty simply means that we must be more vigilant in our efforts to track down nuclear traffickers overseas, secure foreign nuclear material, and prevent nuclear material from entering our country.

As we consider legislation in the coming months, I hope that our expert panel can help this committee fully evaluate how best to identify and track early indicators of terrorist nuclear efforts.

Mr. LINDER. Ambassador Lehman.

## STATEMENT OF RONALD F. LEHMAN, DIRECTOR, CENTER FOR GLOBAL SECURITY RESEARCH

Mr. LEHMAN. Thank you, Mr. Chairman. I am honored to be invited along with two very good friends to discuss this very important issue with you. I still wear a number of hats, so I am speaking in my personal capacity, and I will try to be very brief.

Much has been said in public about nuclear terrorism, not all of it correct. And that is not all bad. Special care must be taken not to provide terrorists with cookbooks to solve their problems. Nor do we want to expose to terrorists our vulnerabilities or reveal too much about countermeasures we may take. Still, we must be candid with ourselves. There is a real danger, and there is much that we don't know or may not find out until it is too late. This is particularly true with specific terrorist planning and activities.

The consequences of failure could be tragically high. We must take the possibility of nuclear terrorism very seriously now, as relevant technologies continue to spread. This requires that everyone be sensitive to the danger. Thus we must balance not saying too much with ensuring that we are saying enough.

You have asked me to focus today on the possibility that terrorists might gain access to technology and technologists useful to the acquisition of nuclear weapons. Here we understand basic realities and a number of trends: Building nuclear weapons from scratch is a challenge. Terrorists may find it easier to obtain them by theft, gift, or purchase. Even this will not be easy, and the U.S. and other governments have programs aimed at preventing such activities, particularly with the help of sufficiently knowledgeable insiders. However, fissile material, key weapons components, and conceivably full-up nuclear weapons could be obtained.

Also we cannot rule out the possibility that terrorist organizations may attempt to construct nuclear weapons. Although assembly may be a far more difficult path than theft, considerable dual-use technology continues to become accessible. And whether nuclear power generation expands or contracts in the years ahead, a huge overhang of weapons-usable material will remain as a potential source of nuclear weapons.

Because fissile material is essential to the nuclear devices terrorists may wish to acquire, controlling and securing fissile material must be the highest priority, second only to protecting weapons themselves. At the same time, we must be careful not to recreate the mistakes of the Maginot Line. We can gain great leverage from sound physical security, especially when guns, guards, and gates are augmented by an effective system of material protection, control, and accountability.

In the end, however, any linear defense will have vulnerabilities, particularly if an insider threat is involved. This is true in securing fissile material and it is true in preventing the exploitation of dual-use technology. Worse, terrorist groups are becoming adept at exploiting legitimate industries' activities and individuals. In between the legitimate and black markets are not very well understood but unsavory gray markets. Here, it is individuals with whom we seldom have contact who are more likely than we are to see activity related to illicit nuclear weapons activity. Thus in countries where we have concerns about security, we can help. The indigenous governments and institutions, however, must step up to the seriousness of the matter, take responsibility, and hold people accountable.

Essential to the success of the terrorists is the assistance of knowledgeable individuals, knowledgeable in the sense that they are good enough to solve the problems that terrorists face. In the

case of nuclear terrorism, those problems may be how to overcome security at nuclear storage areas, or how to work with radioactive material, or how to design an explosive device. The fact that terrorists need access to knowledgeable people gives us a further arena in which to counter the terrorists. Engagement of these communities and industries through their governments and directly is of great importance. In particular, we need to become involved in the Islamic world.

Today I want to stress this need for broader engagement, layered defenses, and a dynamic strategy. There is an unclear but present danger that governments of concern, rogue officials, or nonstate groups can exploit ever more widespread dual-use technology to obtain weapons of mass destruction. Modern societies will have to do a better job of understanding the latent capabilities for destructiveness in our societies. We need a better assessment of our vulnerabilities, and we need to do a better job of managing the risks. We need to understand that the distinction between state and nonstate actor is blurred. We need to build a dynamic strategy that recognizes that our reaction times will be short.

When you are looking for a needle in a haystack, it helps to have a tool like a magnet. Most of these active tools such as sting operations involve intelligence and law enforcement, and must be undertaken by governments. The governments that may prove to be best positioned to deal with terrorists may be governments elsewhere. Many governments are stepping up to the terrorist problem, but many are not engaging effectively on the WMD challenge as it relates to terrorism any more effectively than they have dealt with the problem of the spread of nuclear weapons to nation states. The reasons are clear: Governments themselves have competing goals and interests. Many enabling technologies are too widespread to monitor cheaply and effectively. Modern business networks with just-in-time inventories, offshore outsourcing, flat, almost virtual organizational pyramids, numerous competitors, and multi-tier markets are amorphous and changing. Universal norms seem inappropriate in specific cases; enforcement options are unattractive.

We run the risk of replaying the old debate of whether the technologies are the problem or those that use them are the problem. We won't be effective until we recognize that action must be taken on both fronts.

Thank you, Mr. Chairman.

Mr. LINDER. Thank you, Ambassador.

[The statement of Mr. Lehman follows:]

PREPARED STATEMENT OF THE HONORABLE RONALD F. LEHMAN

Mr. Chairman, Distinguished Members of the Committee:

I am honored that you have asked me to join in your examination of the danger of nuclear terrorism. As this Committee knows, I have assisted the US government in a number of areas that relate to this topic and continue to do so. Both personally and professionally, I consider these initiatives to be very important, but you have asked for my personal views. Thus, today I do not speak officially for any program, organization, or Administration with which I have been or am now associated.

Much has been said in public about nuclear terrorism, not all of it correct. And that is not all bad. Indeed, special care must be taken not to provide terrorists with "cookbooks" to solve their problems. Nor do we want to expose to them vulnerabilities they might exploit or reveal too much about countermeasures we may be able to take. Above all, we must be candid with ourselves. There is much that we don't know or may not find out until it is too late, particularly about specific

terrorist planning and activities. We will be asking constantly whether the glimmers we see are the "tip of an iceberg" or simply disconnected "ice cubes."

Although the odds that any particular group of terrorists will acquire nuclear weapons are low, the probability that some terrorists somewhere will acquire a nuclear weapon may increase over time. The consequences could be tragically high. We must take the possibility of nuclear terrorism very seriously now and in the years ahead as relevant technologies continue to spread, no matter how difficult we make it for terrorists to acquire nuclear weapons. This requires that publics be sensitive to the danger, particularly those who may someday find themselves in a position to help. Thus, we must balance not saying too much with saying enough.

You have asked me to focus today on the possibility that terrorists might gain access to technology and technologists useful to the acquisition of nuclear weapons. Here, we understand basic realities and a number of trends. Building nuclear weapons from scratch is a challenge. Terrorists may find it easier to obtain them by theft, gift, or purchase from sympathetic governments or rogue government organizations. Even this will not be easy, and the U.S. and other governments have programs and policies aimed at preventing just such activities. Particularly with the help of sufficiently knowledgeable "insiders," however, fissile material, key weapons components, or full-up nuclear weapons could be purloined. Much has been made of inadequate security in the transition republics of the former Soviet Union. South and East Asia also deserve special attention, but securing fissile material remains a global problem.

Still, we cannot rule out the possibility that terrorist organizations may attempt to assemble nuclear weapons from components or even from amounts of fissile material obtained from some source. (It is unlikely that typical terrorist groups would by themselves succeed in enrichment or reprocessing, but it is conceivable.) Although assembly may be a far more difficult path than theft, considerable knowledge and technology including dual-use equipment and facilities once associated with nuclear weapons continues to become more accessible. And whether nuclear power generation expands or contracts in the years ahead, a huge overhang of weapons-useable material will remain as a potential source of nuclear weapons even if no new production were to take place and even if we eliminate large amounts of existing fissile material.

In that sense, we already have strategic warning. We know there is great risk. We can point to general indicators such as the spread around the world of dual-use scientific knowledge, engineering skills, industrial capabilities, nuclear materials, and the like. A political, military, social, and economic overlay can further note the penetration of these capabilities into regions of political turmoil and highlight how they may be networked to create nuclear weapons potential. We can correlate these with visible terrorist activities by groups with motivations, statements, and attacks that suggest an interest in weapons of mass destruction (WMD). These indicators can help in assessing risk and setting priorities, but these strategic indicators may become fewer and less clear in the future as latent WMD potential becomes even more widespread. Moreover, we have very little certainty of tactical warning and may get few precise actionable indicators of any WMD attack.

Because fissile material is essential to the nuclear devices terrorists may wish to acquire, it will come as no surprise that controlling and securing fissile material must be the highest priority, second only to protecting weapons themselves. At the same time, we must be careful not to recreate the mistakes of the Maginot Line. We can gain great leverage from sound physical security, especially when "guns, guards, and gates" are augmented by an effective system of material protection, control, and accountability. In the end, however, any linear defense will have vulnerabilities, particularly if an "insider threat" is involved. This is true in securing fissile material, and it is true in preventing the exploitation of dual-use technology. Worse, terrorist groups, as with other criminals such as drug cartels, money launderers, and smugglers, are becoming more adept at exploiting legitimate industries, activities, and individuals who unknowingly become a part of the network. In between the legitimate and black markets are not very well understood, but unsavory "gray" markets. Here too it is individuals with whom we seldom have contact who are more likely than we are to see activity related to illicit nuclear weapons related activity.

Thus, in the transition countries and other countries where we have concerns about security, we can help. The indigenous governments and institutions, however, must step up to the seriousness of the matter, take responsibility, and hold people accountable for adopting best practices and then testing their security measures and personnel to make them even more effective. Here too we can help even if they, not we, are more likely to have the right people at the right time at the right place posi-

tioned to do the right thing. They, like we, must have a dynamic strategy that takes into account that terrorists will probe and adjust until they determine a way ahead.

Essential to the success of the terrorists is the assistance of knowledgeable individuals—knowledgeable in the sense that they are good enough to solve the problems the terrorists face. In the case of nuclear terrorism, those problems may be how to overcome security at nuclear storage areas or how to work with radioactive material or how to design an explosive device. Terrorists are unlikely to begin at the basic research level, and they are unlikely to seek or find Nobel Prize winners to lead their programs, although totalitarian regimes have had access to numerous world-class talents. Terrorists are more likely to try to bring together journeyman skills related to proven paths, and they may be able to attract competent, if disgruntled or disturbed, people. The less they have to break new ground, the better from their perspective.

This is not to say they will follow exactly current or historic paths taken by nuclear weapons states. They may surprise us in their creativity. But they will need help and much of that help can only come from technologically savvy people, be they scientists, engineers, technicians, or just employees who know where things are located or how they work. The technology sector of American industry will tell you that the best form of knowledge or technology transfer is the transfer of knowledgeable people. There is no reason to believe it is much different in the case of terrorism.

The fact that terrorists need access to knowledgeable people gives us a further arena in which to counter the terrorists. Unfortunately, it cannot be said that all individuals in the technology sector would refuse to help terrorists. The history of crime and terrorism, unfortunately, includes a number of technical people including medical doctors who have taken professional oaths to protect lives. Ideological or theological extremists are to be found in the technical communities, which, however cosmopolitan, generally contain most elements of the views of the societies with which they most closely interact. Still, the technology sector is one populated predominantly by individuals who must interact with a wide range of people who do not share the goals, or at least the means of terrorists.

Much of the community of technologically savvy individuals is sensitive to the security concerns we have about terrorist access to dual-use technology or material, be it nuclear, chemical, biological, or other. Some are very aware of the dangers. Most operate in an environment that stresses security of intellectual property and industrial know-how. Many work in an export control environment. Important segments work on safety and security. Others work in areas such as sensors or vaccines that may provide countermeasures. The United States and its allies have considerable interaction with this community in the advanced economic sectors. We are less well connected to the scientific and industrial networks that operate in less advanced economies, especially within authoritarian regimes and troubled regions. Even here, however, there are contacts and means of influence. Engagement of these communities and industries through their governments and directly is of great importance. In particular, we need to become more involved in the Islamic world.

I want to stress this need for broader engagement, layered defenses, and a dynamic strategy, in part, because the problem of the latency of potential destructive capabilities in developed and developing economies is bigger than the nuclear question. There is an unclear and present danger that governments, rogue officials, or non-state groups and individuals can exploit ever more widespread dual-use technology to obtain weapons of mass destruction or in other ways threaten great damage. I say unclear danger because so many capabilities can be networked in so many ways that it is difficult anticipate the precise use to which they will be put. I say present danger because the risks are here and now and include more than the nuclear. Indeed, many analysts believe that the greatest threat is biological.

