

TRENDS IN ILLICIT MOVEMENT OF NUCLEAR MATERIALS

HEARING

BEFORE THE

SUBCOMMITTEE ON PREVENTION OF
NUCLEAR AND BIOLOGICAL ATTACK

OF THE

COMMITTEE ON HOMELAND SECURITY
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TRENDS IN ILLICIT MOVEMENT OF NUCLEAR MATERIALS

Thursday, September 22, 2005

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

The subcommittee met, pursuant to call, at 2:05 p.m., in Room 210, Cannon House Office Building, Hon. John Linder [chairman of the subcommittee] presiding.

Present: Representatives Linder, Shays, Lungren, McCaul, Langevin, Dicks and Norton.

Mr. LINDER. The Committee on Homeland Security, Subcommittee on Prevention of Nuclear and Biological Attack will come to order.

I would like to welcome and thank our distinguished panel of witnesses for appearing before the subcommittee today.

It has often been said that defending against nuclear terrorism will require a multilayered approach. Given the complexity of the problem and the extraordinary consequences of a successful nuclear event, we must look to any and all opportunities for preventing such attack. Should a terrorist organization acquire the requisite nuclear material, we would then be faced with the difficult task of interdiction. Here, as in so many areas, timely intelligence is critical. We cannot be everywhere all the time; but if we have good intelligence, we may be in the right place at the right time.

The Department of Homeland Security is developing, in collaboration with other agencies, a global system for nuclear detection. The challenge is daunting, and the relevant geographical area is enormous. We have also heard in previous subcommittee hearings of the inherent limitations of detection technology. We must therefore focus our resources where they can be most effective.

When it comes to nuclear smuggling, our interdiction efforts should take note of trends in the trafficking of nuclear materials. We should also be aware of existing contraband smuggling routes and techniques of evasion currently used by criminal organizations. These methods present a well-worn path for clandestine distribution of materials, including human beings, around the globe.

Unfortunately, nuclear smuggling is not a purely hypothetical threat. Incidents of nuclear smuggling continue to appear in the news. Just last month Turkish officials in Istanbul arrested two men smuggling a small amount of uranium, enriched to 17 percent. Press reports indicate that the uranium likely originated from a

Russian nuclear facility. Fortunately this case, like most nuclear smuggling incidents, involved materials not suitable for a nuclear weapon. But just like the illicit drug trade, what we detect may only represent a fraction of the material involved.

When it comes to the intermingling of criminal and terrorist organizations, we have clear examples closer to our shores. In South America, the terrorist organization known as the Revolutionary Army Forces of Colombia has been trafficking in illegal drugs for many years. The U.S. Drug Enforcement Agency has also reported that both Hamas and Hezbollah have established drug and other criminal operations in the triborder area of Argentina, Paraguay, and Brazil. Bureaucracy may spend its time and money reinventing the wheel; terrorists will exploit existing networks and assets.

As DHS begins to invest in detection technology, it will be useful to discuss the links between terrorist and criminal networks, existing smuggling routes, and ways for us to monitor and interdict smuggling of nuclear material.

Fixing levees and draining a city has proved difficult and costly enough. I for one cannot even begin to comprehend both the human toll and clean up cost resulting from a nuclear explosion in a U.S. city.

I look forward to the testimony of our expert panel, and I recognize the Ranking Member.

PREPARED STATEMENT OF HON. JOHN LINDER

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works, existing smuggling routes and ways for us to monitor and interdict smuggling of nuclear material.

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Mr. LANGEVIN. Thank you, Mr. Chairman. And I would like to welcome our witnesses here today, and I certainly look forward to hearing their testimony.

Our work in this subcommittee has shown that the nuclear terrorist threat is very real, requiring the full attention of our government. We have learned about the relative ease with which a terrorist can build a crude nuclear device, and therefore we must do all we can to prevent them from building or obtaining other nuclear material, including taking steps to reduce the illicit smuggling of nuclear material.

Security of fissile materials in Russia still concerns me, especially after the National Intelligence Council reported in December 2004 that undetected smuggling of nuclear materials has occurred at Russian weapons facilities. Reports specifically mentioned that Russian authorities twice thwarted terrorist efforts to survey nuclear weapons storage sites. The intelligence council report leads me to believe that while progress has been made in securing fissile material, more must be done to prevent this material from ending up in the hands of terrorists. Revelations about the A.Q. Khan proliferation network show that nation-states could provide terrorists with nuclear material, and therefore we must adapt our non-proliferation programs to deal with this threat.

I would like to hear from our witnesses today about where they feel the smuggling trends are going and where our government should focus its attention to further deter smuggling efforts.

Criminal smuggling has presented a challenge for our government for decades, as smugglers move illegal drugs and migrants into the country. I would like to know if there are steps that can be taken using the lessons learned from drug and migrant smuggling.

I would also be interested in hearing your opinions on what our government needs to do to ensure that our nonproliferation programs are capable of mitigating the nuclear terrorist threat.

Finally, I would like to hear from our witnesses about how our government could better coordinate its proliferation and detection programs. Specifically, do you think the Domestic Nuclear Detection Office is capable of leading the government's efforts to develop a global architecture?

I look forward to our witnesses addressing these and other issues. And, Mr. Chairman, I would like to thank you for holding today's hearing.

Mr. LINDER. I thank the gentleman. Members are reminded that they may submit written reports for the record.

We are pleased to have a distinguished panel of witnesses before us today on this important topic. Let me remind the witnesses that their entire written statement will appear in the record. We ask, due to the number of witnesses on our panel, that you strive to limit your testimony to 5 minutes.

Dr. Juzaitis is an associate laboratory director at the Lawrence Livermore National Lab.

Dr. Lee is the president of Global Advisory Services and a senior fellow with the Foreign Policy Research Institute.

Mr. Schweitzer is director for Central Europe and Eurasia at the National Academy of Sciences.

Dr. LEE.

STATEMENT OF RENSSELAER LEE

Mr. LEE. Thank you very much, Mr. Chairman. I am going to start with the observation that the nuclear smuggling danger is probably quite a bit more serious than it appears. Admittedly, the visible face of the nuclear black market doesn't seem very compelling: Lots of radioactive junk floating around, a multitude of sellers, few bona fide buyers, and more a minor international nuisance than a first order of strategic threat. But this picture may be misleading.

As with other illegal businesses, drugs, for example, what is seized is only a small fraction of what may be circulated through smuggling channels. Important incidents go unreported or undetected—or actually go unreported or underreported, especially in former Soviet bloc countries. And it goes without saying that sophisticated thieves and smugglers are far less likely to get caught than the amateur players and scam artists who dominate the known smuggling incidents.

Furthermore, anecdotal evidence suggests that a handful of nation-states and subnational actors are in the market for strategic nuclear wares. It is certainly conceivable that would-be sellers and prospective buyers can connect with each other in ways that are not readily apparent to Western law enforcement and intelligence agencies.

In my written testimony I have discussed some of the nuclear leakage threats that I think are most worrisome, such as the corruption inside former Soviet nuclear facilities, state-sponsored proliferation a la A.Q. Khan, and mounting evidence that cross-border smuggling operations are becoming more sophisticated.

I would like to focus here on demand-side challenges just for the next couple of minutes, especially strategies that are likely to be used by adversaries to pursue their WMD objectives. Al-Qa'ida's activities, of course, are of particular interest since that organization has made multiple attempts to acquire both nuclear materials and tactical nuclear weapons since the early 1990s. It is believed that al-Qa'ida, lacking the requisite official contacts inside nuclear supplier countries, would try to recruit criminal groups to obtain the items that it wants and smuggle them to a target country like the United States. And al-Qa'ida's natural allies for this purpose probably would not be the major transnational syndicates that we are all familiar with like the Colombian cartels, the Sicilian Cosa Nostra, and the larger Slavic formations like Uralmash and Solntsevo in Russia. These groups boast lucrative and well-protected illegal businesses, extensive investments in the legal economy, and de facto political representation in their societies, and they probably wouldn't want to risk these assets by getting in-

volved in a high-profile and risky activity like smuggling dangerous nuclear materials.

Terrorists probably would find better luck picking ideologically sympathetic groups with less of a stake in the surrounding social order. Reports of al-Qa'ida's negotiations with the Chechen mafiya in Russia to buy tactical nukes, though I think these are probably exaggerated, they seem to fit this pattern. And the Chechens certainly have the international connections to mount a successful smuggling operation.

I have argued that the measures that we are introducing against nuclear smuggling abroad might not be effective against high-end threats from collusion, for example, from collusion among well-placed nuclear insiders, increasingly professionalized smuggling operations and sophisticated procurement schemes of well-heeled adversaries. State-sponsored proliferation is a particularly difficult challenge, of course. We provide nuclear security assistance to states on the assumption that they want to protect their own nuclear assets. Well, if they don't, our options are obviously rather limited.

Certainly there aren't too many magic bullets that can prevent some of these worst-case scenarios that I talked about and mentioned in my written testimony from becoming a reality, but I have suggested that we should try to complement our essentially right now reactive and stationary lines of defense approach to nuclear security with proactive, intelligence-based policies that could help contain corruption and at the same time provide advanced warning of illegal nuclear deals. I mentioned these examples: Human reliability systems that can detect corrupt or disloyal conduct, whether employees of nuclear enterprises or people who are responsible for interdicting nuclear smuggling. I also mentioned law enforcement and intelligence operations that could shut down demand-driven smuggling networks and expose high-level corruption at the state level.

But we must also understand, and in conclusion, that our nuclear security policy is inextricably tied to the imperatives of the global fight against terrorism. We have got to be vigilant against catastrophic events, not just those that are gestating abroad, but also those that are aimed at the home front or even already en route to U.S. shores.

Thank you very much, Mr. Chairman.

Mr. LINDER. Thank you, Dr. Lee.

[The statement of Dr. Lee follows:]

PREPARED STATEMENT OF RENSSELAER LEE

A SHADOW MARKET?

The threat of catastrophic terrorism in the post-9/11 world raises new concerns about a recurrent and pervasive phenomenon: the illegal trade in nuclear and radiological materials. The true dimensions of the nuclear smuggling business and its implications for international stability and relationships are somewhat ambiguous. Little nuclear material of significance and no nuclear warheads appear to circulate in the black market; buyers are elusive; and arrest and seizure statistics provide little evidence of participation in the market by rogue states, terrorists, and major transnational crime formations. Nevertheless, the observed reality of the traffic may be a misleading guide to the magnitude and patterns of the traffic as a whole. It is what we can't see happening that gives us greatest cause for worry.

As with other illegal businesses, drugs for example, what is seized is only a small fraction of what circulates in international smuggling channels. Some significant incidents go unreported, particularly in former Soviet states. Also, it stands to reason that sophisticated and well-connected smugglers are far less likely to get caught than the amateur criminals and scam artists who dominate the known incidents. And on the demand side, we can be fairly certain that a handful of nation-states and sub-national actors are “in the market” for nuclear materials. Over the years, North Korea, Iraq, Iran and Libya have tried to purchase stolen fissile material for a bomb, and al-Qa’ida has sought such materials in various venues—Africa, Western Europe and the former Soviet Union—since the early 1990s. Conceivably, purveyors of strategic nuclear wares may converge with end-users in ways that are simply not visible to Western law enforcement and intelligence agencies.