Nuclear and biological attack clearly pose the most disastrous consequences. Still, we may also be under estimating the lesser dangers that are associated with chemical attacks and conventional attacks. The modern global economy is highly leveraged. We must not let the complexity of economic activity and our spirited efforts at recovery after the September 11, 2001, attacks lead us to underestimate the total economic cost of both the cumulative harm over time and the steps taken in response. We are fortunate that we were able to manage our way through this period without greater economic disruption. We cannot rule out, however, the possibility that a series of major terrorist attacks, especially if involving WMD and especially nuclear weapons, could push the world into an economic depression with devastating political and social consequences that are not lost on the terrorists who might want to bring this about.

Modern societies will have to do a better job of understanding the latent capacities for destructiveness in our societies. We need a better assessment of our

vulnerabilities, and we need to do a better job of managing the risks. By "latent" capacities, I mean what the dictionary defines as "potentially existing, but not presently evidence or realized." We need to understand the degree to which the potential to acquire, deploy, and use WMD is becoming more accessible to more players (state, quasi-state, and non state) for more deadly goals against our citizens and interconnected societies. We need to build a dynamic strategy that recognizes that our reaction times will be short because the lead times for terrorists may become much shorter and our ability to observe their preparations weaker. This will put a premium on prevention. It will put a premium on active strategies for intelligence and law enforcement.

When you are looking for a needle in a haystack, it helps to have a tool like a magnet. "Sting operations" play an important role despite their limitations. Recognizing that terrorists are attracted to vulnerabilities and icons may improve our chances of detection. Similarly, choke points and boundaries can increase the chances of detection. Going to the source by infiltrating or monitoring terrorists groups and those they seek to exploit to obtain weapons capability becomes more important. Most of these activities involve intelligence and law enforcement and must be undertaken by governments. The governments that may prove to be best positioned to deal with terrorists may be governments elsewhere. Terrorism is a multinational problem, and multinational solutions, such as closer cooperation among intelligence and law enforcements agencies, especially in combating nuclear materials trafficking, are needed to deal with it.

Many governments are stepping up to the terrorist problem, but many are not engaging effectively on the WMD challenge as it relates to terrorism any more effectively than they have dealt with the problem of the spread of nuclear weapons to nation-states. The reasons are clear. Governments themselves have competing goals and interests. Many enabling technologies are too widespread to monitor cheaply and effectively. Modern business networks with "just in time" inventories, offshore outsourcing, flat-almost virtual organizational pyramids, numerous competitors, and multi-tiered markets are amorphous and changing. Universal norms seem inappropriate in specific cases. Enforcement options are unattractive.

We run the risk of replaying the old debate over whether the technologies are the problem or those that use them are the problem. We won't be effective until we recognize that action must be taken on both fronts. We need only look at the problem of nuclear proliferation among nations to see that we are in danger of making the same mistake with respect to terrorism, i.e., assuming that if we put in place measures to control material, we have solved the problem. These safeguard measures have helped, and helped greatly. But for too many years, the international community relied too heavily on IAEA safeguards of declared material and declared facilities while it sought to avoid addressing the more complex issues of motivations, planned latency, covert programs including non-materials related activity, third-party assistance, non-state actors, and treaty break-out. Even now that these risks have been so clear, we do not have in place the means to deal effectively with clear violations of the NPT.

Again, we run the risk of making the same mistake on the terrorist front. To treat fissile material as if it were the gold in Fort Knox has the right spirit. Unfortunately, the better analogy may be to armored cars, bank vaults, or art masterpieces in museums. Every now and then there is a heist, carefully prepared—sometimes with the help of an insider. Since we must deal with conventional, biological, and chemical terrorist threats in which we cannot rely so heavily on materials controls, we should look toward a synergistic strategy for dealing with nuclear terrorism that is also proactive.

Deeper cooperation among nation-states in intelligence and law enforcement can be supplemented by counter-WMD cooperation such as in the Proliferation Security Initiative and by the fulfillment of the potential of UNSC 1540, which moves to hold governments accountable for measures to prevent non-state actors from acquiring WMD. Across the board, we need to roll up our sleeves and work together more at the detailed level. In this context, more extensive and advanced cooperative threat reduction that involves embedded engagement with scientific, technical and industrial communities around the world will be necessary to improve understanding of the problem and develop countermeasures. It may also give us more hope that there will be someone at the right place at the right time who does the right thing.

Thank you.

Mr. LINDER. Mr. Albright.

**STATEMENT OF DAVID ALBRIGHT, DIRECTOR, INSTITUTE FOR INTERNATIONAL SECURITY**

Mr. ALBRIGHT. Thank you. Thank you for inviting me, and I look forward to a discussion with long-term colleagues.

The U.S. government and this committee is wisely taking extraordinary steps to reduce the chance of terrorists getting nuclear weapons, regardless of whether we perceive the risk as low or even high. And toward that goal, the priority is developing more effective means to detect and prevent a terrorist group's efforts to acquire nuclear weapons.

What I would like to do is focus my comments on the theft of fissile material and construction of nuclear weapons by a terrorist group. And part of the reason for this is the enormous stocks of weapons-usable fissile material in the world. These large, and, in some cases, inadequately protected stocks could provide more opportunities for terrorists than this theft of nuclear weapons. I have provided the committee with a table of our estimates on holdings, in-country holdings of fissile material around the world. And of the total, about 2,400 tons of fissile material, roughly half is in Russia. But I would like to point out that there are stocks in many other places, and that these need to be of concern also.

I have also provided the committee a figure describing a pathway whereby a terrorist group could acquire and use a nuclear weapon. It starts with planning in the group's search for fissile material, which we probably would all agree is probably the hardest and most uncertain task facing a terrorist group. Another key challenge is building the nuclear weapon itself; that there are certain steps involved in constructing the weapon that could present serious challenges for a terrorist group. Nonetheless, I think they can overcome those problems. Then the group must be able to assemble the weapon and move it to a target for detonation. And the detection of the terrorist group's efforts could be discovered all along this pathway.

However, certain steps can be made more vulnerable to outside detection, and I would like to focus on the two more promising ones. One is the location where weapons-usable fissile material are stored or used, and the sites where nuclear components would have to be made and assembled by the terrorists.

And with regard to the first one, I mean, these sites are already the focus of U.S. and international efforts to increase physical security. A payoff of this work is to both increase the difficulty of theft or diversion of fissile materials, and increase the probability of detection of efforts to steal or divert the fissile material from these sites.

A U.S. priority has to be to try to better understand the size and physical protection of all major stocks of fissile material, particularly in Russia. The U.S. should aim to develop extensive knowledge of all significant stocks of fissile material, where they are located, and how the country provides adequate security. And this goal should be accomplished cooperatively with other states whenever possible. And a focus should be on U.S. personnel having legitimate contact and cooperation with individuals working at sites with fissile material. And, as I have said, this contact could in-

crease the chance of learning about suspicious activity at the site and increase physical protection and accounting at the same time.

Now, the U.S. agencies are already improving their knowledge of fissile material stocks and working in this direction, but certainly more work needs to be done, although I would want to commend the work so far.

The second part of the pathway I would like to discuss is the manufacture of nuclear weapons components themselves. And this task involves the terrorist group accomplishing many things, such as casting plutonium or highly enriched uranium metal in vacuum furnaces, working with fast electronics and high explosives in the case of an implosion-type nuclear weapon, or heavy projectiles in the case of a gun-type weapon.

Although all these tasks can be accomplished in small buildings with relatively little equipment, they can be vulnerable to detection. These tasks are going to involve equipment and materials that are considered sensitive and must be purchased. In addition, the necessary know-how is specialized and relatively uncommon. Therefore, one way to increase the chance of detection is to use the extensive infrastructure dedicated to thwarting illegal exports to states.

Most countries have national export control systems, although of mixed quality and effectiveness. The states with the most effective control system also have required companies and individuals involved in exports of sensitive items to become more aware of dangerous or illegal exports. These individuals also in certain cases, which we have seen personally, watch domestic sales in order to thwart illegal retransfers out of this state, and they become in a sense the first line of defense on the sale of equipment to dangerous elements.

Although this approach applied to thwarting terrorist efforts cannot be as effective as when applied to illegal procurements by states, it can still provide a way to increase the detection of suspicious individuals trying to acquire certain equipment or materials that could be used in manufacturing of their weapon.

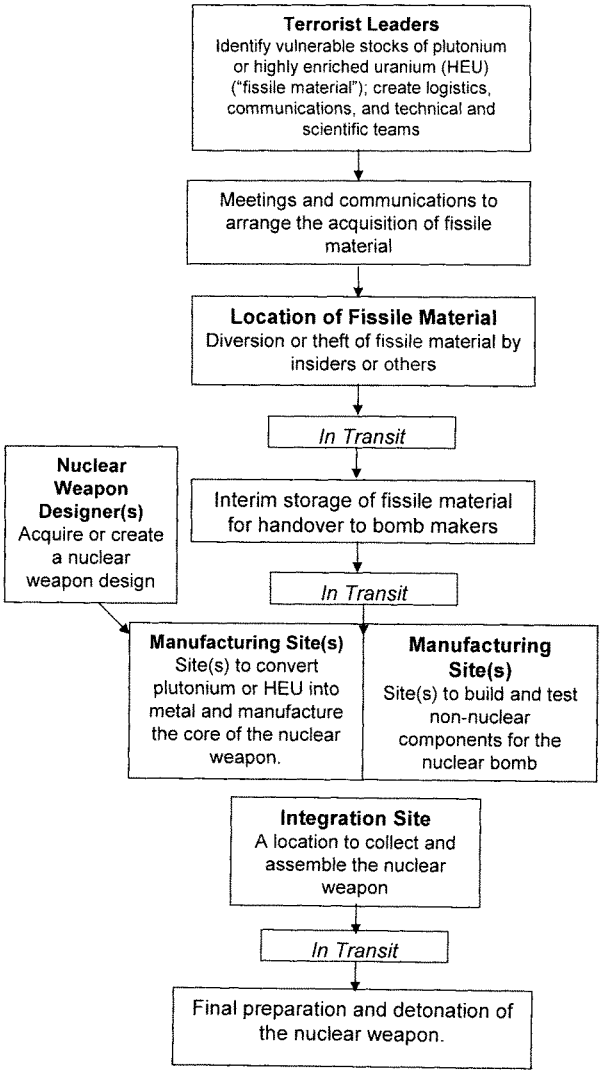
An overarching goal in both cases that I have discussed is to work with other states and individuals to increase the awareness of the risk of nuclear terrorism and build a norm or culture that values physical protection and transparency. In doing so, the chance of detecting terrorist efforts to build nuclear weapons can also be increased. Thank you.

Mr. LINDER. Thank you, Mr. Albright.

[The statement of Mr. Albright follows:]

## Terrorist Construction of a Nuclear Weapon: A Key Pathway

**David Albright**
**Institute for Science and International Security (ISIS)**
**May 26, 2005**



Fissile Materials of Special Concern (end 2003, in tonnes) In-Country Stocks of Unirradiated Plutonium and Total Stocks of HEU
ISIS Estimates—May 26, 2005
DRAFT

| Country | Plutonium | | | HEU | | | Total (rounded) |
|---|---|---|---|---|---|---|---|
| | Military | Civil | Subtotal | Military | Civil | Subtotal | |
| Russia | 145 | 38.2 | 183.2 | 1070 | 15–30 | 1085–1100 | 1275 |
| Pakistan | 0.04 | — | 0.04 | 1.1 | — | 1.1 | 1.14 |
| North Korea | 0.04 | — | 0.04 | ? | — | 0 | 0.04 |
| India | 0.04 | ~1–1.5 | 1.04–1.54 | ~0.5 | — | 0.5 | 1.5–2.0 |
| China | 4.8 | — | 4.8 | 20 | 1 | 21 | 26 |
| South Africa | — | — | 0 | — | 0.5 | 0.5 | 0.5 |
| Belgium | — | 3.5 | 3.5 | — | 0.5 | 0.5 | 4.0 |
| France | 5 | 78.6 | 83.6 | 29 | 6.4 | 35.4 | 119 |
| Germany | — | 12.5 | 12.5 | — | 1 | 1 | 13.5 |
| Israel | 0.6 | — | 0.6 | ? | — | 0 | 0.6 |
| Japan | — | 5.4 | 5.4 | — | 2.0 | 2 | 7.4 |
| Switzerland | — | 0.5–1.0 | 0.5–1.0 | — | ~0 | ~0 | 0.5–1.0 |
| United Kingdom | 7.6 | 96.2 | 103.8 | 21.9 | 1.5 | 23.4 | 127 |
| United States | 92 | — | 92 | 700 | — | 700 | 792 |
| Smaller Stocks of HEU in Many Countries | — | — | 0 | — | ~20 | ~20 | ~20 |
| Smaller Stocks of Plutonium in Several Countries | — | ~1 | ~1 | — | — | 0 | ~1 |
| Total (rounded) | 255 | 237 | 492 | 1720 | 170 | 1890 | 2400 |

Mr. LINDER. Ms. Holgate.

**STATEMENT OF LAURA S.H. HOLGATE, VICE PRESIDENT FOR RUSSIA/NEW INDEPENDENT STATES PROGRAMS NUCLEAR THREAT INITIATIVE**

Ms. HOLGATE. Mr. Chairman, Congressman Langevin, I appreciate the opportunity to contribute to your subcommittee's exploration of nuclear terrorism, and, as my colleagues have said, among old friends.

At NTI, we have observed that the difference between a terrorist and a nuclear terrorist is found in the word "nuclear." No nuclear material, no terrorism.

This obvious logic underpins our fundamental prescription for averting nuclear terrorism: Secure, consolidate, and, where possible, eliminate nuclear weapons materials in all forms, in every location.

This terrorist threat, which world leaders agree is our number one security priority, requires an adjustment in our thinking about what role individuals play in either preventing or contributing to nuclear threats. I believe that access to nuclear materials is more important in considering today's nuclear realities than is sophisticated scientist knowledge.

This is not to say that scientists don't pose a threat. A.Q. Kahn is the prime example. But even his contribution to nuclear proliferation had less to do with his specific scientific knowledge and more to do with his radical ideology, greed, and entrepreneurial skill.

In considering the immediate post–Cold War threats, the potential for former Soviet scientists to decamp for Baghdad or Tripoli or Pyongyang, carrying in their heads or their briefcases the crown jewels of nuclear bomb design, was a prime concern, and a number of U.S. and international programs were developed to address this potential exodus. The good news is that this early set of proliferation concerns never came to pass, probably for a combination of reasons: These programs' effectiveness, Russian preferences to remain within familiar social and political structures, patriotism, professionalism, and a plain old fear of getting caught. So far as we know, there has never been a Russian A.Q. Kahn.

The bad news is that U.S. and international programs have not adapted to today's nuclear threat: terrorists' pursuit of nuclear capability through theft of materials or weapons. Almost any employee at a nuclear facility can facilitate nuclear terrorism through access to nuclear materials or through information about how such materials or weapons are handled at a particular site. Individuals at all levels know about storage venues and conditions, transfer schedules, security vulnerabilities, routines, and procedures. This kind of insider information provided to an outside terrorist group can help them acquire nuclear weapons and materials. The nuclear materials, once acquired, a small handful of chemists and metalworkers, even without prior experience with weapons, could build a crude but effective gun-type device with the explosive power of the bomb we dropped on Hiroshima, which I remind you our bomb designers were confident enough in that they did not even test before they used it.

The drastic shrinkage of Russian nuclear facilities we will experience over the next several years creates the potential for disgruntled, opportunistic, unprofessional, or blackmail personnel at all levels to make their knowledge of or access to materials and weapons available to those who seek it. In an environment in which petty pilferage of toilet seats, cooking oil, and even small arms occurs on a daily basis, we should not assume that less educated staff will distinguish nuclear materials from other assets they may be willing to sell or reveal. In fact, it is more likely that a machine tool operator or a maintenance worker would do so than that the higher-level scientist would.

The solution to today's nuclear threats is this: sustainable alternatives for all types of employees set to lose jobs owing to the very valid and necessary nuclear downsizing in Russia. Existing programs, such as the Department of Energy's Russian Transition Initiatives and the Department of State-funded science and technology centers, will continue to be valuable components of a comprehensive approach. But taking these threats seriously would involve including the following changes or additions to current efforts, and I will make a few examples.

First of all, to spin off nonweapons research and commercial activities to locations outside nuclear facilities so that staff employed there no longer have awareness of or access to nuclear weapons and materials.

Second, to reduce current moonlighting practices by creating full-time sustainable jobs outside institutes.

Third, developing new techniques to reduce or redirect excess staff, such as early retirement programs.

Fourth, and most importantly, make reducing total employment at such facilities, especially of employees with access to nuclear materials and weapons and related information the key measure of merit.

This kind of approach would require greater funding, but, even more important, broadened authorities for existing programs and linkages to traditional international efforts such as those carried out by the U.S. Agency for International Development. Even though critics have dismissed the relevance of so-called soft programs, developing sustainable alternatives to weapons work is a critical component of reducing nuclear terrorism.

At NTI, we frequently ask ourselves, our elected representatives, and our fellow citizens of the world: The day after a catastrophic instance of nuclear terror, what will we wish we had done to prevent it, and why aren't we doing that now? I have done my best to offer some answers, but the second question has no good answers. The time to act is now. Thank you.

Mr. LINDER. Thank you very much.

[The statement of Ms. Holgate follows:]

PREPARED STATEMENT OF LAURA S.H. HOLGATE

Mr. Chairman, I appreciate the opportunity to contribute to your exploration of nuclear terrorism. At NTI, we have observed that the difference between a terrorist and a nuclear terrorist is found in the word "nuclear": no nuclear material, no nuclear terrorism. This obvious logic underpins our fundamental prescription for averting nuclear terrorism: secure, consolidate, and—where possible—eliminate nuclear weapons materials, in all forms, in every location. We know how to do this, and it

is affordable and achievable within the next decade, but we have yet to act with the sense of urgency this threat requires, whether out of a misplaced sense of priorities, or out of a false perception that this threat is not real.

How might a terrorist become a nuclear terrorist? They could steal or acquire a weapon manufactured by a state with a weapons program. Russia has tens of thousands of weapons, including small, portable and low-tech tactical weapons, none of which are subject to outside accounting. The Beslan tragedy demonstrates the corruption and incompetence that exists in the Russian security services. Pakistan is known to have radical Islamists in the armed services charged with guarding their weapons, and A.Q. Kahn, one of the leaders of their nuclear weapons program, ran the most stunning nuclear black market commerce we have ever seen. North Korea, who has proven they will sell anything to anyone, may be prepared to sell one or more weapons to terrorists once they make enough for themselves.

Given the technical difficulties associated with detonating a bomb that they did not design, however, terrorists might instead prefer to build their own. They could build a simple gun-type device, based on stolen highly enriched uranium or, less likely, an implosion device using plutonium. The largest sources of raw materials of nuclear bombs can be found in facilities associated with national weapons programs, but they are also used, and, in many instances poorly guarded, in dozens of civilian research facilities and college campuses in over 40 nations around the world. The nuclear materials once in hand, a small handful of chemists and metal workers, even without prior experience with weapons, could build such a device.

We need not speculate about Osama bin Laden's interest in acquiring a nuclear weapon. He has spoken to the world of his intentions, and even sought a *fatwa,* or religious decree, sanctifying his pursuit of nuclear and other weapons of mass destruction. We know that he recruited scientists and engineers—many trained in Western institutions—who could help him realize his nuclear vision, and we found nuclear weapons designs in the caves in Afghanistan. It would be foolish to believe that he is unique among terrorists in seeking nuclear capabilities.

Preventing terrorists' access to nuclear weapons and materials is the single most effective way to avert nuclear terrorism; it's the only step in the process where we have an advantage. Every other step along the terrorists' path to the bomb is easy for them and hard for us. The US and others have been making progress in the prevention mission, in large part through the visionary and effective threat reduction programs known collectively as "Nunn-Lugar," but not on a pace or at a scope that will solve the problem on a timeframe relevant to the threat.

When Senators Nunn and Lugar originally passed their ground-breaking bill in 1991, our picture of the proliferation threat was very different. We worried about starving Soviet scientists decamping for Baghdad or Tripoli or Pyongyang, carrying in their heads or their briefcases the "crown jewels" of nuclear bomb design, sophisticated miniaturized weapons suitable for delivery on the tip of an ICBM. Programs like the International Science and Technology Center were designed to give these scientists a reliable monthly stipend in exchange for working on peaceful research topics, in the hopes that avoiding economic desperation would prevent them from selling the keys to the nuclear kingdom.

The good news is that this early set of proliferation concerns never came to pass, probably for a combination of reasons: our programs' effectiveness, Russian preferences to remain within familiar social and political structures, patriotism, professionalism, fear of getting caught. So far as we know, there has never been a Russian A.Q. Kahn. The bad news is that US and international programs have not adapted to today's nuclear threat: terrorists' pursuit of nuclear weapons through theft of materials or weapons.

This reality—combined with the elimination of two of the largest state-based proliferators in Iraq and Libya and the discovery that Iran's nuclear technology came from Pakistan, not Russia—fundamentally changes the way humans may contribute to nuclear threats. A decade ago, we focused on the scientists because they held the keys to developing the large-scale nuclear materials production and sophisticated weapons systems necessary to states seeking a sustainable nuclear arsenal. Today, we need to widen our scope to understand the role any employee at a nuclear facility can play in facilitating nuclear terrorism through access to nuclear materials, or to information about how such materials are handled at a particular site. Individuals at all levels know about storage venues and conditions, transfer schedules, security vulnerabilities, routines and procedures. This kind of insider information provided to an outside terrorist group can help them to acquire nuclear weapons and materials. This is today's challenge, and we are not yet rising to meet it.

Russia's ten closed nuclear cities are host to hundreds of tons of highly enriched uranium and plutonium, and dozens of military bases house tens of thousands of nuclear weapons. Even if we were doing all we could from a physical protection

point of view, the drastic shrinkage these facilities will experience over the next several years creates the potential for disgruntled, opportunistic, unprofessional, or blackmailed personnel at all levels to make their knowledge of or access to materials and weapons available to those who seek it. In an environment in which petty pilferage of toilet seats, cooking oil, and even small arms occurs on a daily basis, we should not assume that less educated staff will distinguish nuclear materials from other assets they may be willing to steal or reveal. In fact, it is more likely that a machine-tool operator or a maintenance worker would do so than the higher-level scientists. Yet many of our programs persist in their focus on scientists, and pay scant attention to the broader set of personnel who may pose nuclear risks.

Current programs, effective in dealing with last decade's threat, often fail to take today's materials-and-weapons-based threat into account:

- Many of those who are counted as "engaged" in peaceful activities maintain their clearances and access to sensitive facilities and materials.
- Non-scientists are often not eligible to receive funding from these programs.
- Programs are not prioritized to address cities or facilities with the greatest risk of materials diversion.
- They do not address the risks posed by retired military officers who continue to be housed (often unemployed and perhaps alcoholic) at bases that store nuclear weapons.
- Most programs have a high-tech, entrepreneurial approach that leaves out middle- and lower-level employees.

The solution to today's nuclear threats is this: sustainable alternatives for all types of employees set to lose jobs owing to nuclear downsizing. Existing programs, such as the Department of Energy's Russian Transition Initiatives and the Department of State-funded Science and Technology Centers, will continue to be valuable components of a comprehensive approach, but taking these threats seriously would include the following changes or additions to current efforts:

- Spin off non-weapons research or commercial activities to locations outside nuclear facilities, so that staff employed there no longer have awareness of or access to nuclear materials and activities
- Reduce current "moonlighting" practices by creating full-time sustainable jobs outside institutes
- Develop new techniques to reduce or redirect excess staff, such as early retirement programs
- Make educing total employment—especially of employees with access to nuclear materials, weapons and related information—should become the key measure of merit
- Increase low(er)-tech job creation, and recognize that it contributes to the overall mission
- Support regional economic planning and development
- Increase access to capital for small-business start-ups and expansions
- Incorporate relevant military personnel and sites into personnel-related programs

This approach demands greater funding, but even more important, broadened authorities for existing programs and linkages to traditional international development efforts, such as those carried out by the US Agency for International Development. Even though critics have dismissed the relevance of so-called "soft" programs, developing sustainable alternatives to weapons work is a critical component of reducing nuclear terrorism.

Some small but instructive progress has been made in broadening the approach to unemployed nuclear workers, or those at risk of losing their jobs. US AID has recently changed its mind-set toward working in Russia's closed nuclear cities. Whereas in the past, US AID has by and large avoided cities where significant nonproliferation projects are being carried out, they now interpret their mission to include, and I quote from their own strategic goals, "reducing the threat of weapons of mass destruction to the United States, our allies, and our friends." This has created interest at US AID in finding ways to target some of their ongoing programs in economic development and health, for example, to Russian cities dealing with large layoffs of nuclear workers. (Unfortunately, this realization comes at a time of shrinking US AID budgets in Russia.) US AID's existing cadre of local nongovernment organizations provides a ready base of expertise to work effectively in these new areas, and in the process, to become familiar with the unique needs of these cities. As part of US efforts to reduce the risks of nuclear terrorism, US AID should be encouraged, and funded, to expand its existing programs and develop targeted initiatives to contribute to the creation of sustainable alternatives to weapons work, including language and business training, local governance, housing, and civic infrastructure.