INSIDIOUS THREATS

Insider theft. Typical smuggling incidents have involved opportunistic thefts of small amounts of material by solitary nuclear workers, who then search for a buyer, often with the help of local relatives or petty criminals, who in turn are soon apprehended by police. Yet here are important exceptions. For example, in 1998 Russia’s Federal Security Service reportedly foiled an attempt by “staff members” of a Chelyabinsk nuclear facility (probably Chelyabinsk-70) to steal 18,5 kilograms of highly-enriched uranium, almost enough for a nuclear bomb. Where the material was headed and who the customers were. Is unclear but an operation of this magnitude almost certainly would have required prior arrangement with a prospective buyer. Also unclear is whether the theft attempt was an isolated case or a single failure in a string of successful diversions.

Other incidents have involved deceptive practices by senior facility managers, specifically illegal exports under cover of the legal trade in nuclear and radioactive materials. In a well-known case, at the Mayak Production Association in Chelyabinsk, the manager of Mayak’s isotope separation plant was convicted of exporting a non-nuclear radioisotope (iridium-192) using false customs documentation. Yet managers could just as well create appropriate paperwork to conceal a more serious diversion—describing a shipment of HEU as a relatively innocuous substance—such as natural uranium or cesium, for example.

State-sponsored proliferation. A further danger—one also difficult to detect—is that of “state-sponsored” proliferation, in which high government officials covertly transfer strategic nuclear goods to client states or groups, either for personal gain or as a matter of policy. The black market network run by A.Q. Khan is latter-day model for this. Khan is known to have sold centrifuge technology and nuclear bomb designs to states such as Iran and Libya; yet, according to an Iranian exile group, it also provided an undisclosed quantity of highly-enriched uranium to the Iranian government in 2001. Almost as egregiously, Pakistan’s Atomic Energy Commission in July 2000 took out a full-page ad in a Pakistani newspaper offering for export enriched uranium, plutonium and other nuclear materials. (The ad was withdrawn under U.S. pressure) Similarly, some U.S. officials believe that the Russian-Iranian nuclear cooperation allows Iran to maintain wide ranging contacts with Russian nuclear entities and to exploit these relationships to advance its nuclear weapons objectives.

Demand-side challenges: nation states, terrorists and criminals. Anecdotal evidence suggests that nation states and terrorists are in the market for strategic nuclear goods, but face significantly different constraints in procuring them. Nation states have the advantage of being able to deal with government officials or facility managers directly, and might successfully exploit quasi-official channels and networks (leveraging formal cooperation agreements) to get what they want. Terrorists lack such opportunities, and must somehow link up with a social subset of people who willing to commit illegal or disloyal acts. The obvious candidates here are criminal organizations, specifically ones having connections inside nuclear enterprises and cross-border smuggling experience.

Who would be al-Qa’ida’s natural allies within the criminal world? Probably not major transnational formations such as the Slavic Solntsevo and Uralmash gangs, the Sicilian Cosa Nostra and the Colombian cartels. These entities boast well-protected and lucrative illegal businesses as well as extensive investments in the legal economy and de-facto political representation; they probably would not want to jeopardize these assets (bringing down the wrath of the world’s law enforcement agencies) by trafficking in strategic nuclear materials. Al-Qa’ida is more likely to seek as partners ideologically sympathetic criminals who have relatively less of a stake in the surrounding *status quo*, or even other terrorist groups. Petty criminals recruited by professional jihadists in the jails of Western Europe, North America and

the Middle East might fall into this category. Also, reports that al-Qa'ida has sought assistance from the Chechen "mafiya" and the Islamic Movement of Uzbekistan in pursuing its nuclear ambitions seem to dovetail with this hypothesis.

Smuggling dynamics. Nuclear smuggling is widely perceived as an anemic, disorganized and supply-driven business. Yet evidence suggests increasing levels of sophistication in cross-border smuggling operations. For instance, sellers of nuclear material are increasingly likely to rely on paid couriers instead of trying to move are goods on their own. Smugglers are believed to collect and share information on which Russian customs posts are equipped with radiation monitors and to route their shipments accordingly. Reportedly, smugglers have probed the sensitivity of monitors by sending across decoys with innocuous radioactive items such as radium—dial wristwatches. According to Western customs officials, smugglers are becoming more adept at shielding and concealing their wares, for example encasing material in lead containers installed in vehicles instead of carrying it on their persons. All this seems to suggest an organizational intelligence behind the traffic, as well as (ominously) expectations that customers exist or can be found for stolen and smuggled materials. Finally, several data bases indicate a significant shift in the locus of smuggling activity, from Europe to the Caucasus and Central Asia. Little weapons-usable material has been detected along these southern routes, but the trend is nonetheless worrisome because of the relative proximity of the traffic to regional trouble spots in the Middle East and South Asia. Possible links of nuclear smuggling to obviously arms and drugs trafficking networks in these regions need to be explored further.

Worst case scenarios. Finally, the visible machinations of the nuclear black market provide little clue to what might already have happened. Recall the period of the 1990s, when the Russian nuclear complex was going through a period of deep malaise. Former Senator Sam Nunn, now the CEO of the Nuclear Threat Initiative, told a Senate Hearing in 1995 that the collapse of the USSR "let loose a vast potential supermarket, for nuclear weapons, weapons-grade uranium and plutonium, and equally deadly chemical and biological weapons." Even allowing for some hyperbole, it would be a miracle indeed if no leakage of significance had taken place during this period. Indeed, nuclear smugglers captured in Europe in the 1990s indicated to authorities that significant quantities of HEU and plutonium had already escaped from government control and were available for sale. Where this material (if it exists) is today is anyone's guess: it could be buried somewhere in a birch forest, stashed in someone's attic, circling the globe looking for potential buyers, or hidden in a cave in remote eastern Afghanistan.

RESPONSES

Limitations of policy. Nuclear security conditions apparently have improved in Russia and other new states since the 1990s. Russian officials claim that thefts have tapered off at nuclear facilities, and no weapons-usable material has surfaced in international smuggling channels in recent years, at least according to the official IAEA record. U.S. materials protection and border monitoring programs and the turnaround in the Russian economy (reflected in much of the nuclear complex) may account for these trends. Nevertheless, prospective thieves and smugglers may have become smarter at circumventing or neutralizing the new systems being installed. Also, nuclear officials are more likely today than in the 1990s to have international connections or relationships enabling them to find connections to potential buyers. The legitimate international trade in radiological materials may provide a cover or channel for shipments of nuclear wares that could be diverted to dangerous uses. We cannot conclude, therefore, that the nuclear smuggling has diminished in importance, even though the visible signs seem encouraging.

New U.S. safeguards are probably fairly effective against low-end threats from unsophisticated thieves and smugglers but this is not much cause for comfort. At the facility level today's main threat comes not from disgruntled solo players but from conspiracies of well-placed employees able to shut down alarm systems, bribe guards and alter relevant paperwork. Russian experts tell us that at most Russian facilities collusion of just 4 or 5 insiders is required to carry out a successful diversion scheme. Similarly, the border and cargo monitoring systems being deployed in the former USSR and Europe may be ineffective in intercepting serious smugglers with the requisite technological expertise and knowledge of the terrain to move their wares covertly. Obviously, smart smugglers can opt to circumvent those customs posts that are equipped with radiation monitors. Alternatively, they may simply bribe border officials to turn off or ignore the sensors. A further limitation is that most of the equipment being installed at borders is not sensitive enough to detect well-shielded HEU, which is the material most likely to be used in a terrorist bomb.

Additionally, our nuclear security programs absolutely are not designed to counter the state-sponsored proliferation scenarios discussed above. The systems focus on providing support to states presumably desirous of protecting their own nuclear assets. High-level diplomatic pressure and concerted political action are probably the only effective means of dealing with states, or their top officials, that refuse to play by the rules.

Finally, new U.S. security measures have taken a long time to implement. For the Department of Energy's Materials Protection, Control and Accounting Program is not scheduled for completion until the year 2008. But already 15 years have passed since the disintegration of the Soviet Union. The more time our programs require, the more problematic their strategic justification, which raises the question of whether we are simply locking the proverbial barn door after some of the horses have already escaped.

Intelligence-based security. Our "lines of defense"-approach to nuclear security policy have many weaknesses that can be exploited by clever adversaries intent on obtaining the ingredients for a nuclear weapon. This reality highlights the need for approaches that can lower the scope and degree of official corruption (difficult as this is), provide advance warning of illegal nuclear deals and stop consequential proliferation incidents before they happen. Various options present themselves: here:

First, we might work with the Russians to construct a vulnerability profile of each nuclear energy enterprise. This could be based on such factors as economic conditions and wage scales, neighborhood presence of organized crime and potential terrorist groups, past histories of theft and theft attempts, accessibility to foreign visitors, and frequency of travel abroad by enterprise scientists. It should also be possible to gauge the susceptibility of the nuclear workforce to bribes or blackmail and employees' propensity to engage on corrupt or disloyal conduct.

Illicit drug use, gambling habits major medical expenses, and conspicuous consumption unrelated to income are obvious warning signs. Post-employment screening techniques—polygraphs, psychological testing, and investigation of bank records—can be powerful predictive tools. They might also yield information on prior thefts, possibly leading to recovery of stolen material that perpetrators have not yet had the chance to export. Additionally, remote monitoring of nuclear storage sites and guard posts from vantage points inside and outside the facility in question could provide an additional layer of security against insider thefts. Some such steps are now being introduced within the Russian nuclear complex, but not on the scale contemplated here.

A second recommendation is to focus more intelligence and law enforcement resources on the nuclear smuggling problem, especially on the demand side of the proliferation equation. Better intelligence can be seen as a dynamic component of nuclear defense, complementing the essentially reactive and stationary risk management systems that the United States is implementing in the former USSR and elsewhere. Not enough is known about adversaries' WMD procurement networks in nuclear supplier states: how they are organized, and financed, what front companies and other intermediaries are used, who their inside collaborators are and so on. Law enforcement sting operations in which operatives play the role of purveyors of strategic nuclear materials can be useful in fleshing out buyer and end-user networks and in shutting some of them down.

Third, and related to this, collaboration with law enforcement and security agencies in countries of proliferation concern needs to be strengthened. Such organizations do much of the heavy lifting in containing nuclear theft and smuggling (see Chelyabinsk incident referred to earlier.) They also possess useful information on smuggling incidents, trends, players, networks and terrorist connections that would be of great value in configuring U.S. nonproliferation programs in these countries.

Finally, as should be obvious, the imperatives of U.S. nuclear security policy are ultimately inseparable from the imperatives of the global war on terrorism. Al Qa'ida's attempts to acquire nuclear materials and weapons have gone on for well over a decade. A large penumbra of uncertainty surrounds the extent of nuclear leakage from Russia and other supplier states. We do not know how far al-Qa'ida and its affiliates may have progressed toward building a bomb. Hence, as we build our defenses against proliferation in Russia, Europe and elsewhere, we must remain vigilant against threats that may be already out there, waiting to strike us when we least expect.

Mr. LINDER. Dr. Juzaitis.

STATEMENT OF RAYMOND J. JUZAITIS

Mr. JUZAITIS. Good afternoon, Mr. Chairman, Congressman Langevin, and members of the committee. Thank you for the opportunity to appear before you today. My remarks today summarize my prepared statement that I ask be submitted for the record. ???

Mr. LINDER. Without objection, it will be.

Mr. JUZAITIS. Let me first say that nuclear terrorism is an enduring threat. The principles of nuclear weapons cannot be uninvented, and the hundreds of tons of weapons-usable nuclear material generated since the 1940s cannot be simply unproduced. More countries may join the nuclear club, and nonstate adversaries and extremist groups beyond al-Qa'ida may arise.

Lawrence Livermore National Laboratory supports the nuclear counterterrorism mission on many fronts. In fact, the very organization that I lead, the Nonproliferation Arms Control and International Security Directorate at Lawrence Livermore, actually has main responsibility over the homeland security program as well. We understand that our programmatic responses to nonproliferation and homeland security are simply two sides of the same coin. A lot of the technologies are employed in meeting the objectives of both sets of programs.

We are a key participant in the national-international programs supported by multiple agencies, including the Departments of Energy, Defense, Homeland Security, State, and Justice, that are addressing critical aspects of this complex threat. As part of a comprehensive nonproliferation and counterterrorism program, Livermore analysts have assessed incidents of illicit trafficking of alleged nuclear materials for more than 25 years. We maintain a comprehensive database of illicit trafficking incidents, assessments, and related information. These assessments provide important insights into this very key observable of the much larger nuclear terrorism and nuclear proliferation landscape. The Nuclear Assessment Program of which I think this committee is aware has been in existence for over 30 years, providing comprehensive technical, operational, and behavioral assessments of nuclear extortion threats. The same NAP personnel also assess nuclear black market transactions. As you are aware, NAP publishes a monthly newsletter which summarizes open-source reporting of illicit trafficking in nuclear materials.

I would also like to state here at this point that through DOE's membership in the broader Intelligence Community, Lawrence Livermore has access to all-source information that appropriately informs many, if not most, of our technical activities. However, and I say that strongly here, that all testimony today will reference only—reference only the information available through open-source reporting.

With regard to nuclear smuggling trends, and as described in unclassified reports, I am unaware of any illicit trafficking incident predating the dissolution of the Soviet Union that involved weapons-usable nuclear material; that is, plutonium or highly enriched uranium. However, since the early 1990s, open-source information indicates that there have been roughly a dozen or so incidents involving significant amounts—and significant here, I mean gram quantities or larger—of potentially weapons-usable nuclear mate-

rial. Most of these incidents involved an individual or small group of people with legitimate access to the material, who opportunistically stole it and subsequently tried to find a buyer. Through their own error and/or law enforcement investigation of the theft, the individuals were apprehended, and the material was recovered.

My laboratory and others have also catalogued hundreds of other illicit trafficking incidents, maybe 600 to 700 of these, in which non-weapons-usable materials such as radioactive sources or completely bogus materials such as lead or mercury were being trafficked by sellers who claimed to have possession of nuclear materials. In general, the traffickers asserted that the material was weapons-usable. In some cases they claimed that material was a functional nuclear explosive.

In light of recent world events, even though nuclear smuggling currently appears to be dominated by scams and driven by opportunists, there is no room for complacency. Each smuggling incident must be carefully assessed on its own merits as an incident or a collection of incidents that might be the needle in the haystack that indicates that a genuine adversary is attempting to or has successfully acquired fissile material or even a weapon diverted from a country's nuclear stockpile. As such, every observed incident like this is an early indicator or could be an early indicator of a much greater threat.

So in terms of recommendations, as important as it is to carefully track and assess the illicit trafficking of alleged nuclear materials, we must stay focused on the big picture, which is countering nuclear terrorism and nuclear proliferation. And what we would like to do is not just respond to these kinds of indicators, but build a comprehensive program that actually anticipates and prepares for the threat. This is an extremely complex problem for which there are no silver bullet solutions.

As I noted earlier, many important programs are already under way to tackle critical elements of the problem. To name a few, the Cooperative Threat Reduction and Material Protection Control Accounting programs are helping to secure legacy Soviet nuclear weapons and weapons-usable materials. Second Line of Defense and Megaports programs and the new Proliferation Security Initiative are enhancing capabilities for detecting and interdicting nuclear materials in foreign border crossings, airports, seaports, and while in transit. The Nuclear Assessment Program and other efforts that are based on intelligence information can analyze specific incidents and track trends in nuclear threats and nuclear smuggling.

So, all in all, there are multiple elements of a comprehensive program. The key effort for us is—or the key consideration is to link these separate programs together into a global architecture that is risk-based and actually informs our investment of resources so that all the varying elements can work together in order to reduce the continuing threat posed by proliferation and, possibly through nuclear smuggling, a terrorist event here in our country. I thank this committee for this opportunity.

Mr. LINDER. Thank you.

[The statement of Mr. Juzaitis follows:]

PREPARED STATEMENT OF DR. RAYMOND J. JUZAITIS

Mr. Chairman and members of the committee, thank you for the opportunity to appear before you today. I am the Associate Director for Nonproliferation, Arms Control, and International Security at the Lawrence Livermore National Laboratory (LLNL), which is administered by the University of California for the Department of Energy's National Nuclear Security Administration (NNSA).

LLNL is a national security laboratory, established in 1952 to strengthen U.S. nuclear deterrence. As a principal participant in the Stockpile Stewardship Program, we help maintain confidence in the U.S. deterrent and its nuclear weapons stockpile in the absence of nuclear testing. We are also key contributors to critical national programs aimed at reducing the threat posed by the proliferation and potential terrorist acquisition of nuclear weapons and other weapons of mass destruction (WMD).

At LLNL, we take an integrated, systems approach to the interrelated challenges of nonproliferation, counterproliferation, counterterrorism, and homeland security. We address all of the phases of the WMD threat (indications and warning, prevention and detection, response and recovery), the different types of threat (nuclear, radiological, chemical, biological, high explosive, cyber), and the various threat "players" (declared and de-facto weapons states, overt and covert proliferators, state-sponsored and transnational terrorist groups). We integrate science, technology, and analysis as we assess the capabilities, motivations, and intentions of proliferators and terrorists, devise technologies and systems to detect proliferation-related activities and smuggled WMD materials, and collaborate with policy makers, the intelligence and defense communities, emergency planners, and first responders in developing capabilities for dealing with WMD proliferation or terrorism. We partner with industry, academia, and other research institutions to bring the full weight of the U.S. scientific community to bear on these most pressing national security challenges. In addition, we work closely with customers and end-users to ensure that the technological solutions we develop meet their real-world operational needs.

Well before September 11, 2001, LLNL was addressing the threat of WMD terrorism. In 1996, LLNL was requested by the Director of Central Intelligence and the Deputy Secretary of Energy to organize a study of the threat posed by terrorist groups using WMD against the U.S. The so-called Livermore Study Group (comprised of 20 experts from the Intelligence Community, DOD, DOE, FBI, State Department, Congress, U.S. industry, and academia) developed nuclear, chemical, and biological threat scenarios to identify key needs. They constructed an end-to-end framework for dealing with the WMD terrorism threat and made specific recommendations with respect to government structure, policy and legal changes, and science and technology to address the most critical gaps thus identified. One of the group's key recommendations was for a national program integrated across the entire federal system to comprehensively address the threat of WMD terrorism.

"DEFENSE IN DEPTH" TO COUNTER NUCLEAR TERRORISM

Nuclear terrorism is an enduring threat. The principles of nuclear weapons cannot be un-invented, and the hundreds of tons of weapons-usable nuclear material generated since the 1940s cannot be un-produced. The future stability of some of today's nuclear weapon states is not assured, more countries may join the "nuclear club," and non-state adversaries and extremist groups beyond al-Qa'ida may arise.

Countering the terrorist nuclear threat requires a "defense in depth"—namely, an integrated system of systems comprised of multiple programs and activities aimed at anticipating, detecting, and interdicting the threat as close to the source and as far from the target as possible. Many of the elements of such a defense in depth are already in place.

The first lines of defense—securing nuclear weapons and weapons-usable materials at their source—are embodied by the Cooperative Threat Reduction (DOD) and the Material Protection, Control, and Accounting (DOE) programs, which were established in the 1990s after the collapse of the Soviet Union. Additional layers of defense are provided by the Second Line of Defense (DOE) and Megaports (DOE) programs as well as the newly established Proliferation Security Initiative (DOD), which are enhancing capabilities for detecting and interdicting nuclear materials at foreign border crossings, airports, seaports, and while in transit.

At the other end of the defense spectrum are long-standing national nuclear incident response programs. These include the Nuclear Assessment Program (originally DOE, transferred to DHS in 2003) for evaluating communicated nuclear threats and nuclear smuggling cases, the Radiological Assistance Program (DOE) for assisting local response entities, the Accident Response Group (DOE) for handling accidents involving U.S. nuclear weapons, the Joint Technical Operations Team (DOE) for lo-

cating and dealing with a terrorist nuclear device, Triage (DOE) and Reachback (DHS) programs for providing expert technical assistance to responders in the field, the Consequence Management program (DOE) for dealing with the immediate aftermath of a nuclear incident, and the Nuclear Attribution program (DOD, DOE, DOJ, DHS) for identifying the origins of terrorist nuclear material or a nuclear device, LLNL provides technical, analytical, and operational capabilities in support of all of these efforts.

DETECTION TECHNOLOGIES AND SYSTEMS

Every layer of defense requires nuclear detection systems. Radiation detection portals for vehicles and personnel have long been in use at the nation's nuclear weapons complex. Similar instruments, together with access control and material accounting systems, have been installed at numerous sites in Russia and elsewhere to enhance the protection and control of Soviet-legacy weapons-usable nuclear material. Radiation detection instruments are also deployed at foreign border crossings and ports as well as at various entry points into this country. For example, U.S. Customs and Coast Guard inspectors are currently equipped with radiation pagers and low-resolution handheld isotope identifiers. The ORTEC Detective, based on LLNL's high-resolution handheld RadScout isotope identifier, is being deployed and will greatly improve the rapidity and effectiveness of secondary screenings.

Other detection systems have been developed and deployed for road-based and waterway monitoring. For example, LLNL's Adaptable Radiation Area Monitor (which won a 2005 R&D 100 award and is being commercialized) has been demonstrated in challenging urban deployments, including DHS's Countermeasures Testbed. Other deployments at various military bases, under the DTRA's Unconventional Nuclear Warfare Defense program, have demonstrated the ability of innovative algorithms and software packages to integrate the detection signals from a network of sensors to provide tracking and interdiction capabilities. In addition to demonstrating the capabilities of the detection technologies, such real-world deployments are also providing invaluable experience in developing concepts of operations (conops) and coordinating response functions among the various involved agencies.