A second novel approach has developed out of volunteer-based Sister City relationships. During the 1990s, several US and Russian towns involved in nuclear weapons activities became Sister Cities: Los Alamos, NM and Sarov; Livermore, CA and Snezhinsk; and Blount County, TN and Zhleznogorsk. Citizen-to-citizen contacts have engaged schools, local officials, cultural leaders, and others in a myriad of exchanges, planning exercises, donations and other interactions. These cities have joined with other US-Russian Sister Cities where nonproliferation activities are carried out in an initiative known as Communities for International Development. Based on what these groups have been able to accomplish on pure volunteerism, they offer a solid platform for expanding federally funded activities in this arena.

At NTI, we have factored these issues into our own project design. We have developed two projects intended to demonstrate new techniques for engaging weapons workers generally, especially middle managers, in the closed city of Sarov. One project involves a $1 million NTI contribution to an existing Russian revolving loan fund. This fund supports small and medium business generally in Sarov, and NTI's funds are targeted specifically to supporting businesses that provide jobs for workers coming out of the weapons institute. Our funds have supported three new businesses, provided over 70 new permanent jobs for weapons workers, and enough funds have been repaid from these businesses' success to permit investment in a fourth enterprise. This dollar-per-job-created compares very favorably with government-funded programs. Also at Sarov, NTI's funds will permit the hiring of two experienced marketing directors to promote SarovLabs, a contract research firm, to Western and Russian private sector clients. SarovLabs, formerly known as the Open Computing Center, provides part-time jobs for some current weapons institute employees, but the rest of their time they continue to work at the institute. The goal is to bring in enough new business to create 100 new full-time positions that are sustainable enough to give former weapons workers confidence to sever their ties with the institute, which limits the risk they might pose to theft of materials or weapons. We believe these new approaches offer models that might be built on to more fully address these nuclear terrorism risks.

*The Day After*

At NTI, we frequently ask ourselves, our elected representatives, and our fellow citizens of the world: the day after a catastrophic instance of nuclear terror, what will we wish we had done to prevent it? Why aren't we doing that now? I've done my best to offer some answers to the first question. The second question has no good answers. The time to act is now.

Mr. LINDER. I have got a few questions, and then we will move around the panel. We are about to have a vote in the next 15 or 20 minutes, so we will get as much out of the way before that as possible.

We have made a good bit of progress identifying and containing Russian-manufactured fissile material and weapons. I have two questions. What are we doing about Pakistan—for Ambassador Lehman, I guess. And how many nations can you say in open session that we know have stockpiles?

Mr. LEHMAN. First of all, Mr. Chairman, on the question of how many stockpiles, I think—you mean fissile material itself? I have got—I think David has probably got the exact number from the IAEA. But it is a sizeable number, although many of them have material in, say, for example, research reactors that is a fairly small amount. Nevertheless, it is a cause of concern.

On the U.S. Government efforts to engage Pakistan, obviously there is a lot of sensitive discussions, and I am not the right person to talk to about that. But in general, there has been a major effort both in the public with NGOs, Members of Congress, and the executive branch to persuade the Pakistanis that controlling both their weapons and their material is a very high priority. But, as you know, we have this long history of A.Q. Kahn activities that show how very difficult it is to be sure that governments or even government entities are doing the right things.

Mr. LINDER. Are we better prepared now to see any indication of similar networks operating?

Mr. LEHMAN. Well, there is good news and bad news. The good news is we are better prepared. The bad news is that the networks are getting more and more complex because there is more and more technology floating around. And when you have the kind of outsourcing activities that are so typical of economies today and business activities today, it is very hard, even with the most wonderful data management systems, to really get a good picture of what happens. And remember, every time we have a success and it goes public, the terrorists learn what not to do next time.

Mr. LINDER. Mr. Albright, you commented on all the things the United States has been trying to do around the world to locate and nail down this material. Are other nations helping? Are we the only Nation that is interested in this?

Mr. ALBRIGHT. No. Many nations are part of it. I think the United States is the leader and has been for over 20 years. I mean, I think we faced our problems. We had weaknesses in physical security in particularly our old nuclear weapons product complex, and that, combined with increased concern about proliferation, has led to a very aggressive leadership on this area. And certainly it would be better for countries to contribute more. I think there is a desire that Russia particularly would buy into physical protection more. I mean, it has certainly been willing to accept money and make improvements, but I think that there is still a sense that they are not—their culture hasn't changed enough where they really deeply believe in the need for physical protection and realize the risk of the terrorist nuclear weapons.

Mr. LINDER. What is the source of the least protected and the most vulnerable fissile material in the world? Is it universities? Is it hospitals?

Mr. ALBRIGHT. Well, I think overall it is—you can't generalize. I mean, you could—I think traditionally there has been a sense that on the civil side, that there is less protection. But in a way, the adage of the squeaky wheel gets fixed has played a very large role and created a situation where there are many places that have excellent physical protection, and then there are others that have escaped attention. And that is essentially what happened in Russia until the end of the Cold War, was not adequate to deal with the threat posed by the collapse of the Soviet Union. They hadn't created these internal systems that really could work well.

Mr. LINDER. Let me ask Ms. Holgate. You said so far we have not seen a Russian A.Q. Kahn. Do we think there might be one out there?

Ms. HOLGATE. I think if there existed one, that he is already gone—or she. But I think the folks who are there have been remarkably loyal, remarkably patriotic, and frankly they are not all that interested in helping some of the countries that we have been most concerned about in terms of proliferation.

Mr. LINDER. What percentage of their material have you identified?

Ms. HOLGATE. Well the Department of Energy's figures are the ones we have to go with here. And the Department of Energy is focusing on providing material, protection, control, and accounting

upgrades on 600 metric tons of highly enriched uranium and plutonium inside Russia. Now, those are at—mostly at some of their major bomb-making factories. What is clear about that is that that number is a dynamic number. It changes. And we don't know exactly what is happening to the material that moves into that 600 figure and the material that moves out.

We also know that Russians themselves, Russians have told me in my work with them at NTI that some of their civil facilities, they don't have high-quality accounting at those facilities. And so I think the fundamental answer is not only do we not know, but there is an excellent chance the Russians don't know.

Mr. LINDER. Thank you. My time has expired.

Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

Ms. Holgate, following up on your last point there with respect to locations where there may not be weapons-grade material, but at more peaceful sites used at nuclear facilities for producing energy. To what degree do we need to worry about that material? And we have been focusing a lot on weapons-grade plutonium, highly enriched uranium, but how great a security threat is using nuclear material from a reactor a threat?

Ms. HOLGATE. Well, let me just make a distinction between nuclear power reactors for producing energy, the vast majority of which use low enriched uranium which poses next to no proliferation threat. The civil reactors I was speaking of are research reactors, which use highly enriched uranium, something over 20 percent, and some of them use uranium as much as 90 percent. Anything over 20 percent the IAEA says you can make a bomb with, and that is concerning. So I would say that category of civilian research reactors or critical assemblies or other types of research facilities that may simply have material are much more to be concerned about than any kind of a civilian power plant.

Mr. LANGEVIN. In your testimony, you state that the key requirement for a terrorist to become a nuclear terrorist is to obtain nuclear material. The National Intelligence Council, as you are well aware, issued a report in December of 2004, which states: We assess that undetected smuggling has occurred, and we are concerned about the total amount of material that could have been diverted or stolen in the last 13 years.

Now, this concerns me since we have had nonproliferation programs in place over the last 13 years. And now, I do believe that things have improved in Russia, but what are the three things that you think our government has to do now to ensure that future reports from the Intelligence Community will not continue to say that undetected smuggling is occurring? And within that, I would like to know your thoughts as to—and the other panelists as well—why we haven't had a Russian A.Q. Kahn. That, to me, is just counterintuitive.

Ms. HOLGATE. Well, I am less surprised that we haven't had a Russian A.Q. Kahn than I am that we haven't had some of these more low-level petty pilferers. And that is when you see the smugglers we have caught. It is not scientists, it is the seaman who happens to have access to the material at the naval base. You know, it is a worker who sees stuff that he thinks might be valuable and

he goes and he hides it under his bed, sometimes at great damage to himself and his family. Those are the people that have been getting caught. And thank goodness they haven't had either the quality or the quantity of material relevant from a bomb perspective. It is only—it may only be a matter of time. And I share the concern over the intelligence statement about we don't know how much may have been stolen.

I tend to believe that if it had made its way from a pilferer to a terrorist group, we would have seen its use. So my only hope is that to the degree that it has gone missing, it is stuck in that netherland between how those pilferers might connect to an outside group. We may not yet have seen the kind of targeted outsider, you know, working with the dedicated insider to try to capture specific material in connection with a bomb; but that is what I really worry about at these large sites with large quantities of material.

Mr. LANGEVIN. The A.Q. Kahn case is disturbing to me in terms of the scope of its operation and the nations to which he provided nuclear secrets. The Congressional Research Service reports that Kahn sold blueprints, centrifuge assemblies, uranium hexafluoride feedstock, and, worst of all, nuclear weapon designs.

Now, one of the purposes of this hearing is to determine if there are any indicators for such terrorist activities. Now, understanding that intelligence is going to be the best indicator that we have, what are the lessons learned from the Kahn case? And how can we catch a terrorist trying to obtain the bomb? And, by the way, in my opening statement I asked you to address, if possible for the panel, what surprised you about the Kahn case? What caught us really off guard other than it happened in the first place?

Ms. HOLGATE. I will defer to my colleague, Dr. Albright, on the Kahn issues as he has done a lot of research on that.

Mr. ALBRIGHT. What surprised me about the A.Q. Kahn case was twofold: One is that they were in the end peddling an entire gas centrifuge plant. They would have been able, if finished, to make many nuclear weapons in a year. So typically that is something countries or very advanced industries in developed nations do. So that was the first surprise.

The other was is that he was providing to Libya, or provided to Libya a very sophisticated—from a proliferance point of view, crude but somewhat miniaturized—implosion weapon design and the manufacturing instructions to make the actual components. And so I think those are the two big surprises.

I would say, though, that you can't compare—it is not useful to talk about A.Q. Kahn and Russian fissile material. I mean, A.Q. Kahn and his network evolved out of a over 20-year illicit procurement effort to arm the Pakistanis with nuclear weapons, and then at some point in the 1980s they decided to turn it into an export operation. And so it is a very different phenomena than what we have been talking about, about fissile material controls in Russia.

But I would say that Russia is not going to come off scott free. I mean, there has been a lot of exports of equipment technology out of Russia in the missile area. We don't know for sure on the nuclear area. But their export control system, which is really what A.Q. Kahn was exploiting and undermining in various nations, has been very weak. And they had horrible problems in implementing

effective export controls. And so someone may emerge in Russia who turns out to be a major supplier to a country's nuclear weapons program.

And in terms of helping terrorists, we may still see that, particularly on the side of weapons assistance, equipment to make nuclear weapons. You know, I hope to God we don't see it on fissile material, but I think all three of us are saying that that is also a possibility.

Mr. LANGEVIN. Thank you. My time has expired.

Mr. LINDER. Thank you. Chairman Cox.

Mr. COX. Thank you, Mr. Chairman. I want to thank our witnesses for excellent prepared testimony and excellent support thus far during this hearing. We are very pleased to have you today.

The reason that we are focused on the prevention of nuclear attack is that the prospect of cleaning up the mess afterwards is so dismal. Obviously, we are going to spend resources and plan for response and recovery for any kind of terrorist threat. That is unavoidable. But with some kinds of terrorist threats, such as blowing up buildings or setting fire to things or using conventional explosives, the prospect of recovery is much easier to imagine than these high-consequence events, such as terrorists getting their hands not on a dirty bomb but an authentic nuclear weapon, which is what we have been discussing here today. The priority, therefore, on prevention I think is well placed, and we really appreciate your helping us walk through this.

My understanding is that our screens are not going to be able to put up this chart. Or we can? This is the chart, Mr. Albright, that you included with your testimony. I just—is it possible to enlarge that? Maybe we can scroll up and down it. Or is that all we are going to do? All right. Well, that is as good as not having it up, because nobody is going to be able to read that. But I will just refer to it. It is in the formal written record.

This is a great diagram, Mr. Albright, that you prepared for us that we all understand is notional. Terrorists don't have to follow this flow chart to put together nuclear weapons; they can follow their own plan. But this is based on some reasonable assumptions.

I just want to walk us through this and see whether or not, given that the subject of today's hearing is identifying earlier indicators of terrorist activities, how we might focus our efforts at each one of these stages, the earlier the better, to learn sooner than otherwise might be the case that something is going on.

The role of the Department of Homeland Security, I should mention parenthetically here, is to help us to knit together some of the information strands. When Mohammed Atta was pulled over just shortly before 9/11 by a Florida State trooper, the Florida State trooper didn't know that he was a person of interest to the CIA and to the Treasury and to FAA. We all know from reading the 9/11 Commission report all the information that we didn't use, and one of the reasons that DHS is there is to help us, through the Information Analysis Office, not make that mistake again. We have NCTC, we have a lot of fusion systems that we are putting in place now that weren't there prior to 9/11. Let us focus on how we might look for certain kinds of information, and try and piece it together to prevent nuclear terrorism before it happens.