Other research is under way to develop imaging detectors and new detector materials and to demonstrate next-generation detection concepts. Our overall aim is to develop a suite of detection technologies that (1) are inexpensive to manufacture, operate, and maintain, (2) are able to operate unattended for long periods of time in inhospitable environments, and (3) incorporate data processing, networking, and communications capabilities to provide network-wide, context-aware information. Such systems, when integrated with effective conops, should make it feasible to effectively monitor for nuclear threats (and discriminate non-threat detections) without impeding legitimate commerce or travel.

NUCLEAR SMUGGLING: A KEY NUCLEAR THREAT OBSERVABLE

For more than 25 years, Livermore analysts have assessed incidents of illicit trafficking of alleged nuclear and radiological materials. LLNL maintains comprehensive databases of illicit trafficking incidents, assessments, and related information, providing important insights into this key observable of the larger nuclear terrorism and nuclear proliferation landscape.

With regard to nuclear smuggling trends, and as described in unclassified reports, I am unaware of any illicit trafficking incident pre-dating the dissolution of the Soviet Union that involved potentially weapons-usable nuclear material (e.g., plutonium or highly enriched uranium).

Since 1993, open-source information indicates that there have been roughly a dozen incidents involving significant amounts (gram quantities or larger) of potentially weapons-usable nuclear material. Most of these incidents involved an individual or small group of people, with legitimate access to the material, who opportunistically stole it and subsequently tried to find a buyer. Through their own error and/or law enforcement investigation of the theft, the individuals were apprehended and the material recovered.

LLNL and others have also catalogued hundreds of illicit trafficking incidents in which non-weapons-usable materials, such as radioactive sources, or completely bogus materials, such as lead or mercury, were being trafficked by sellers who claimed to have possession of nuclear material. The traffickers generally asserted that the material was weapons-usable; in some cases, the traffickers claimed that the material was a functional nuclear explosive or "suitcase nuke."

In light of recent world events, even though nuclear smuggling currently appears to be dominated by scams and driven by opportunists, there is no room for complacency. Each smuggling incident must be carefully assessed on its own merits, as any

incident (or collection of incidents) might be the “needle in the haystack” that indicates that a genuine adversary is attempting to or has successfully acquired fissile material or even a weapon diverted from a country’s nuclear stockpile. Attention also needs to be paid to the “big picture,” via assessments of nuclear smuggling incidents in total and linkages to tactical threat incident analysis and strategic and operational analyses, in order to improve interdiction and the identification of threat trends.

THE NEED FOR AN OVERARCHING GLOBAL ARCHITECTURE

Given the multiple U.S. agencies that are responsible for the programs that comprise a defense in depth and the geographic span of the activities, the nation’s efforts to counter nuclear terrorism must be formulated and implemented within an overarching, integrated, global architecture. Given the size and complexity of the endeavor, this architecture must be based on a systematic assessment of risks vs. investments.

This architecture needs to coordinate three critical thrusts—securing nuclear weapons and nuclear materials at their source (domestic and foreign), detecting and tracking the movement (licit and illicit) of nuclear materials, and enhancing U.S. detection, interdiction, and response capabilities.

With a systems approach, we can develop a national investment strategy that allocates resources—technologies, people, effort—where they are most effective. A qualitative and quantitative risk-based framework will allow us to credibly answer such questions as: Which instruments and systems should be deployed and where? Should we deploy more equipment or more people? What new technologies or capabilities are needed to fill which current or anticipated gaps? How can we most effectively work with foreign entities to detect and interdict threats as far from U.S. shores as possible?

Even more important, a global architecture for countering nuclear terrorism will facilitate the critical coordination and sharing of information among the various involved agencies. The eventual goal with such a system is to be able to fuse detection data and intelligence assessments in a near-real-time environment to achieve overall situational awareness. Such an integrated approach to detection and information analysis will provide dramatic improvement in alarm resolution, threat assessment, trend analysis, and ultimately national defense against nuclear threats.

THE REAL KEY TO DEFENDING AGAINST NUCLEAR TERRORISM

As I’ve outlined, most of the necessary elements of a “defense in depth” against nuclear terrorism are defined and many are already in place. Work is under way to develop, demonstrate, and deploy increasingly capable nuclear detection systems. Long-standing threat assessment capabilities exist and are being enhanced with novel information extraction and data fusion tools.

But the real key to countering nuclear terrorism is effective coordination among all of the agencies with responsibilities for this exceedingly difficult problem. The 9/11 Commission and WMD Commission reports spelled out very clearly the damage we do to national security when stovepiping and turf battles are the interagency norm. A recent GAO report (June 2005) highlighted the common problem of lack of effective planning and coordination among agencies responsible for combating nuclear smuggling.

Partnership, collaboration, peer review, and communication are needed in order for the nation to successfully defend against nuclear terrorism. Definition of an overall global nuclear defense architecture requires coordination among technologists, policy-makers, and front-line responders, educating each other on what is operationally required, what is technically feasible, and what is politically acceptable. Likewise, technologists, industry, and end-users must collaborate to define technical system requirements, to demonstrate and validate new systems, and to commercialize new technologies and transition new systems into the hands of the end-users. Interagency coordination is equally important in the sharing of threat information and assessments, in implementing and operating the overall defense system, and in responding to and handling real threat incidents.

Cooperation and partnership are needed internationally as well, since much of the “heavy lifting” in countering nuclear terrorism is done abroad—nuclear material protection and control efforts, enhanced border and maritime security, international safeguards and export control regimes, law-enforcement collaboration in investigating trafficking incidents or interdicting suspect shipments, and so forth.

In addition, in light of the difficulty of securing funding for long-term research efforts, it is critical that the various agencies with R&D charters coordinate their efforts, both to make sure the entire spectrum of needed research is covered and

to see to it that scientific advances and technology developments supported by one agency are effectively moved from laboratory to deployment. Many of the LLNL technologies that are being deployed to counter nuclear terrorism are the product of many years of support by DOE/NNSA. Working in partnership, DHS, DOE/NNSA, DOD, and other federal agencies can ensure that, in total, the most important problems are being addressed, technology developments are effectively transferred to user organizations, and the nation's resources (technical talent, facilities, funding, etc.) are optimally applied to counter nuclear terrorism.

CLOSING REMARKS

Unlike the days of the Livermore Study Group, when we talked of the need to prepare for the "catastrophic maybe" of WMD terrorism, there is widespread recognition of the reality, severity, and enduring nature of the terrorist threat, particularly the threat of nuclear terrorism. This recognition is being translated into increased funding for the organizations and programs chartered to counter terrorism and secure the U.S. homeland. Included in this increased funding are critical monies for the long-term R&D needed to generate the technological breakthroughs that will be required to turn counterterrorism concepts into effective operational systems. However, even as the nation increases its focus on protecting the homeland against nuclear terrorism, it is essential to continue support for the programs that provide early-stage defense in securing and interdicting nuclear material, the information analysis and data mining efforts to search for and provide early warning of specific threat activities, and the emergency response capabilities that enable the nation to deal effectively with the full range of nuclear terrorist threats.

Just as U.S. scientific and technological superiority helped secure the peace during the Cold War, science and technology are key to winning the war against terrorism. However, terrorists are innovative, resourceful, and committed. Thus, we must be even more innovative, resourceful, and committed to thwarting their attempts to harm to this country and its citizens. WMD terrorism is an enduring threat, and the nation must prepare for the long haul. In particular, programs in proliferation prevention, counterterrorism, and homeland security require sustained investment. They are closely linked and must not be selected "either/or"; neither can they be conducted in isolation from one another. It is critical that we work to ensure effective coordination, collaboration, and communication among the many departments and agencies with responsibilities for proliferation prevention, counterterrorism, and homeland security.

We at LLNL have long been concerned about the terrorist nuclear threat. We have built on our historical nuclear weapons mission and developed expertise, capabilities, and technologies to meet this threat. LLNL is already providing critical elements of the nation's defense against nuclear, chemical, and biological terrorism. Our hallmark approach of integration—across technical disciplines and among R&D institutions, sponsors, and end-users—is well suited to the nuclear terrorism challenge. We are committed to using our scientific and technological resources to meet the nation's national security needs today and in the future.

Mr. LINDER. Mr. Schweitzer.

STATEMENT OF GLENN E. SCHWEITZER

Mr. SCHWEITZER. Thank you, Mr. Chairman, for inviting me to discuss a topic with you that has concerned me for more than a decade. And I will be talking from that perspective rather than simply as a representative of an organization.

I am going to talk about dirty bombs, and I will try to quickly answer five questions. The first question: How real is the likelihood of a dirty bomb detonation? My answer is: Very real. They are simple to construct; the material is readily available in dozens of countries; the consequences will be highly disruptive, although the death toll will be low; and leading experts throughout the United States and the world predict it will soon happen.

Secondly, what is the likelihood that radioactive material will be smuggled into the United States rather than terrorists using radioactive material that is already here for a dirty bomb attack in the United States? I would say the probability of smuggling it in in the

near term is low, but in the longer term, as NRC and DOE tighten the reins on the way we handle waste materials, I would say the import option increases significantly in likelihood in the years ahead.

Why should the United States be concerned over detonation of a dirty bomb abroad? My testimony—and there are a number of reasons, and I will just pick two. One is copycat scenarios are well-known now in the terrorist world. And, secondly, the United States has both public and private assets abroad.

Next, what is the evidence that terrorist organizations are working with criminal organizations in smuggling of radioactive material? My testimony cites seven specific recent cases where terrorist organized crime groups were caught with the radioactive material in hand. There are hundreds of other reports, as my colleague mentioned, 600 I think he said, but I think these are very persuasive in that criminals with known links to terrorist groups have been caught with the material in hand and with other evidence which suggests they have dirty bombs on their minds. There are many more unconfirmed reports, lots of unconfirmed reports, of the drug runners handling nuclear materials.

Finally, what should the U.S. Government do to prevent dirty bomb attacks? First, I think it is important to recognize that homeland security extends beyond the boundaries of the 50 States to include the routes and—routes of nuclear terrorism. Secondly, many years of steady effort will be needed to reduce the threat to a tolerable level, and programs to counter the threat should be put in place for at least a decade. Short-term solutions will have little impact in this area.

Thirdly, money is crucial for any networks, and the big money is in the hands of the narcotraffickers. Crimps in the drug and money-laundering supply lines will have direct and indirect effects in reducing the threat of high-tech terrorism.

And, finally, governments have always had a stewardship responsibility in the nuclear field, and the United States cannot give too much emphasis to helping weak governments strengthen their regulatory infrastructures.

In sum, Mr. Chairman, we need to follow the dangerous material trail, the brain trail, and the financial trail as best we can. And only by enlisting the efforts of countries throughout the world will we be successful in doing just that. Thank you.

Mr. LINDER. Thank you very much, Mr. Schweitzer.

[The statement of Mr. Schweitzer follows:]

PREPARED STATEMENT OF GLENN E. SCHWEITZER

I appreciate the opportunity to share with the subcommittee my views on the threat posed by the growing capability and interest of terrorist groups in embedding highly radioactive materials in explosive devices. I present this testimony in my personal capacity as a long-time specialist in international affairs with a technical background in nuclear engineering who has attempted to find practical ways to combat international terrorism for more than a decade. Thus, while I am a staff member of the National Academies, I am not speaking on behalf of the National Academies or any other organization. Also, I have not had access to classified information on the topic being discussed today. Therefore, my views undoubtedly reflect only a portion of the total story concerning the coming age of the use by terrorists of dirty bombs.

Nevertheless, I believe that the information and impressions I have garnered from open sources and from personal contacts with technical specialists and policy ana-

lysts interested in radiological terrorism will be helpful to you in making judgments as to the seriousness of the threat and appropriate responses by the United States—at the international, national, and local levels. I assume that the primary interest of this subcommittee is directed to the role of the Department of Homeland Security (DHS) in preventing a successful attack on our population and our assets within the 50 states. But as you well know, effective preventive measures must involve a number of government departments and agencies, and also international organizations. Therefore, some of my remarks are intended for a broader audience than only DHS.

In preparation for this testimony, I reviewed my assessment of the linkages between organized crime and terrorist organizations that was published in 1998. At that time, there were clear overlaps between terrorist networks and organized crime networks—in Latin America, in Europe, and in Asia. However, many academics and government officials were attempting to draw sharp distinctions between terrorist groups that seek political changes and organized crime and drug cartels that are enterprises driven by a thirst for the accumulation of wealth. They argued that terrorists routinely use violence to achieve political goals whereas criminal organizations employ violence more selectively and only when bribery and intimidation fail.¹

But the reality then and now has not been so jigsaw-puzzle neat. Terrorist and criminal organizations rely on the same global transportation, communication, and financial infrastructures for illegal ploys. They take advantage of the same breakdowns in authority and enforcement in states under siege. They both seek increasing shares of the fortunes generated from narco-trafficking and other crimes. Whether mercenaries are hired to do the bidding of drug lords or of terrorist kingpins, the hit teams share a single motive in employing violence—earning their financial keep. And when terrorist groups use their own suicide teams, they too need some level of financial support to prepare for and to launch an activity—for example, money that is stolen through well known criminal devices such as credit card fraud. Later in the testimony I will show how these observations of the mid-1990s are playing out with regard to current interest in the use of dirty bombs.²

Also in the early 1990s, new terrorist scenarios could be clearly seen on the horizon. In 1993, I discovered a new advertisement of the Hong Kong Sunshine Industrial Company, a shadowy hub of organized crime trading in conventional arms. A freshly printed flyer of the company that was being distributed through underground channels was given to me by a foreign government official who apparently was well connected with purveyors of illicit activities. It stated that the company was offering employment opportunities for specialists with skills in rocketry and nuclear weapons.³ At about the same time, the Aum Shinrikyu sect in Japan became interested in weapons of mass destruction as they explored the availability of uranium, experimented with biological agents, and killed and injured hundreds of innocent passengers through release of sarin gas in the Tokyo subway system.

I needed no further evidence then, nor do I now, that organized crime has entered a new phase of complicity with high-tech terrorist organizations. Thus, it should not be surprising that my 1998 book warned of a wave of anthrax letters and postulated the detonation of a dirty bomb at Europol headquarters in The Hague as plausible events. At the same time, I have always believed that for the near term, simpler approaches will be used by most terrorists. Thus, the book also suggested that greater attention be given to the possibility of suicide skyjackings and of repetitive subway bombings.⁴

Now nearly a decade has passed. What has changed in the outlook that terrorists and organized crime will collaborate in spawning high-tech attacks on western countries?

There have been many changes. The following have not been for the better:*

- The memberships of terrorist organizations have grown: more recruits and more technically skilled members.
- Terrorist organizations have been emboldened by successful operations of like-minded brethren in the United States, Europe, Russia, and elsewhere.
- The number and distribution of terrorist cells, loosely linked through the Internet and couriers, have increased significantly.
- Money laundering networks remain a problem as financial fronts have long experience in reappearing in different configurations after they are penetrated.
- Drug trafficking routes continue to expand, with clear linkages to al-Qa'ida and other terrorist organizations in the Middle East and Asia

Positive developments during the past decade have included the following:

- The United States and other nations have expanded counter-terrorism programs to protect populations and assets, improve intelligence, and pursue known terrorists.
- Weak governments are increasingly cooperating with responsible western governments in rooting out safe havens for terrorist groups.

- International organizations are promulgating standards for protecting dangerous materials and preventing thefts of these materials (e.g., International Atomic Energy Agency's *Code of Conduct* for radiological material) and are expanding information-sharing with law enforcement organizations (e.g., Interpol data base).

Other pluses and minuses can be added to this list. But the bottom line seems clear. Terrorist groups are growing in strength while the vulnerabilities of their targets are only slowly being reduced.

I have selected Dirty Bombs as the theme for this presentation because the probability of the detonation of a dirty bomb that disperses radioactive material at home or abroad is high. There are other means for dispersing radioactive contaminants into the air or water, but the dirty bomb is probably the easiest radiological dispersion device for terrorists to master and use. I share the view of many specialists that radiological terrorism is becoming a near and present danger, as indicated by the results of a poll of 85 experts recently conducted by Senator Richard Lugar concerning the threat of weapons of mass destruction. The results of the poll included the following:

Respondents judged the probability of a major radiological attack over the next five years to be greater than the probability of a biological, chemical, or nuclear attack, with 68 of 83 respondents saying there was a 10 percent chance of an attack that affects a major portion of a city. When the timeline is extended to ten years, 40 of 82 respondents judged the risk of such an attack as 50 percent or greater.⁵

The following assessment of the International Atomic Energy Agency (IAEA) echoes these results:

The radioactive materials needed to build a "dirty bomb" can be found in almost any country in the world, and more than 100 countries may have inadequate control and monitoring programs necessary to prevent or even detect the theft of these materials. . . . What is needed is cradle-to-grave control of powerful radioactive sources to protect them against terrorists or theft.⁶

A dirty bomb can take many forms and can range in size from a suitcase to a truck. The approach that would most likely be followed by a terrorist organization at present is to embed one or more ionizing radiation sources (IRSs) in an explosive device that depends on TNT, dynamite, C-4, or other available explosive material.⁷ Upon detonation, the radioactive material would contaminate areas in the vicinity of the explosion. The death toll from the radiation would probably not be high, with the number of victims killed by the radiation probably less than the number killed by the blast of the explosion. The size of the contaminated area would of course depend on the composition and the dispersal characteristics of the radioactive material (e.g., ranging from powder to metallic pieces), on the dispersion effectiveness of the explosive device, and on the local weather conditions. Some scenarios project contamination spreading over many blocks of a densely populated city.

While the death toll might not be high, the disruptive effect of an explosion could be large. The levels of danger associated with nuclear contamination are poorly understood by most populations which only know that radiation exposure is not good and should be avoided. Thus, a rush to evacuate once word spread that radioactive contamination had been rained on businesses and residences might be hard to control. A multi-block area of a city might well be closed following a detonation—disrupting transportation, businesses, government facilities, and populated neighborhoods. Such closures might last days, weeks, or months depending on the nature and extent of the contamination and the success of clean-up efforts. All the while, displaced people might be hesitant to return to the area, worried about long-term effects of exposure to any level of contamination and concerned about repetition of such an act. A variety of books and articles have been written in recent years about the effects of a dirty bomb detonation under various scenarios.⁸

For terrorist groups with some modest level of technical skills, the key to constructing a dirty bomb is availability of appropriate radioactive material. As noted in the IAEA statement, such material is omnipresent. Much is in the form of IRSs used in medicine, food processing, well logging, electricity generation, industrial gauging, and scientific research, for example. There are literally millions of IRSs scattered around the world, and tens of thousands of them have sufficiently high activity to make them worrisome components of dirty bombs.⁹

Against this general background, I cite the following seven incidents since early 2004 that clearly indicate the interest of both terrorist organizations and organized crime in dirty bombs.

- Scotland Yard charged eight terror suspects in London with (a) plotting to commit murder using Americium-241 from smoke detectors together with explo-

sives in devices based on schemes in the *Terrorist's Handbook*, and (b) having surveillance plans for the New York Stock Exchange, the International Monetary Fund, and the Prudential Building in New Jersey. The leader was identified as bin Laden's "U.K. general."¹⁰

- In a police scam, Scotland Yard arrested four terror suspects attempting to purchase "red mercury" smuggled to London from Russia for sale to a Saudi buyer who was purported to be sympathetic to "Muslim causes."¹¹
- Russian and Ukrainian security forces arrested an international criminal group for possession of Osmium-187 near Kursk.¹²
- The Ukrainian security service confiscated three containers of Cesium-137 and arrested four members of an organized crime group in the Crimea.¹³
- In a related incident, the Ukrainian security service arrested members of an organized crime group who were in possession of six containers of Cesium-137.¹⁴
- The Ukrainian security service arrested members of an organized crime group that is spread throughout the country and seized two containers of Cesium-137 in Armiansk, Ukraine.¹⁵
- Ukrainian police arrested 3–4 members of a criminal gang who had Strontium-90 together with a large cache of arms near Odessa.¹⁶

In short, we are no longer talking only about *hypothetical* threats of terrorists and organized crime groups trafficking in dangerous materials that could be used in potent dirty bombs.

Some dirty bomb experts believe that the most likely scenario for detonation of a dirty bomb in the United States is the theft of one or more IRSs in use or in storage in the United States and then detonation of a bomb in a nearby city. There would be no need to circumvent customs procedures that are increasingly sensitive to detection of radioactive material. Last week *Business Week* set forth a scenario of a dirty bomb being detonated at the New York Stock Exchange using radioactive material from an IRS that a sleeper cell had stolen from a hospital in New Jersey. Surely this type of scenario should be of concern.¹⁷

But illegal importation of IRSs into the United States may become a better option for nuclear terrorists in several years. Soon the Nuclear Regulatory Commission (NRC) will have put in place stronger procedures for ensuring proper handling and security of IRSs, and the Department of Energy (DOE) will have completed most of its intensified effort to collect abandoned IRSs in the United States.

Against this background, the following considerations heighten concern over thefts of IRSs abroad:

- Once a stolen IRS enters the international black market in Europe or elsewhere there is no way to predict where it will end up. Indeed, international terrorist groups might attempt to bring it into the United States.
- The successful detonation of a dirty bomb anywhere in the world could encourage copy cat scenarios in the United States and elsewhere as has been the case with other tactics adopted by terrorist organizations.
- Stolen IRSs that make their way to remote terrorist hideaways might be used for training purposes in preparation for attempting theft and detonation of an IRS in the United States or for sending suicide teams trained in dirty bomb methods to the United States.