The first thing, Mr. Albright, on your flow chart is that terrorist leaders identify vulnerable stocks of plutonium or HEU. And I might add at this point I think it is probably a safe assumption to think that the more likely of those two scenarios is HEU because it is more likely, as you said, Ms. Holgate, in your testimony, that we are going to be looking at a gun-type device, not an implosion device. Let us ask ourselves whether—is there anything that we might be looking for at that moment? Or is that too early?

The next thing is, we are going to have meetings and communications to arrange the acquisition of fissile material? Following that, we locate the fissile material, and we divert it or steal it from an inside operation, or just break in and get it, apparently. After that, we have to move it. The early aspects on this are meetings of terrorists with themselves. I take it that would require, say it again, listening to what they are doing or having some infiltrator in there. But ultimately they get to actually building this weapon after some transit for the materials. They have manufacturing sites, they have got an integration site.

My time is quickly running down here, so I am going to try and load this all into one question for the whole panel here. But using this chart—do the witnesses all have a copy of this? If not, we will hand it to you because it didn't pop up on the screen as well as I had hoped. I know that at least Mr. Albright has it, because it is your chart.

And then, of course, the last box is detonation of the nuclear weapon. I don't think we want to catch it just then. Although I did see on an episode of 24 that after they launched the missile with the nuclear warhead, that somehow they stopped that all from happening. Probably not in real life. Probably we ought to be looking at the top of this chart.

So can you help us interpret this chart and turn it into actionable kinds of work that intelligence gatherers and analysts could do if we are putting this priority on prevention?

I will start with Mr. Albright, but all three of you are richly equipped to help us answer this question.

Mr. ALBRIGHT. I think I tried to emphasize the two places where we can take steps to increase the chance of detection. I mean, concrete actions that will lead to a higher probability of detection, namely at the locations where fissile material is stored, and then trying to detect illicit procurement of equipment.

The others, there is certainly a lot of things that can happen. And I am not sure it is suitable for an open hearing. Certainly I am not encouraging a closed one. But there are a lot of things that go on to try to intercept communications. And you can actually take this and do a much deeper analysis, looking at what kind of specific activities happen at each of these boxes, and then try to increase your ability, intelligence agencies' or communities' ability to detect that the terrorists are trying something.

So I think it is—the trouble along some of the steps, like when the terrorist leaders meet or when there are things that are in transit, there is a certain luck to it all. And if we are short of human sources within these terrorist organizations, then it is hard to have a high chance of detection, although I think it is important

to do and to certainly increase our ability to penetrate these groups.

Let me just stop there. I don't want to take too much time.

Mr. COX. Ambassador Lehman?

Mr. LEHMAN. I would make two additions to the chart, but not with the intent to help the terrorists. But one is, David uses the word "sites" in plural, and I think he is right to emphasize that. One of the awkward words of modern industry is disintermediation. But what it really means is the flattening of the pyramid of organizations. And I think that what we are likely to see is that the activities will take place at a number of different sites.

Now, obviously, when you integrate the bomb, as David's chart points out, at some point all of the necessary things need to come together. But I think if you are looking for a plant where they do all the nonfissile material components, I think you are not likely to find one. I think you are going to find that bits and pieces are done in a lot of different places. And the people who will be doing some of that will be honest people who have no idea why they are doing this other than they got an order.

The second point that I would emphasize is the box on nuclear weapon designers or designs. And of course that, you know, knowing what it is you are going to build is terribly important, and it may not be as easy as some people think.

Having said that, I think I would share Laura's emphasis that the knowledgeable people that the terrorists may need may not be the designer. It may not even be someone who is particularly technically adept. It depends on where they are and how they are doing the process. I think—and this is the theme of my prepared remarks—is that we have got to recognize that in order to get the material and assemble it, if that is the path they take, other than stealing a weapon, they need some knowledgeable people. Some of those have to be technologically savvy, others not so much so. But they need to get access to those people. They are going to go fishing in those waters. We, or somebody friendly to our interests, needs to be sailing in those waters. We need to have the prospect that the ships will pass and we will see.

Now, the bad news is it is a big world, a big ocean out there, and it is hard to see. The good news, as I think David and Laura have emphasized in their remarks, is there are places where the ships keep coming. Obviously, focusing on fissile material and its locations is a terribly important thing, but there are other worlds out there where these ships have to sail, and we need to have somebody watching those waters. Thank you.

Ms. HOLGATE. I guess the only thing I would add to that is, building on your comment about the 24 episode the other day, is that NTI has actually taken a pathway similar to this and transformed it into a film, which is available free to anyone who logs on to Our Last Best Chance dot org Web site. It stars Fred Thompson, a former colleague of all of yours, as the President, and shows how governments and people deal with these steps as they watch them unfold and what we can and cannot do at various stages. So I will just commend that to folks for their entertainment and education.

Mr. COX. Thank you very much, Mr. Chairman. Perhaps we should link our Web site to that.

Mr. LINDER. Not a bad idea. Ms. Norton.

Ms. NORTON. Thank you very much. In this area I am particularly struck by how all of the assumptions about proliferation changed since 9/11, or should have. We were dealing government to government, we still have a great deal of work to do government to government. And if we shored that up, and we are very far from that, we will have gone some distance. But, of course, as we look at sites, known sites, we then have to speculate about sites and sites that are not even regarded as sites, sites where—scientific sites. And so the who and the what is part of the proliferation, leading, I must say, to, at least in the general public, wild speculation about the possibility of attack, what form it would attack, how people should prepare. And the difficulty goes from not knowing about whether or not, about—not knowing about the sources of fissile material to who really has the expertise to do what would need to be done.

I frankly have a—I have two questions. One isn't really about the a A.Q. Kahns of this world. It is really about larger pool of scientists, highly trained scientists. One of you answered something about—several of you talked about helping the terrorists. I mean, what that suggests is that you don't have to be a fully-blown scientist who worked in the nuclear field to follow the steps and learn what you have to learn.

And that is my first question, is—is given the huge pool of people who are trained, given the number, given how much of this is driven by religious zealotry, how likely is it that some highly trained scientist could indeed be the source of expertise for Al-Qa'ida-type groups, learning himself, self-taught, learning in the way that scientists today can learn about this field? What is your sense about the possibility that whoever might help to produce a weapon for terrorists might not come from the usual sources, but might come from the large number of highly trained scientists throughout the Arab world, the Muslim world? Is that, is that likely or is that simply—or would that take too long and not the most likely way in which such a weapon would be produced?

Mr. LEHMAN. Obviously the easiest path is to follow roughly the path somebody else has taken. So I think the hardest way for a terrorist to get to a nuclear weapon is to go back to basic physics and try to—

Ms. NORTON. Yeah, but I am not talking about basic physics. And that assumes that, you know, the only folks who really understand this have been the ones in these who have been working, such as the Russian scientists. I am talking about highly trained scientists that we know existed in places like Iran and other places who may not have had access to the laboratories in question.

Mr. LEHMAN. And I think that is a very good point in that we need to understand that the expertise is not just in a few places on the globe. It is incredibly widespread. But even some of the finest Nobel Prize winners don't know how to fix their own radio. They need a team of people who can do such things. And, unfortunately, if the terrorists already have components or have material or have certain things already predigested, presolved for them,

then the people they need may turn out to be at a lower level of knowledge, and they only need to be so competent. And the message is that there are more and more of those people all over the world.

But you have also raised, I think, a very important point, and that is that there is a tendency to think that nobody in the scientific community really would ever help these people, and I like to think that the scientific community is at least as good and as honest as everybody else. But the history of science is filled with scientists who became criminals or associated with terrorists. Indeed, bin Laden's deputy is a medical doctor. Medical doctors take oaths to save lives. We have to recognize that we can't simply assume that, because the number is small, that the number is zero. It is a large and growing pool. And even though the percentage is very small, the absolute number could be dangerous, and that is sort of where we think it is, that there are people out there. Thus far, our success has been that the people who want that knowledge and the material have not been able to meet up in the right way with the people who want to use it. And that is where we have to focus our efforts.

Mr. LINDER. The gentlelady's time has expired.

Mr. Shays.

Mr. SHAYS. Thank you, Mr. Chairman. I want to thank you, Mr. Chairman, for an excellent panel and for holding this hearing, and say first to you, Ms. Holgate, your comment, no nuclear material, no nuclear threat, speaks to me. Because in my work as Chairman of the National Security Subcommittee, both in Russia and visiting our labs, there is no doubt in my mind that terrorists can build a nuclear weapon. And to suggest anything other than that I think would be to really fool people.

True, they can't—and if you disagree after what I am saying, I want to hear it. Terrorists may not be able to build a sophisticated weapon that can go in a missile. They can't reduce by a pound and give us the ability to put more missiles on the warhead. But they can take, it seems to me, a very crude tube with enriched uranium, even trying more than once to create the impact, they can blow it up. And it seems to me the only question is, it won't be dependable, they may have to try a few times, but they don't care if they go up with it. The yield will be inefficient. And they are ultimately going to have to commit suicide in the process. But none of that would deter them. So what have I said that you would disagree with? I would just like to start with you, Ambassador.

Mr. LEHMAN. I think I basically agree, it can be done. And the only thing that I would like to emphasize that we really need to put a tremendous emphasis is on securing fissile material.

Already we don't know if it is all going to be in the places we secure, and we can put the best locks and systems on a facility, but if the man who runs the facility is the person who can unlock the door, then there at least is always a potential vulnerability.

Because of the concern about biological weapons, chemical weapons, other types of terrorism, we need a dynamic strategy in any case, and I think it ought to be synergistic with our efforts to counter nuclear terrorism as well.

You are going to need a dynamic defense in depth.

Mr. ALBRIGHT. I agree.

Ms. HOLGATE. I wouldn't disagree with a thing you have said, sir.

Mr. ALBRIGHT. Can I say one thing, sir? I agree with you, but I think if you study, particularly proliferant state nuclear weapons programs, they really are starting, as Congresswoman Norton talked about, starting from scratch. They may have some nuclear training but very little, and they are having to learn the ropes. They run into problems and I am not saying this to downplay the threat. I am saying it so that we don't write this off, that we just, oh, okay, don't worry about it, it is a given, they can make a bomb. They actually need to do certain things to make a bomb and some of those things are detectable, particularly if we increase our efforts in certain areas.

Mr. SHAYS. And I should be hearing that point about being detectable, but the bottom line is you don't need instruments that are hard to get. The material is pretty basic if you are willing to have a low yield, and, I believe, enriched uranium explosion. If it is plutonium, does the weapon need to be more sophisticated?

Mr. LEHMAN. Yes.

Mr. ALBRIGHT. Yes. The tradeoff is you need a lot more material for a gun-type device.

Mr. SHAYS. But even if it had one-tenth the yield of Hiroshima, it still would be a nuclear explosion, correct?

Mr. ALBRIGHT. It would be devastating.

Mr. SHAYS. Okay.

Mr. ALBRIGHT. If it is detonated in a city, for example.

Mr. SHAYS. Right. But your point to me, that I am trying to make sure I am listening to, is that even containing the weapons-grade material doesn't mean—under Nunn-Lugar doesn't mean it is going to stay there. And your other point that I think I am hearing is we may contain what we know, but we may not be containing what we don't know. I mean we won't be.

Your last point—you know what, that is fine. I am done. Thank you, Mr. Chairman.

Mr. LINDER. Dr. Christensen.

Mrs. CHRISTENSEN. Thank you, Mr. Chairman. I have one question and I am sorry I missed the testimony. I tried to skim through it, but a lot of the focus seemed to have been on fissile material in other countries, and some of the protections I have read are anywhere—I think the quote is from appalling to excellent—the protection of the facilities that may house this material. And I was just wondering, looking at the facilities in this country that might house fissile material, how would you rate our protection of that critical infrastructure?

Mr. LEHMAN. I think that we may be the world's best. The question is, is best good enough? We constantly need to test our own systems to see where the vulnerabilities are, because you can spend a lot of time addressing one kind of scenario, one threat; you can spend a huge sum of money and then discover there is this other problem. So you need to be agile and dynamic in testing yourself.

But there is another good reason for testing on yourself and that is that you can then get a feel for where weaknesses may be else-

where, where there is even greater risk and perhaps use that information to help.

So it is always good to take a good strong look at ourselves, but in the end, there is only so much money and so you have to kind of allocate where you really need to put the priorities.