Looking beyond these concerns that relate directly to the primary responsibilities of DHS, thefts of IRSs abroad can have additional adverse effects on U.S. interests, namely:

- Dirty bombs could be used against U.S. government or private sector assets abroad.
- A dirty bomb incident anywhere could dampen public support for using nuclear technology for civilian purposes at a time when an expansion of nuclear power is being evaluated in the United States and elsewhere in the light of recurring energy problems.
- The United States imports a variety of IRSs for scientific, industrial, and agricultural purposes; and malevolent use of an IRS abroad could adversely affect international trade involving IRSs.

A primary concern of this hearing is what can be done to prevent international criminal networks, terrorist networks, or hybrid networks from becoming a significant smuggling channel of ingredients for dirty bombs. The London cases cited above indicate that international trafficking in IRSs to be used in dirty bombs is coming of age. The Ukrainian cases suggest that while nuclear crime involving networks of small cells of criminals may be increasing, there is no direct evidence that construction of dirty bombs was the motivating factor in these cases.

It is useful to look at other networks as well. Reflecting on the A.Q. Khan money-making network that engaged in trade of centrifuges for enriching uranium with

countries which were on the black list of western countries, clearly Khan's official position in Pakistan and personal stature were keys to the success of this network. Apparently governments were his customers, and it seems likely that they were comfortable dealing with someone who had government credentials, regardless of whether Khan's authority was or was not misrepresented; and such respect for government operatives is an important lesson learned.¹⁸ Turning to the relevance of al-Qa'ida's financial network, the characteristic that stands out is the source of the money—the Saudi Government and Saudi charities. The network had many twists and turns; and if others have the starter cash, they presumably could copy many of the approaches.¹⁹

Finally, the drug networks should probably be of greatest concern in considering the future of international smuggling of material for dirty bombs. They have long been channels for trade in conventional weapons, and they probably could handle IRSs without too much difficulty. At the same time, as previously noted, terrorist groups need financial sustenance for a variety of activities.

There are already clear linkages of terrorist groups to the opium/heroin trade from Afghanistan; and the amount of money involved is so large that astute dirty bomb terrorists may well seek direct or indirect ties with the many way stations along these routes. In 2003, U.S. Central Command reported its first seizure of a small al-Qa'ida boat smuggling hashish worth about \$10 million. Since that time many reports have emanated from Afghanistan and elsewhere of al-Qa'ida involvement in drug trafficking. Also, related terrorist organizations have reportedly been involved in drug smuggling in the Philippines. Finally, one report indicates the possibility that drug money is being used for obtaining radioactive material for dirty bombs.²⁰

Against this background, what steps should now be taken to reduce the likelihood that dirty bombs will be detonated in the United States, in the near term or in the more distant future of say five years?

First, the U.S. government is already taking many steps to prevent a dirty bomb detonation in the United States. As noted, the NRC and DOE are tightening security on IRSs and radioactive waste. At points of entry into the United States, radiation monitors are being deployed in increasing numbers and with increasing sensitivities. Sealed shipping containers are increasingly being certified as free of tampering en route to the United States. New York and other cities are arming enforcement agencies with pagers and more elaborate detection capabilities. And you know better than do I the many other steps to develop more robust security barriers throughout the country.

Internationally, the United States has been a leader in galvanizing a multinational approach to preventing and intercepting radiation smuggling. The IAEA has adopted a variety of guidelines concerning the classification and handling of IRSs, methods for protecting and accounting for them, and recommended procedures for import and export of IRSs. Also, the Agency provides assistance to many countries that are endeavoring to strengthen their nuclear security systems. The United States initiated the Proliferation Security Initiative to facilitate search and seizure of ships suspected of having illicit weapons-related cargoes, and particularly nuclear cargo. DOE has mounted programs in more than 40 countries to upgrade the security at particularly vulnerable sites where radioactive material is used or stored. Also, DOE has improved radiation detection capabilities at international borders and at key ports throughout the world.

Let me now offer several principles for advancing these and other efforts that are important for protecting the American people from a dirty bomb attack.

- Homeland security does not begin at the outer boundaries of the 50 states but extends to the roots and routes of threats that are targeted on the 50 states.
- While cradle-to-grave stewardship of IRSs is the goal, many years will be necessary to reduce the threat of dirty bombs to a tolerable level; and efforts that are launched to contribute to achieving this goal should be put in place for at least a decade.
- Money is required for international networks of criminals or terrorists or for hybrid networks to be effective, and the biggest cache of accessible funds is in the hands of the narco-traffickers. Crimps in their drug supply lines and their financial networks will have indirect, but important, effects for reducing many types of high-tech smuggling.
- Governments have always had a clear responsibility to ensure proper handling of all types of nuclear materials, and the United States cannot give too much emphasis to helping other governments strengthen their regulatory infrastructures for ensuring adequate stewardship over dangerous nuclear material.

- In short, in order to ensure the safety of the United States, we need to follow the dangerous material trail, the brain trail, and the financial trail as best we can. And only by enlisting the efforts of countries throughout the world, will we be successful in doing just that.

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Mr. LINDER. Dr. Lee, do we have any idea how many locations there are of fissile material?

Mr. LEE. How many locations? Well, I think if you are talking about the former Soviet Union nuclear facilities of one kind or another, I would say somewhere between 50—maybe 50, 75, 100. You have got also around the world a great many nuclear reactors that I understand use highly enriched uranium. It is not just a former Soviet Union problem, it is also a problem that affects many other countries, including countries that have received highly enriched uranium from either Russia or the United States to run their reactors with. I don’t want to be quoted on those numbers, but it is a fairly extensive problem extending really as a global problem.

Mr. LINDER. You said that a successful smuggling operation needs to put an end user together with a would-be seller. Do we have any idea who the middlemen are?

Mr. LEE. Well, the middlemen might be criminal groups. They might be—

Mr. LINDER. Is the Mafia involved?

Mr. LEE. Well, again, my sense is that your major criminal organizations that have a big stake in society, and lots of sort of legal as well as illegal connections, might not want to put themselves on

the spot and to sort of incur the wrath of international law enforcement by getting involved in trafficking, and certainly on any significant scale nuclear radioactive materials on behalf of terrorist groups or even at all.

So I think when you say Mafia, no. I see really the problem is sort of these kind of these criminal groups that are really somewhat outside the mainstream of their societies that might have ideological pretensions and ambitions and views that really go against—again, against the mainstream of their society. Like, for example, the Chechen groups in Russia which are involved in the supporting an insurgency there in southern Russia and the Caucasus. I mean, these are the groups I think you have to worry about.

Also, there are all these small petty criminals that al-Qa'ida has been recruiting in the jails of Western Europe, probably also in North America. When you are talking about these big criminal foreign nations, I am less sure that they are the ones that al-Qa'ida would be sort of partnering with.

Mr. LINDER. Dr. Juzaitis, who uses your database of transfers that you keep, the 600 to 700 things?

Mr. JUZAITIS. The database that I spoke of that the NAP publishes is published through the Department of Homeland Security. They are the sponsor. The information in those newsletters is directed at policymakers and sponsors to give an overall appreciation for the magnitude of the threat. And those we can actually count—the secondary transmission of those memos I wouldn't know, but it is official use only, but it is openly—it is available.

Mr. LINDER. Is all-source information significantly different than open-source? Can you answer that?

Mr. JUZAITIS. I think I would like to reserve the answer for that for a more appropriate session.

Mr. LINDER. That would be fine.

Mr. JUZAITIS. But let me say that we do analyze across the whole spectrum of adversaries, and we look for relationships among individuals, we look for relationships among states, organizations, and try to connect where there are motivations, technical capabilities, and access to materials as part of an analysis, and we try to do that with the all-source information.

Mr. LINDER. Thank you.

Mr. Schweitzer, you talked about following the three trails, and one was the brain trail. Do we have a sense of who these people are? Should we be looking for people instead of things?

Mr. SCHWEITZER. Well, there are all sorts of brains. There are the financial brains, there are the nuclear brains, and then there are the smuggling brains. And if you talk about nuclear scientists, I don't think there is any way to approach that except to encourage transparency around the world. And I strongly advocate an approach of an engagement to encourage transparency. Obviously, you won't get inside some of the classified facilities around the world, but I think that that is the only approach to that.

On the smugglers, I am persuaded that drug smuggling is where the real problem is. I don't share the view that they won't touch it. I think that the day has arrived where they touch most any-

thing. They touch all sorts of conventional weapons, they have the networks, and I think that those are the people you worry about.

The financial ones, the Department of Treasury has been trying to crack that nut for a decade, and the people who have financial institutions are geniuses in folding and reappearing in another cloak the next day. So you just have to keep plugging away at it.

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

The gentleman from Rhode Island is recognized for 5 minutes.

Mr. LANGEVIN. Thank you, Mr. Chairman. Again, I want to thank our witnesses for being here today.

Let me begin with this. Our government has struggled to stop the transnational threats of drugs and migrant smuggling for quite some time now, as you are very well aware. And I am interested to learn about the new ways to attack smuggling networks so we don't use the same old methods that have failed against drug and migrant smugglers.

Dr. Lee, you mentioned in your testimony that our government should construct a vulnerability profile of Russian nuclear energy enterprise and determine where smuggling is likely to occur. On that point, do any of our nonproliferation programs have this component? And, if not, how are the assessments made as to where we are going to—

Mr. LEE. I believe this is happening on kind of a selective basis. I think DOE is doing a project to try to get sort of on a small scale to look at criminal groups and potential terrorist groups that are sort of acting or operating in the neighborhood of nuclear enterprises, and I think this is a very important step. You have got a sense of what kind of an environment. I mean, some of these nuclear facilities really exist in kind of a sea of sort of—and in many respects in neighborhoods that are highly undesirable, lots of drug trafficking, lots of other kinds of criminal activities. That doesn't mean, however, that all these criminals are necessarily interested in taking on the high-risk business of smuggling of nuclear materials, but it certainly is a risk factor.

In terms of what is going on in terms of inside the enterprise, sort of personnel reliability systems, polygraphs, psychological testing, I think this is absolutely vital. I mean, it is vital from the standpoint of identifying risk-type behavior, for example, drug use, within the enterprise; you know, corrupt behavior, thefts or planned thefts, thefts that have already occurred. I mean, these are things that I think are being contemplated. Some of the Russians that I have talked to are somewhat leery of this. I think it is a question of sort of reimposing a totalitarian system of sorts on the nuclear complex. But other Russians, I think, are beginning to see the value of these personnel reliability indicators that could really, I think, improve the security at the enterprise level itself.

Mr. LANGEVIN. What other techniques could our government use to stay ahead of the terrorists, in your opinion?

Mr. LEE. Well, I think really it comes down to very much an intelligence-based system that can really go after terrorist groups and rogue states and other adversaries that are trying to obtain nuclear material. And here I think certainly we have to have our own sort of unilateral U.S. intelligence capabilities in countries like

Russia and other former Soviet States as close as possible to areas of proliferation concern, like, for example, the former secret cities.