Mr. ALBRIGHT. I think there is a principle at play here that it is similar to protecting money in a bank. I mean, you can't become complacent. It is an ongoing struggle and the United States has had problems in the past, some in the not-too-distant past, and so it is something you have to worry about, what Ron said about the money often becomes the critical factor.

I know in the nineties, senior Department of Energy officials told me to get the money to help the Russians, they had to take it from some of the security accounts for U.S. facilities. And that created its own problems.

Ms. HOLGATE. The only thing I would add to what has been said, I would certainly echo the notion that U.S. government-run weapons-related nuclear facilities are among the best in the world. Civilian facilities, however, may be a different story. When you are talking about a highly enriched uranium in a university research reactor in the middle of a city where the guard force may be the local campus cops, where you have a constant flow of graduate students through, I think there is a lot of improvement that can be done in security there; or when the tradeoffs, as was pointed out, between security and funding becomes unmanageable, given the research that is being done there, given that it can be done elsewhere or done with nonweapons-usable material, I think that is a big caveat to what has been said so far.

Mr. LINDER. Thank you. Mr. Gibbons.

Mr. GIBBONS. Thank you very much, Mr. Chairman, and to our witnesses, welcome. Thank you for your testimony. It has been very enlightening for this committee as well.

When we look at this diagram that we have talked about, the Chairman or Mr. Cox talked about—this diagram—in there is nothing about the design. It starts with fissile material, it looks like, and then goes down to finding fissile material first and then construction. The design of such devices varies but you can find them on the Internet. This is not your rocket science-type project where you need an A.Q. Khan physicist to be a designer. You can construct a crude device off the Internet if you can find it on the Internet.

But that still doesn't answer the question about espionage for the design of more sophisticated devices wherein back in the early part of the decade, last decade, we saw the W–88 diagrams had been stolen from the United States and ended up in, I believe, North Korea.

But I guess my question is this. At the end of the decade, when the Soviet Union was breaking apart, there were a number of weapons allocated to each of the various divisions of Russia, whether it is Bulgaria, et cetera. When that broke up, there was a poor accounting of all of those weapons, including what some have called and our colleague from Pennsylvania Mr. Weldon has said that there were a number of suitcase-size weapons in that former Soviet Union that are unaccounted for.

Now, do you believe in your research that any of these weapons may or may not be on the black market or have passed through the black market to anybody who is a terrorist?

Ms. HOLGATE. I think it is fair to say, sir, that at the breakup of the former Soviet Union, that all of the warheads that had been in Ukraine, Belarus, and Kazakhstan—.

Mr. GIBBONS. We are not talking warheads here, not warheads off a missile. I am talking a suitcase-size device.

Ms. HOLGATE. The tactical weapons, the information we had at the time was that Moscow detected a weakness in its periphery even before the Wall fell, and they began pulling as many tac nukes, including suitcase bombs, back into Russia proper as they could.

Now, there has never been the kind of accounting, as you point out, there has been on the missile-launched warheads, and there has not been the kind of transparency because they have never been governed by any kind of an arms control treaty. And, as I am sure you have seen, when you ask your friends in the Intelligence Community, how much do the Russians have, you see these giant arrow bars because nobody really knows and we worry the Russians don't know.

I would say, however, that this suitcase nuke thing is a little bit of a red herring. The point is there may be tactical nuclear weapons missing and those are the things to worry about, but the specific scenario in the suitcase environment for those who have looked into that research has not turned out to be quite as stated by General Lebed in the mid-nineties when that was such a scandal.

Mr. GIBBONS. In your studies or any of your studies in this problem, have any of you come across information, intelligence or otherwise, that say on the black market there are parts that can be acquired on the black market that would allow for you to construct a simple, crude, nuclear-style device?

Mr. ALBRIGHT. Parts. The first response is I have seen plenty of information that terrorists have nuclear weapons, that they were bought in Russia. We have never been able to confirm any of that information and never found, in fact, evidence to support it. And in terms of components, we have seen reports of components being sold but not that we have seen that are credible in the sense that it is a nuclear weapons component advertised for sale.

If I can step back to this thing about the knowledge spreading, we cannot find what we would call a nuclear weapons design that would be usable to make a nuclear weapon on the Internet. When we have done searches, what we tend to find is information that in some ways parallels what the U.S. has declassified, and when there are key questions that remain classified, or information, we tend not to find it on the Internet.

Let me just end it by saying the situation could get much, much worse, for example, if A.Q. Khan's bomb design shows up on the Internet.

Mr. GIBBONS. Well, let me ask one brief question, because you say if these terrorists had a weapon—and you have no idea whether they do or they don't at this point in time—if they did, why do you suspect they haven't used it?

Mr. ALBRIGHT. I mean, there are some who don't accept the statement that if they have it they will use it right away. Again, I don't know of any evidence that they have it, but they may be holding it back to use in some ways as a nation may use a nuclear weapon: to extort concessions, to intimidate, to—in the case of Afghanistan and Pakistan, pre-Taliban, or during the Taliban era, certainly there was a theory about conflicts developing between what they would call the Jews and Crusaders versus the Muslim world, and they needed nuclear weapons to prepare for that.

So I think there is a lot of thinking in some of these communities that may not be just saying we will get it and we will rush to the United States. I mean, they may be thinking, in fact, a little more deeply, and I believe they will use it in some way if they have it, but it may be in a more complicated way.

Mr. GIBBONS. Thank you. Thank you, Mr. Chairman.

Mr. LINDER. The circumstance on the floor is that we are going to have a series of votes and motion to recommit that might take as much as an hour. So if Mr. McCaul would like to inquire, and I would ask Ms. Harman and Mr. Markey to submit any questions in writing, would the panel be satisfied with answering that?

Mr. McCaul.

Mr. MCCAUL. No questions.

Mr. LINDER. We will then adjourn this.

Mr. MARKEY. Mr. Chairman, people like me are put in a very difficult position. On the one hand, the majority has ruled that we cannot make opening statements, and as a result, the people who are sitting in your chairs make opening statements and you also get to ask questions. And then people like us, who have intense interest in these nuclear issues, are then left at the back of the line with important questions that have remained unanswered and then asked to allow a hearing to end without us ever having uttered a word.

And so I would object to the ending of this hearing so that the Members who really believe that you are now talking about the most important issue in the world are given an opportunity on this subcommittee, which is my principal selection, to come back and to ask the members of the witness panel these questions.

Mr. LINDER. Had you had been here when it opened, you would have been the first person to ask questions.

Mr. MARKEY. After you, after the Ranking Member, and again that is impossible to know.

Mr. LINDER. We are not going to ask our guests to sit around for an hour while we complete our votes.

Mr. MARKEY. Let us ask our guests if they would want to wait around or not. Would the witnesses object to waiting around an hour? I see no objection.

Mr. LINDER. This hearing is recessed.

[Recess.]

Mr. LINDER. I want to thank our witnesses for staying through that recess, about an hour, and we have some more questions for you. We expect another vote in probably half an hour.

Mr. Markey.

Mr. MARKEY. Thank you, Mr. Chairman very much, and we thank you, Chairman of the full committee, and we appreciate you,

Mr. Linder, returning for this opportunity, and I know that there are other members who are going to be coming back now. I have been trying to notify them out on the floor that they are going to have this opportunity. And I appreciate the witnesses for sticking around. We thank you very much.

Now, as we know, the Little Boy nuclear weapon which had a 13-kiloton was actually never tested before it was detonated in Hiroshima, and we also know that Howard Moreland, when he published how to build a nuclear bomb in the Progressive magazine, and Jimmy Carter tried to get a restraining order against it, that the courts just ruled it is not proprietary information; every kid who is majoring in physics in schools in the U.S., half of them from overseas in our colleges, already have access to that information. So it is not a secret how to build a nuclear bomb, and obviously that was printed and anyone can get the designs as to how to build a nuclear bomb.

In fact, prominent physicists have said that you don't even need a nuclear device to get an explosive yield; that simply one piece of weapons-grade highly enriched uranium on another could create a critical mass and a bomb that could kill thousands of people. Of course, that would be suicidal, but we know that these terrorists are suicidal.

The Bush administration is currently in the process of approving a new uranium enrichment facility in New Mexico. Do you think we need to produce more HEU when there is so much of it in the former Soviet Union just waiting for us to pick up?

Mr. Lehman, do you support or oppose the construction of that facility in New Mexico from a nonproliferation perspective?

Mr. LEHMAN. Congressman Markey, I am here testifying just on this broader issue of nuclear terrorism. Whether or not we build a particular facility, it is incumbent upon us to make sure that it is absolutely secure.

Mr. MARKEY. I am just talking about the signal we are sending to the rest of the world as we are telling them that they should not have highly enriched uranium facilities, given the plethora that exists already.

Mr. Albright.

Mr. ALBRIGHT. My understanding is it is not being built to make highly enriched uranium.

Mr. MARKEY. It is not?

Mr. ALBRIGHT. It is just to make low enriched uranium. You may have more information.

Mr. MARKEY. It is my understanding that it is highly enriched uranium.

Ms. Holgate.

Ms. HOLGATE. Well, without speaking specifically to that facility, I have to say I share David's understanding that it is a LEU production—well, centrifuges are centrifuges. They can be used to make LEU or HEU, but the purpose of it is LEU.

But the more interesting point to your question about Russian HEU, NTI has just completed a study with Russian colleagues on how to accelerate the blend-down of Russian highly enriched uranium to perhaps use that additionally for nuclear power plants; and a counterintuitive fact about that is you actually have to blend

that material, blend the 90 percent enriched material with 1.5 percent enriched blend stock. So you actually do need to have some kind of an enrichment capability even to get the power possibilities out of Russian HEUs.

So I would say that those are not incompatible realities to have an enrichment capability in order to get the power out of Russian HEU.

Mr. MARKEY. You said, Ms. Holgate, in your testimony that Russia thus far has not had its own A.Q. Khan. Yet the Russian Government has continued to sell nuclear facilities into Iran. It continues its nuclear and missile assistance to China, and while A.Q. Khan theoretically—although I don't believe it—was not tied to the Pakistani Government, here the Russian Government itself is engaging in reckless nonproliferation policy.

Don't you think, for all intents and purposes, Vladimir Putin is the A.Q. Khan—I am being serious on this—in terms of his relationship with China and his relationship with Iran?

Ms. HOLGATE. Well, certainly, the missile issues are apart from my personal knowledge, but I understand that is quite serious and quite clear that there has been some government connection, and obviously building a reactor in Iran is government-sponsored and they are up front about that.

I would say Russia has been relatively responsible in that broad context, and they have insisted that any fuel used—any low enriched fuel that would be used in that reactor—come from Russia, and that the spent fuel go back to Russia. In the absence of indigenous capability for enrichment and reprocessing, a power reactor using low enriched uranium is the smallest component of a proliferation potential in Iran.

Mr. MARKEY. Do you agree with that, Mr. Albright?

Mr. ALBRIGHT. Yes, I do. In terms of what she said about the—.

Mr. MARKEY. I am going to go back to the Putin question. Could you characterize Putin's cavalier attitude towards the sale of these materials into China and Iran?

Mr. ALBRIGHT. Well, I can't characterize Putin's actions. I certainly worry a great deal about what Russia has been selling in these areas.

Mr. MARKEY. Do you think these things can happen without Putin's acquiescence?

Mr. ALBRIGHT. I think they can, yes.

Mr. MARKEY. Do you think there can be a sale of nuclear components into Iran without Putin?

Mr. ALBRIGHT. Well, the leader of Russia certainly knew about the deal in 95, and you will remember they were also going to try to sell an enrichment plant to Iran. So I share your concern about the Russia Government. But I do believe that there is also a great risk that under Russian law would be illegal exports that could be quite dangerous could leave Russia, and that could happen without Putin knowing.

Where I would fault Putin and fault the Russian Government is that they are not trying to implement export controls to the extent they desperately need to.

Mr. MARKEY. We thank you for staying around. My 5 minutes have expired. I would note, though, that under Rule IX of the

House of Representatives, that each committee shall apply the 5-minute rule during the questioning of witnesses in a hearing until such time as each member of the committee who so desires has had the opportunity to question each witness, and I am glad today that finally we are in compliance with the rules, and I yield back.

Mr. LINDER. Mr. Cox.

Mr. COX. Thank you, Mr. Chairman. I too want to thank our witnesses for their gracious willingness to stick around during our floor votes. We are going to be interrupted again, but as I said earlier, your contribution is very, very valuable and we very much appreciate you being here.

When I last left off my line of questioning we had up on the screen the diagram, the flow chart prepared by Mr. Albright, and if you have all still got your copies of that I would like to keep our focus on that. Because what we are trying to do in this hearing is look for those pieces of the puzzle that will give us an early warning that terrorists are actually moving from a general interest in or willingness to use nuclear weapons to execution.

As you know, Osama bin Laden went out of his way to obtain a fatwa in 2003, blessing Al-Qa'ida's use of nuclear weapons.