Also, I think, though, we need to enhance our cooperation with host countries' security services, because I think they have a lot to teach us about what is going on, so what the threats are, and we can use the information they provide to try to configure our nuclear security systems more effectively.

Mr. LANGEVIN. In terms of our current nonproliferation programs, are you satisfied that they have some of these components already in operation?

Mr. LEE. I think we are sort of moving in the right direction.

Mr. LANGEVIN. Could you highlight what the most important of them are?

Mr. LEE. I think we are moving in the right direction, but, you know, it is a very slow process. And one of the things that worries me, I mean, frankly, about all of our programs is they have been very slow to implement. It is nobody's fault, it just happens. You know, that—the Soviet Union collapsed 15 years ago, and we have programs—we are talking about finalizing the securing of nuclear and nuclear materials and weapons by 2008; equipping 300, 330 customs posts by 2012; training 15,000 or creating 15,000 civilian jobs or weapons sites by the year 2030. I am certainly not going to be around then. And meanwhile, but the threat is now. The threat is now. I mean, the terrorists are not going to—they are not going to wait until we put in all this architecture before consummating a threat.

So we have to accept the possibility that some of the problem is already out there; it has escaped from government control. It is somewhere; maybe in the hands of terrorists, maybe not. But that is the problem that worries me the most of all of this. And, you know, where is this material? Circulating around the world somewhere. Is it buried in the birch forest in Russia? You know, where is it? But I don't think that we can afford to assume that some material hasn't already escaped. How do we recover it? I don't know the answer to that.

Mr. LANGEVIN. I see my time has expired, but thank you for your answer.

Mr. LINDER. The gentleman from Texas is recognized for 5 minutes.

Mr. MCCAUL. Thank you, Mr. Chairman.

In my State of Texas, the border is always a big issue. And I went down to—I was invited by Henry Cuellar, Democrat from Laredo, to sort of assess that area. It is the largest land port on the southwest border. It is on the Mexican side, Nuevo Laredo. It is completely lawless at this point in time. There is a lot of violence. There are cartels going at war with each other. We had 43 U.S. citizens kidnapped last year alone in Nuevo Laredo. And when I was briefed by the DEA on this whole situation, they explained the—and I think, Mr. Schweitzer, you touched on this point. They showed us the cartel routes, and they smuggle contraband whether it is a bale of marijuana, whether it is human smuggling, whether it is potentially a nuclear device, and that greatly concerns me.

A couple questions come to mind. In my view—you could comment on the coordination between agencies like the DEA and the

FBI who look at these things and the Department of Homeland Security from an intelligence standpoint. And is it likely—are there devices that are small enough nuclear devices that could be smuggled like, say, a bale of marijuana could? What is your assessment?

Mr. SCHWEITZER. I think Dr. Juzaitis is in a better position than I am to comment on the coordination of the government agencies.

Mr. MCCAUL. If I could follow up with you. You mentioned that there is a theory that, particularly on the southwest border, they wouldn't touch this type of stuff, they wouldn't be associated, but you seem to have the countervailing view.

Mr. SCHWEITZER. I am not sure—I don't buy that argument.

Mr. MCCAUL. You don't buy which argument?

Mr. SCHWEITZER. That they wouldn't touch it.

Mr. MCCAUL. That they wouldn't touch it.

Mr. SCHWEITZER. If the price is right, and they have some semblance of understanding of the need for shielding or protecting themselves or whatever, and—I don't think it is off limits at all for these organizations. In fact, as you say, they are getting into everything now.

Mr. MCCAUL. I tend to agree.

On the coordination issue?

Mr. JUZAITIS. Mr. Congressman, the coordination is absolutely required to protect these kinds of long borders. There is focus these days—let me back up one moment. There is a lot of focus these days on radiation portal monitors and protecting formal points of entry. However, I know that we are working very hard together, coordinated, across government agencies to look at nonports of entry and how you would ensure that smuggling is not occurring there. And that is where we argue that nuclear detection by itself may not be the answer, it is not the silver bullet, because it is impossible to instrument every inch of open border. Therefore, other technologies are being looked at, persistent surveillance technologies, and assessments are being made. These are in the formative steps, and they are less developed than instrumenting ports of entry, but they are being worked, and there is coordination occurring between the FBI, the customs organizations, and the national labs through the Department of Homeland Security.

So coordination is occurring. It is not wonderful, it needs to be there even better, but I think the first steps are being made to make this more of a comprehensive architecture that is looking at all ways of getting into the country, not just through the obvious ports and airports.

Mr. MCCAUL. These are all focused on the same area in sort of activity, but they all have their own silos. DEA will just look at the drugs, for instance, and FBI will just look at the potential terrorists. And it seems to me that information sharing is vital.

Mr. LINDER. It is vital. And ideally this problem can be solved if you integrate good information, intelligence, detection, and response, interdiction and response. Heretofore, you know, up until 9/11, those were separately organized and run. Since 9/11, there is ever-increasing coordination. But unless we get a situational awareness, you know, in our detection infrastructure, which means you have to integrate information and other modes of knowing

things besides detecting, it won't work. And that does involve multiple agencies and coordination.

Mr. MCCAUL. Thank you, Mr. Chairman.

Mr. LINDER. The gentleman from Washington is recognized for 5 minutes.

Mr. DICKS. Many security experts including these witnesses believe that terrorists will conduct an attack using a dirty bomb rather than a nuclear device. Mr. Schweitzer, you mentioned that the Nuclear Regulatory Commission will revise their relatively lax security procedures for the handling of radioactive material that could be used in a dirty bomb. You also mentioned that the Department of Energy will have completed an intensified effort to collect abandoned radioactive material here in the U.S. Can you expand on the measures taken by the NRC and the Department of Energy?

Mr. SCHWEITZER. Well, as you may know, the Department of Energy had an open-source recovery program for a number of years, and in the last recent years rounded up 10,000 of these ionizing radiation sources which could be the ingredients for dirty bombs. And that program is continuing, and they are gradually reducing the number that are loose in the United States because of companies going bankrupt and leaving the sources behind, or because of mishandling or whatever, and I think that situation is very much better than it was, and it is getting better all the time. DOE is funding that program, and it is being aggressively run out of Los Alamos laboratory. So I feel comfortable that they are going a good job.

Mr. DICKS. Are there additional steps that could be taken?

Mr. SCHWEITZER. I think the program managers would say: Give us more money, we will move faster. But I am not in a position to say how fast they can or can't go.

On the Nuclear Regulatory Commission, there are right now proposed regulations to impose cradle-to-grave responsibilities on the holders of ionizing radiation sources specifically, which I think is the likely ingredient of a dirty bomb, and those regulations should be rolling out in the next few months. So I may—

Mr. DICKS. Are the regulations going to help? Are they going to be positive?

Mr. SCHWEITZER. They certainly will be positive. They will put a greater burden on the holders of these sources to make sure that they are under more stringent security control; and that when they are finished with them, they won't just throw them out in the backyard, they will get rid of them properly. So, yes, I think those two activities are very positive.

Mr. DICKS. Dr. Lee, witnesses at previous hearings have testified that current U.S. and international programs have not adapted to today's nuclear threat, the terrorists' pursuit of nuclear weapons. Do you believe that we need to broaden our focus on the human threat from scientists to other employees at nuclear facilities?

Dr. LEE. I certainly do. I think we are going to have to—we are going to somehow have to persuade the Russians who right now, I think, are rather reluctant to impose some very stringent nuclear security systems, personnel reliability systems at the nuclear enterprise level. This means very rigid or much more rigid, rigorous screening techniques for people who are coming in to work at these facilities, and also a lot of different postemployment screening tech-

niques that we can use to try to detect, again, evidence of corrupt behavior or risk factors such as, you know, personal habits that might make people vulnerable, people inside the enterprise vulnerable to pressure from criminals or terrorist groups, which I think is a major problem.

Certainly by extension, I think these same ideas can be applied to people, officials that are responsible for the interdiction of nuclear materials, customs officials right now in Russia, notorious cases of bribery of customs officials. I mean, this is certainly a risk factor in terms of nuclear smuggling. So we want to get the best possible people in there, and we are going to have to use some techniques that are used in the United States, transplant these to Russia and to other former Soviet States as soon as we can do this.

Mr. DICKS. The administration has praised the Nunn-Lugar program for its accomplishments in the former Soviet satellite States and Russia's interior, yet 2005 funding reflected only modest increases in the program's funding. More broadly, critics have voiced concern that the administration's 22 percent increase in funding for threat reduction programs, though a step in the right direction, is too little too late. Can Nunn-Lugar accomplish its goal with its current level of funding from Congress?

Dr. LEE. I think I would like to refer at least part of this question to Dr. Juzaitis. I think it is not a question of—not just a question of how much money we are putting into these programs. I mean, there is certainly constraints on the other side, on the Russians' side, how quickly we can actually implement these new security safeguards that we are putting in.

I think we also have to have smarter safeguards. Again, these personnel reliability systems, I think, should be a major focus of our efforts, measures that can contain, defeat corruption, difficult as this might be. And I think this is really where we have to be going with these programs, because this is where the real threat comes.

Mr. DICKS. All right. Thank you, Mr. Chairman.

Mr. LINDER. The gentleman from California is recognized for 5 minutes.

Mr. LUNGREN. Thank you very much, Mr. Chairman. And I thank our witnesses. As you know, we have competing requirements to be in different places, and so I am sorry I wasn't here to hear your testimony, but I assure you I will go through it in detail.

A question I would pose to all three of you is this: The 9/11 Commission suggested that one of the problems we have had in government is a failure to be imaginative, to imagine the unimaginable. I recall a number of years ago when I was in a small group, former President Nixon was talking about the aftermath of the Walker spy incident. And he said, you know, when we were originally dealing with the threat of worldwide communism, we had to deal with people in our midst who turned on our country because they believed in what they were doing. Now we have a situation where people are doing it for purely monetary reasons, referring to the Walker spy incident. And I know that you have, at least one of you has, covered it somewhat in your testimony, prepared remarks, but how serious is the concern we should have that we are not only dealing with al-Qa'ida and al-Qa'ida sympathizers, but dealing with others

who would be involved in this for purely monetary reasons, criminal-type organized crime? Should that be a serious consideration on our part? Yes, sir.

Mr. SCHWEITZER. I think I reported in my testimony that the incident in London were simply—reportedly were middlemen working for cash for a buyer in Saudi Arabia to supply the radioactive material, and I think this will be more and more common. The terrorists themselves will get access to money, and I think it will be through the drug routes and other ways, and they will be able to buy off the criminals to do some of the heavy lifting.

So I think it is a combination of certain groups who have ideological problems, and they want to have retribution, and there are aiders and abettors who are in it for the cash. Now, that hasn't played out very much right now, but I think as we look to the future, that is going to play out more and more.