Ms. Holgate, you mentioned in your testimony that we found nuclear weapons designs in the caves in Afghanistan. One month before 9/11, two Pakistani nuclear scientists were arrested because of links to Al-Qa'ida and the Taliban, and one of those had been a project director in the lead up to Pakistan's 1998 nuclear test. The other one was with the Nuclear Materials Division in Pakistan.

So we know that it wouldn't be greatly beyond the present, to get on to your flow chart here, and I want to think about what we might be doing to focus on those key indicators.

First of all, we know that the fissile material itself is a sine qua non, so we are trying to watch that, and we have got all these global arrangements that we are pursuing constantly to secure fissile material, and by all accounts we are doing the best job right here in the United States at securing fissile material.

In addition to tracking material, I am inferring from what I have heard so far during the hearing and your testimony that there are some people that we can focus on, and I want to see if I can drill down to that a little bit and understand exactly what kind of people we can focus on and how can we go about this. Since some of the expertise is required is not elegant but would require at least, you know, a basic college degree, let us say in certain areas, what can we piece together to make sure that we are focusing on the right group of people? And then beyond that, how can we track the intercourse, if there is any, between terrorists and such people?

I guess, lastly, is the assumption in my question that this is a worthwhile approach, a valid one.

Mr. LEHMAN. Mr. Chairman, let me offer sort of a way to try to think about this. One is that there are certain traditional paths down which countries that operate with this kind of material and this kind of technology go, and so obviously if you want to get into shipments of material, activities involving material, one way to do it is to go and look at those processes, those companies, URENCO, others, who are involved in the legitimate business trade, and then try to see where the anomalies are there; what is happening that

doesn't make sense, making sure that people there are sensitive to keep an eye out for what may or may not be entirely legitimate activity.

A second path, though, is to say let us suppose that the source of the threat is nontraditional. So, for example, right now we tend to think of a certain limited number of countries as having reprocessing enrichment capabilities and that we would like to see them cooperate and making sure that material is tightly controlled and limited and that the number is limited.

One could imagine that a group of countries or, even theoretically, nonstate actors involving some kind of industrial organization, might decide that they want to have their own system. Okay. Right now that is still big bucks, a lot of talent, a lot of effort, and we would get indicators that they were recruiting certain people, buying certain things over time.

The problem is that I keep coming back to this point that we need a more sophisticated way to think about the state, nonstate, and actor issue and what I will call the legitimate and illegitimate actor issue. They blur. They mix. So it may well be that your proliferator will need certain skills that he has already got. For example, it is quite common to hear people talk about machine tools and what kind of high-precision machine tools that would be necessary for making nuclear weapons. The problem is the tendency is to look at what we use in the nuclear weapons statements and forget that when we were actually making our first weapons it was a much simpler technology that is now widespread.

So I think if we try to look, as I said in my earlier statement, for that illegitimate network or that other network, we have got to find ways to get people on the inside of that. For the legitimate network, we basically have to sensitize people to keep eyes out for anomalies, but in particular what we are looking for is the faster track in between, in which the illegitimate and the legitimate start to come together. That is kind of a vague answer but I am trying to give you a feel for how we might think about it.

Mr. ALBRIGHT. Let me add, because I agree with what Ron is saying, the easiest to talk about is on the fissile material side. The United States sends all kinds of people to Russia to work on this problem. There has been a problem that the information gained by those people hasn't been filtering into the Intelligence Community fully.

I know they are taking steps right now to correct that, but there was a sense that of the people out at the sites learning things, learning about the adequacy of physical protection, learning to know the people and developing relationships with the people, is potentially important early warning for any problems that may develop; and yet that information wasn't really shared within the U.S. Government as it should be.

When Ron has used—if I can take his analogy—the ship sailing into the right seas, that is important; and then we have to make sure that the information gained by that ship is actually communicated to the U.S. Government.

And on the other areas, I mean it is part of what I was trying to do in my testimony and what Ron is struggling with and Laura is: Where can you intervene to increase the chance of detection?

And that was part of the reason I wanted to generate this pathway and, in fact, using pathway analysis.

Most of these things, it does appear you have to be lucky to catch a meeting happening, a cell phone conversation. Our intelligence agencies learn that a meeting is happening and they can put in listening equipment. Those things seem very hard to control. But on the fissile material, and, to a lesser extent, but on the manufacturing of the weapon, it seems that we can take steps to increase our chances that we will learn something. But we do need to have people there.

And I would say under fissile materials side, I think we know what to do and it can—the U.S. can better share the information among its own agencies.

On the export side of this, it is a little more difficult to know what to do. I mean, what I have seen personally is when company officials help you, it is remarkable what you find out. An example would be they get a tender from somebody where they can—in this case it is a country trying to get something, and they don't respond because they are responsible and they don't want to deal with that. But they then pass on the information to the intelligence agency of their country, and then that can be used to nail some of these illegal procurement networks that are going on. And I don't know the extent the U.S. does that, but it certainly is something to encourage, to try to have better relations with people in companies that may see some of these things that terrorists would try to buy.

There is equipment—and Ron's point is very important about the technology level. They are not going to buy the most fancy computer in America when they control a machine to do something, but they will need to buy certain equipment, and the companies in some countries are set up to watch for anything illegal because of these catch-all clauses that if it ends up in a nuclear weapons program then that company is in trouble. So they sensitize their employees to be suspicious of their customers and then, in many cases, to share that information with their respective government.

Mr. LINDER. The gentleman's time has expired. Does Mr. Dicks wish to inquire?

Mr. DICKS. Well, I want to thank the witnesses for being here today. This is obviously one of the most important subjects that our country faces, and there has been a lot of work done on this by the three witnesses. And there are some people who believe that if there was going to be this kind of an attack, that one possible way it could be done would be from a ship or a barge off the coast of the country. So they would have to construct this somewhere else and that that is a possibility.

Have you thought about that issue, Ron? I know you have had a great deal of experience, and all three of you have had great experience.

Mr. LEHMAN. Congressman Dicks, you are onto a very important point, which is there sometimes a tendency to think that the nuclear bomb that a terrorist would make will either be like a nuclear weapons state's bomb, or at least something like Hiroshima–Nagasaki, when in fact it may be a different kind of device. It may be much more inefficient. It may be very large, totally inappropriate

for delivery, not only by missiles but maybe inappropriate for delivery by an aircraft.

Well, then, how do they deliver? The answer is, as you have said, is you can put them on ships. You can put them on trucks. There are various means. I think this is something that the community has to keep an eye on is that if you are looking for the terrorist to meet your traditional standards of performance, efficiency, safety, cost effectiveness at the margin, you are asking the wrong questions.

Mr. DICKS. Other witnesses want to comment?

Mr. ALBRIGHT. No. I agree with Ron, and particularly the terrorists are going to look for shortcuts. Terrorists may look to avoid using certain components that any state wouldn't naturally think to use, and that would simplify their job, but it may make their bomb much more inefficient and bigger.

Mr. DICKS. The other issue, you mentioned we have to have a break in intelligence. One of the things that I have learned about intelligence is that it is one thing to gather it; it is another thing to analyze and act on it. And that is another concern, whether we can get people to see the issue or see the possibility and then to take action.

Thank you, Mr. Chairman.

Mr. LINDER. Mr. McCaul wish to inquire?

Mr. MCCAUL. Thank you, Mr. Chairman. I want to thank the witnesses for their patience in sticking around till we finished our votes.

The Al-Qa'ida has stated publicly that they have the right to kill 4 million people, 2 million children, and we didn't take them seriously in the nineties but we do now. I don't think they are going to achieve that by flying airplanes into buildings.

I think the threat that we are talking about here today is the real threat. Being a freshman, by the time they get to me questions have been asked, so I apologize if I'm being redundant.

But when you look at Dr. Kahn and what he did in terms of proliferation, in testimony before the Senate Select Committee on Intelligence, Porter Goss stated that there is nuclear material, specifically bomb grade, that has not been accounted for in Russia and that it could be in the hands of terrorists, and that is very alarming coming from our top intelligence chief.

I have no idea how much of this stuff is unaccounted for, particularly out of the Soviet Union. I was hoping you could help me in clarifying that.

In addition, as Mr. Gibbons pointed out, we hear a lot about the testimony about the briefcase, that there were maybe up to 60, I believe, unaccounted for. That has never really been verified in my view. I don't know whether these even existed in the Soviet Union, nuclear briefcases; and if so, is it true that there are that many unaccounted for? You can imagine the scenario of that being brought into New York or D.C., easily dropped off, and then an explosion occurs.

That is the first question I have.

The other one is that the threat coming from the border, we have provided funding to secure it, but the cartels' ship contraband,

whether it is human, drug related, and certainly enriched uranium, plutonium could be brought across the border.

In my prior career at the Justice Department, our job was to identify where the cells were or are in the United States and it is not an easy task. We were effective, but I am concerned that there are many here already that we don't know about.

So I guess, and my question really is, what is your best estimate with respect to unaccounted plutonium that is out there and recognizing that it is a guesstimate, maybe it is proving a negative at this point.

Ms. HOLGATE. I will just make a couple of comments on that, and it is hard to say. I mean, you can't really say how much about unaccounted, but I just want to talk about a couple of the reasons Russians might not know themselves how much material they made.

In the Soviet times, each manufacturing plant had its quota, and they were supposed to create X amount of plutonium and highly enriched uranium that month. Now they depended on some other plant making their quota of the raw material, and we all know that the planned economy really never worked as planned, and so an operator who got maybe a little bit more of the input that month may make some of his product and put it off to the side off the books, never telling the bosses about it, maybe never even telling a lot of the plant managers about it. So if next month he did not get all his input, he could supplement from that off the books stock and then meet his quota and get his Hero of the Soviet Union Prize at the end of the year.

There is zero way to know how much that was. Is it a small amount, is it a large amount? There is simply no way. What the U.S. has been trying to do through its assistance programs is to provide techniques, provide modern equipment, provide the training and some of the security culture to the Russians to learn how much they have.

That job isn't done and there is nothing that requires Russia to tell anybody. Even if they did have perfect accountability, there is nothing about their NPT membership, about their bilateral relationship with the U.S. or anybody else, that requires them to report on their total quantities.

Mr. MCCAUL. Do we have any evidence that there is any evidence that that was actually happening, that it was taken off?

Ms. HOLGATE. We know it. The plant managers have said that that is how they operated their plants.

As to the suitcase nukes, there has been a lot of attention to that one particular type of tactical weapon. I believe it is a red herring. There is certainly a lack of accountability for tactical weapons as a class, and these are all weapons, many of them are portable, whether it looked like a suitcase or whether it is just something you can carry with one or two people. They are all concerning.

The kinds of specific statements that were made in the mid-nineties about the suitcase nukes have never been verified, but the general point of the lack of accountability of small, low-tech, possibly, you know, able to be broken into by a terrorist and actually detonated, that could be, you know, one or two people portable. We made them in our arsenal. The Russians made them in theirs.

Mr. MCCAUL. What is the size of these tactical?

Ms. HOLGATE. It varies a lot. Some of them look like an artillery shell, and some of them are, you know, even—are bigger, but they are not, you know—put a few of them in the back of an SUV. It is not what you think of when you think of the massive kinds of things.

But the other thing is if you haven't designed the weapon, I mean, this is where the expertise may really be an issue. If you have got a weapon that you have stolen and you didn't design it, it is going to be hard to make it go off. Even if you're suicidal, even if you don't care, even low-tech weapons have some safety devices. But if you happen to have a designer that you have managed to convince to come over to your side, that kind of person may be able to help you detonate a stolen weapon.

I think a much more likely pathway and much easier for the terrorist is to get the uranium, build their own crude design that they know is going to work, and go that route.

Mr. MCCAUL. So import the uranium and then build the bomb in the United States?

Ms. HOLGATE. Or build it in Europe, put it on a boat, sail it up the Potomac, bring it in over a border, and it is easy to shield this stuff. A little bit of lead will shield it from the kinds of even what we have got deployed now.

Mr. MCCAUL. There has been discussion, and if I can indulge the Chairman, some discussion about a sensor that could detect radiological devices on cargo. Would the lead prevent that sensor from detecting it?

Ms. HOLGATE. Well, let me make a distinction between a gun-type device using HEU and a radiological device. A radiological device has lots of radioactivity. Highly enriched uranium has naturally not a lot, and you can shield it easily with a little lead. So the types of devices that are looking to detect a radiological situation are not going to catch typically a gun-type device.

Mr. LINDER. The gentleman's time has expired. Gentleman from Rhode Island wish to inquire?

Mr. LANGEVIN. Thank you, Mr. Chairman. I want to thank the witnesses for their patience in coming back to this hearing.

Getting back to the A.Q. Khan network and that situation. And you indicated earlier there were some things, obviously, that caught us off guard in terms of sophistication and design of the centrifuges. How assessible is that type of technology for a terrorist to in build a sophisticated device using highly enriched uranium?

The other question I have is what do we need to worry? You may not want to comment on this in an open hearing, but I was reminded earlier that Moore's Law doesn't apply to just physics; it may apply to computers. But what do we have to worry about as technology gets more and more sophisticated? What type of things do our intelligence officials especially need to watch for. As technology gets more sophisticated terrorist may be able to build a bomb that may not be easily built today, but with tomorrow's technology, would it be easy to build?

Mr. ALBRIGHT. There is—certainly we do have to worry that information on making bombs is going to become more widespread, and particularly with the Internet.

Although what Khan was providing, particularly for a nation, was a tested bomb design, it was a Chinese bomb design given to Pakistan. And that was sort of the beauty of what Khan did, was he took what China had given them secretly and marketed it so it had no Pakistani fingerprints on it, so that design is certainly of interest to states trying to put warheads on missiles.

In terms of what it would help, its contribution to terrorists would be it just teaches them how to make specific components and actually tells them what the components are for an implosion-type nuclear weapon. So it would be a tremendous advance in knowledge if you had all that information and then you could—you may choose to do something differently, but it gives you a tremendous knowledge base.

In terms of far-off threats, the thing you worry about is that terrorists sitting in a country, perhaps with some complicity of a government, could learn how to build a uranium enrichment plant, particularly out of centrifuges, and so they could bypass really what amounts to our greatest safety; namely, that they have to get the fissile material from someplace, but if they can actually build it and get around that and do it with relative ease—and there are developments in centrifuges that is making it easier over time to build centrifuges, although that is happening slowly and hopefully if people aren't interested in centrifuges beyond the ones who already have them, some of that development may not take place.

Ms. HOLGATE. Just one thing that I have heard from Russian colleagues on the centrifuge point that would worry me in the medium term is a gloss on this notion of terrorists gaining access to enrichment capacity. A lot of our discussion has centered on the notion that it takes a country to make HEU and it is easy access to theft of that that makes a terrorist a nuclear terrorist.

If you break that link somehow and terrorists do get access to enrichment capacity, that changes all the equations that we have been talking about today.

One technique that some Russian colleagues have talked about, I don't know whether they have proven it in the lab or not, is the potential to use actually very small-size medical centrifuges, hooked in large series, that can come out with small—but from a terrorist's perspective relevant—quantities of HEU. That would be the kind of technology that is more or less off the shelf if that is true. So this is something I would think an eye should be kept on.

Mr. LANGEVIN. Just so I am clear, and it is pretty much my understanding that we can pretty much pinpoint where highly enriched uranium or plutonium was produced in terms of from what country, so that in a sense if there ever was a nuclear device detonated it is highly likely it would have a sufficient fingerprint so that we would be able to trace where it was produced.

Do you agree with that and is that something that we would want terrorists to understand? But right now it is my understanding that it would have a sufficient fingerprint that we could pretty much trace the country that it would come from.

Mr. ALBRIGHT. Yeah, but I don't know if—it is relevant? In the sense that if it is stolen in Russia and used by Iran, passes it to a terrorist group, knowing that it was Russian, is it necessarily going to help you in a response? So I mean it's nice to know and

there are other reasons to do it, but I am not sure it contributes to us solving a terrorism problem. But maybe Ron or Laura may disagree.

Ms. HOLGATE. The problem I have heard with that is the sample question, is you may be able to match a sample to a sample you already have that you know where it came from. The challenge may be there may be a lot of stuff out there that you don't know where it came from. I feel pretty confident we don't have a good sample of North Korean plutonium, for example. So it would be hard to be able to be sure that something came from them if you don't have a reference sample. So that is just one technical issue with that, but Ron is an actual weapons guy.

Mr. ALBRIGHT. If Russia was cooperative and really—I don't think it has been. If you had illicit trafficking, investigators would like to know exactly where it came from, and then that could help uncover a theft ring or uncover how the diversion happened. So in that sense the tracking is helpful, if nations are cooperating and producing the information so that you know what the signatures of the plutonium are and will take responsibility if it is from their country.

Mr. LANGEVIN. Could you expand on that? You said Russia has not been cooperative.

Mr. ALBRIGHT. I don't think they have been cooperative on the investigations, for example, when they have found plutonium in Europe. I think their position has been to deny that it came from Russia. Correct me if I'm wrong.

Ms. HOLGATE. And they have not been willing—they consider the isotopic component of their material from any type to be classified, and so they haven't been willing to provide reference samples. Now, they may be able to do the analysis themselves, but then you run into a problem with are they prepared to admit what they find.

Mr. LINDER. The gentleman's time has expired. Mr. Simmons.

Mr. SIMMONS. Thank you, Mr. Chairman. Thank you first, for having this very interesting and very important hearing. Thank you, second, for reconvening after the break. That is really helpful and I especially thank our panel for indulging us, given the schedule and the activity on the floor.

I want to address most of my comments to Ambassador Lehman who I knew I think 25 years ago when he was on the Armed Services Committee staff in the Senate. I was staff director of the Senate Intelligence Committee at the time. And, without my glasses on, you look just as young and dynamic as I remember. It is great to have you here.

I have some personal experience with nuclear nonproliferation. In a previous incarnation I worked abroad out of an embassy where a sovereign state was engaged in proliferating, and I came away from that experience, which covered about 3 years, with a sense that if you looked at the companies and the countries that seemed to be involved—and this was in the Far East—many of them were European; and even though we had nonproliferation regimes and even though sovereign states had signed off on these nonproliferation regimes and even though the IAEA was over there with inspectors all the time, many of the countries that showed up 25 or 30 years ago on the vendor list are the same countries that we see

here on this graphic from Time, "The Merchant of Menace, and so it kind of begs the question from my perspective.

I thought we were making some progress in those days. The proliferating countries that I was involved with apparently have not proliferated, but others are getting into the game, and the most worrisome part is perhaps that they are nongovernmental entities, nonsovereign states, small, highly resourced, ideological groups that don't have the constraints of retaliation when it comes to developing these weapons and deploying them.

We always knew who we could retaliate against during the Cold War. We don't know that anymore, and so my question goes to the issue of intelligence.

Our Intelligence Community was established and over 40 years did a pretty good job in dealing with the sovereign state issues, whether it was conventional military, capabilities intelligence, or whether it dealt more with the nonproliferation sphere.

When I look at the challenges we have today, finding that needle in a haystack, I wonder what the magnet is. Are we capable today of doing sting operations? Can we draw these folks out and get them? Do we have the assets within these groups that we need to be successful? How confident are you?

And I see that we have just been called for another vote, so I will stop and let you respond if you could.

Mr. LEHMAN. The whole history of intelligence about nuclear programs by nation states and by others is a fascinating history, with a lot of tremendous successes and a number of big surprises. It began with a basic assumption that was correct. The Manhattan Project demonstrated that to be a pathbreaking nuclear power, you could take a tremendous amount of your Nation's brain power and your resources and electricity, and so if you looked for that, you could get a sign for what was going on. The problem was that in the early days of the Cold War, we didn't have a whole lot of tools for looking, so even though the target we were looking at was in some ways massive, the tools weren't all that great. It resulted in some—I hesitate to say humorous—but some big mistakes.

For example, one that is well known is that most people in public, when they were talking about the Chinese program, expected that the Chinese would do a plutonium bomb because you could look at China and see that there wasn't enough electricity for gaseous diffusion. And then it went off and they discovered it was the uranium bomb, and they discovered why there was so little electricity in China; it was all going to the gaseous diffusion plant at Lanzhou. That was a world—but at least you had something big.

The challenge today—and I really think the Intelligence Community understands it has got a big problem—is that that is not how things are going to be done, because so much of what is important, everybody has got. So we often make the point that the laptop computer that you have right now, or your desktop, is many times more powerful than the fastest, most powerful supercomputer we used when we designed the last nuclear weapon. People forget that when we designed the first nuclear weapon, we didn't have any. We had housewives with calculators.

Now, agile manufacturing is going to be a problem. People talk about machine tools. Well you know, villages around the world

have machine tools that are as good as anything that we found necessary for the early weapons program. That is happening.

As I said with agile manufacturing, there are going to be a zillion different companies out there that are going to get designs for piece parts, and the average person in an industry looks at that part and he doesn't know what that is for, but he has got an order, he fills the order. And as more and more industries use technologies that were once associated with weapons programs, it is going to be hard to lift the weapons program out of that noise, because the rest of it is fully legitimate.

But what I keep going back to is it is a challenge, and I don't think that we can separate the intelligence on nuclear terrorism from the intelligence on terrorism.

But we can also augment it by going and looking at certain areas.

I have mentioned that knowledgeable people—and, as I have emphasized, it is not the Nobel Prize winners necessarily—it is a whole range of people who have certain types of knowledge, sailing in those waters. We may catch our fish or we may not. I think that is an important area to delve into. I think, though, in the end, as I said, when you are looking for a needle in a haystack, you need a few magnets. And I think sting operations, false flags, things that permit us to go find them, are going to be very important.

Mr. LINDER. The gentleman's time has expired. Gentlewoman, Ms. Harman, wish to inquire?

Ms. HARMAN. Yes. Thank you, Mr. Chairman.

I would like to apologize to our witnesses for missing their testimony. I was meeting with Ambassador John Negroponte who is the new National Director of Intelligence, and, as you know, Mr. Chairman, we all try to be here on time but it is sometimes impossible given the schedules of this place.

I did read your testimony. I do know Graham Allison extremely well. I am very worried, as one's district surrounds the ports of L.A. and Long Beach, about the possibility of a radiological bomb in an uninspected container. I know that worries our Chairman, too, since he represents real estate nearby as well.

And I have two questions. I know there are votes, so let me just ask them both and hope that we can answer them quickly.

One, I understand you talked about the importance of a threat and vulnerability assessment of where we might be most vulnerable to nuclear—a nuclear attack or the transit of nuclear materials. I just would welcome, if you could amplify your thoughts about that.

Second, as Ranking Member on the Intelligence Committee, I continue to be very worried about the A.Q. Khan network. I know that we have—not only that he is under house arrest, but that most of his operatives, at least those we could identify, have been wrapped up. But I just wonder—and I am not asking anything classified here, and I wouldn't want you to answer it if you have classified information—but I just wonder if the operating assumption shouldn't be that there still may be folks out there who have access to his very thorough materials and who may still be engaged in trying to sell them to terrorist cells.

Mr. ALBRIGHT. On the second point there is a lot of concern. We don't know everything there is to know about the A.Q. Khan network. I think most of the major players have been identified, but not all their information has been recovered. And there are others involved that—well, let me put it this way. There haven't been a lot of confessions by the people that have been arrested, and so there is a lot of mystery, in fact, over do we know all the customers. A lot of their information was digitized so—and we know that the bomb designs, for example, haven't been found as far as I know. There has been some traces of them in Dubai. Those were actually in paper form, but have they been copied? The ones Libya got had been copied multiple times.

So I think there is a lot of concern that the information at the heart of the Khan network has not all been found and that certainly could create or generate a new Khan network, perhaps smaller in scale but still deadly.

And I think also that this group was very persistent— I mean, some of these people go back to the seventies—in their help for Khan. And I think that—I don't think we know all of them, and I think it is going to take quite a while to unravel this mystery. And I think even when it is done, it very well could turn out that another Khan network replaces it, and one that I know that we worry about is North Korea. We don't know what they got, but let us say we know some of what they got; but if they—they are always selling buying and selling, in fact. And they could decide—if things are not resolved so that they do go on a path of denuclearization—they could decide that they are going to make money by selling centrifuges.

Ms. HARMAN. Just to interrupt right there, my experience with the North Koreans—and I actually went there as part of an Intelligence Committee CODEL in 1997—is that they will sell what they have. They have sold—and this is not classified anymore—their missile technology. Iran, among others, is benefiting from that. So that is a new set of worries.

But I just want to underscore what you just said, which is we don't know everything about the A.Q. Khan network itself, let alone copycat networks, and there may be folks out there with some of the materials developed by some very sophisticated people who are still trying to sell them or who have sold them to terrorist networks; is that correct?

My time is almost up. Any comments on a need for a threat and vulnerability assessment.

Ms. HOLGATE. I will just second that very heartily. One of the things that NTI has focused on as a gap in our knowledge is looking at the civil use of highly enriched uranium, the research reactors at universities around the world, the critical facilities. There is no comprehensive inventory qualitative threat assessment of those facilities that the U.S. Government has.

Mr. LINDER. Anyone else have any questions? We have 5 minutes to vote.

Thank you all. Thank you for staying and answering some more questions. We are grateful. The hearing is adjourned.

[Whereupon, at 3:50 p.m., the subcommittee was adjourned.]

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