Mr. JUZAITIS. Mr. Congressman, I responded earlier to an earlier question about the scope of adversaries that we are looking at, and I guess I would like to reiterate at this point the fact that to be imaginative means to imagine all kinds of relationships between people that have motivation, that have technological capabilities or have access to technological capabilities, as well as access to materials. There is a nexus that has to be keenly focused on, and that is the combination of those three.

Money, of course, is the motivating element for many adversaries, but there are others. As my colleagues said, ideological motivation is a motivator. So as we track and as we observe in our intelligence programs, in looking at all-source information as well as open-source information, we should always be maximizing our ability to establish the relationships between those three: motivation, technological capability, as well as access to materials.

Mr. LUNGREN. Dr. Lee.

Mr. LEE. Let me just make a comment on that. I think when we are talking about criminals and their propensity to get involved in a high-profile, high-risk business like nuclear smuggling, I think that we have to make—I think there are criminals and criminals. I know that law enforcement officers, for example, in Israel and France and other countries around the world find criminals to be sometimes a very useful source of information about terrorist groups. You know, this is an—informal liaisons or alliances, you might say, are formed between law enforcement and criminal groups in order to root out more dangerous antisystemic terrorist elements. And I think within the criminal world, I mean, there are people who might be willing to smuggle nuclear weapons into the United States for money, but I would still argue and—that the majority of criminals who have successful businesses of one kind or another probably are not going to want to get into that kind of business.

Mr. LUNGREN. Unless we imagine the unimaginable. I mean, based on the experience I had in law enforcement, one of the things that was acutely important to us was the intelligence cooperation among different elements of law enforcement. You could be doing a drug case—in California we were looking at a drug case, and we happened upon one of the largest organized efforts for staged auto-

mobile accidents. We weren't looking for that, we were looking for drugs, but in the process of doing that, we found that.

And sometimes I think we have to disabuse ourselves of the notion that the war on terrorism in a very real sense can totally be concentrated on al-Qa'ida and al-Qa'ida-like people; that there are others who, for whatever reason that has nothing to do with ideology, may, in fact, enhance or cooperate with those who are doing that. And I guess I was just trying to get a feel from you that, because of the enormity of the question of nuclear devices or of dirty bombs, whether that in and of itself—can we be comforted that criminals would be driven away from this because of the awfulness of the impact? And my own sense is we make a mistake if we look at it that way.

Thank you, Mr. Chairman.

Mr. LINDER. Does the gentlelady from the District of Columbia seek to inquire?

Ms. NORTON. First of all, I want to thank you, Mr. Chairman, for holding this hearing. I regret very much that I have been detained. Of course, I do want to say that we are not close to the border where people most talk about smuggling, but I represent the District of Columbia, and my major concern is when both Presidential candidates, for example, say that nuclear is the greatest threat, when the Secretary of Homeland Security focuses us on nuclear, and then we learn how easy it is to, in fact, smuggle a device into this country—I mean, if it is so easy, I don't know why it hasn't already been done. And I don't know whether that is what we most have to fear.

We, of course, are looking now for known terrorist organizations, but I would like to ask you whether or not it is likely, given what we are told is the ease for, in fact, smuggling in such devices, is it likely that that has been done, could be done? Or is that more difficult than we have been given to believe?

Mr. LEE. I will just make a quick comment, because I think my colleagues are probably in a better position to talk about this, but we have a multilayered system of defenses starting at the gates of Russian nuclear facilities and going through borders, megaports, and coming all the way to the United States. And our system of defense is at the U.S. border. Each one of these lines of defenses has major gaps, holes, can be exploited by clever adversaries.

You know, I share your fears, and I just hope that what you say, this scenario, is not going to come to pass, but I think there are systems in place. Classified information, I suppose, can probably provide some additional information to what could be said in this hearing, but this certainly is a very good question. I mean, I hope our supply-side nuclear control programs are more successful than our supply-side drug control programs. But you just asked; I mean, look at what does come in here already, drugs, illegal immigrants.

Mr. JUZAITIS. I would like to complement that statement by an observation that we should not rush to the conclusion that nuclear weapon or nuclear material smuggling will automatically transpose itself into the drug smuggling network. They are dominated by very different supply-and-demand equations. In the drug business, there are millions of customers and millions of suppliers, and the network is very ubiquitous.

In terms of nuclear materials, as I said, they are not that easy to come by, and it does demand a nexus, a coming together of motivation, access to material, as well as technical capability.

So the sources are not as various as in the drug case. And one could argue that having gotten enough material to pose a real radiological threat to the country, a terrorist may not wish to consign the delivery of that to a drug smuggling network. They would want to maintain much closer control over that than is usually the case in the drug business.

Ms. NORTON. Well, what makes you think that a drug smuggling network would use it? I don't blame them. Don't they have their own networks? Why would they need to go to drug smugglers who have no reason to take unnecessary risks since smuggling for them is as easy as walking across the border? I am assuming that they would have to understand that they have to find their way into the United States, and they would figure it out. They certainly figured it out on 9/11.

Mr. JUZAITIS. That is correct. I was just making the point, they would probably not—yes, then we agree, they would not necessarily use the drug smuggling network. But, again, the answer is vigilance in order to observe any kind of activity like this that we could see early.

Mr. LEE. Drug smuggling, we are talking about a mass market business here. Again, lots of suppliers, lots of consumers. It certainly is not the characteristics of the nuclear smuggling business. But, of course, all you need is really one hit on the nuclear smuggling side, and the consequences could be devastating.

Mr. SCHWEITZER. I hesitate a little bit on this. If you are talking about smuggling into the United States in the near term, I mention in my statement that I don't think it is going to happen, because the nuclear material, at least for dirty bombs, is more easily obtained here. And there is no need to smuggle them in. But as we tighten the controls here, then the option becomes more interesting.

There is a very serious nexus between drug smuggling and nuclear in Tajikistan, which is on the Afghan border. It is the edge of Russia, and the place swarms with both radiological material and drugs, and those are headed for Europe. Fortunately, there is an ocean between us and Europe.

But I think we better be careful to say that drug smugglers are happy with what they are doing, and they are not going to be tempted by big money to take on the nuclear issue.

Ms. NORTON. Thank you very much.

Mr. Chairman, my concern is that the drug smugglers are the ultimate teachers here. They know how to do it, and they have something to teach and are willing to teach for money, not so much that they themselves will lend their network to it. I think they are fat and happy, actually. I agree that you can't take them out of the equation, because once they see there is money to be made, look at Pakistan, where the top general, an official, is involved, and he is in office.

So, Mr. Chairman, I thank you for giving me the opportunity, particularly since I was delayed. But I do think this is the most serious question, and I think that, even if we had a hold on pro-

liferation, and I am sure there is testimony here that we are nowhere near where anybody would say that, then it seems to me we would still have the problem that these materials can now be made all over the world and that there are scientists all over the world who might well be willing to do so, even in the face of proliferation.

So guarding this country and figuring out ways to do so, assuming the worst case, seems to me to be the most important thing we can do when it comes to nuclear materials.

Thank you very much.

Mr. LINDER. I thank the gentlewoman.

The gentleman from Connecticut.

Mr. SHAYS. Mr. Chairman, thank you for having this hearing, and I thank our witnesses, three truly outstanding witnesses that have tremendous backgrounds. As Mr. Lungren said, we could spend hours, frankly, dealing with this issue.

I don't know if you will do a second round, but the bottom line to my concern is, as I listen to you, I think I will not be surprised—you just reinforced it—I will not be surprised if there is ultimately an attack, a nuclear attack and, clearly, definitely not surprised if there is a dirty bomb in the United States, in the next 5 to 10 years. I just wouldn't be surprised. I mean, I would be shocked by it, but I wouldn't be surprised. By "shocked," I mean the implications of it are shocking.

Would you be surprised? I would like to ask each of you.

Mr. SCHWEITZER. I will go first, because I spoke to that issue. Senator Lugar ran a survey of 85 experts, and the consensus of those experts was that, within 10 years, there is a 50 percent chance. I think they were probably a little bit—I think they were too optimistic, myself.

Mr. SHAYS. Optimistic—

Mr. SCHWEITZER. I think the percentage is higher than 50 percent.

Mr. JUZAITIS. I have no basis of making a mathematical assessment of that nature. I think the kinds of things that we are talking about don't lend themselves to stochastic analysis, statistical analysis. There are too many human factors involved, performance factors involved.

On the other hand, I would say, what do we do? What is actionable out of that? No matter what probability—

Mr. SHAYS. Let's get into that. So you are saying, you would be surprised?

Mr. JUZAITIS. No, I am just withholding judgment. I have to act and do everything—

Mr. SHAYS. I am not asking you percentages, because it could even be one out of 20. But one out of 20 is possible. And the issue is, if there was a nuclear explosion in the United States, would you basically say, oh, my God, I never thought this would happen? Or would you say, well, I am not surprised? I don't need a long answer to it. What is the answer? Don't scientists think about things like this?

Mr. JUZAITIS. They do, all the time.

Mr. SHAYS. If it happened, would you be surprised?

Mr. JUZAITIS. We do our work as if we would not be surprised.

Mr. SHAYS. Okay.

Dr. Lee?

Mr. LEE. I wouldn't be surprised.

On the other hand, I guess we have to ask the question of whether a terrorist with a nuclear weapon would necessarily want to use it against the United States.

Mr. SHAYS. Okay, don't even wonder about that.

Mr. LEE. Or use it as a threat instrument.

Mr. SHAYS. Good grief—

Mr. LEE. I would go pretty much with what Glen Schweitzer said, I would not be surprised.

Mr. SHAYS. In the 6 years, now 8 years really, that I have done this work in the National Security Subcommittee as Chairman, the one last thing I wouldn't even wonder about it—I think they crave to do it. By "they," I think Islamic terrorists would consider that they had done the Lord's work in their own twisted way.

I have seen a weapon at Los Alamos that was basically made by material that someone could make pretty easily, as long as you didn't care about yield, as long as you could get enriched uranium to collide fast enough, 50-year-old technology, right, and do that, maybe it wouldn't fit nicely on the tip of a nuclear warhead, but a terrorist doesn't care about that. It would be an ugly looking thing. It would be large, but it could work.

What is interesting about your hearing, Mr. Chairman, is the only issue, in my judgment, is, can they get a hold of the weapons grade material? That is the only issue. And you all have made a strong case for, well, they sure as heck could ship it into the United States, enriched uranium, basically, about 30 pounds, and I could hold it with my hands, and it is not warm. Plutonium I think would be more difficult for them to do. I could hold it in my hands, and it feels warm. But it is the size of a large orange, as opposed to a large grapefruit for enriched uranium. So these things to me seem to be hugely important.

The only point I would kind of make where I wrestle with this, I believe in Nunn-Lugar. My challenge with Nunn-Lugar is, I think the Russians don't spend half the money we give them. They don't quantify what they do. They think that we want to know, we have this kind of desire to get at their technology and know what they know, and yet all we want is for them to get this stuff and contain it. That is the only thing we want. So I am willing to spend even bad money on this.

But maybe could I ask for a reaction to whether they think the Russians spend all of this money or a part of the money that we give them?

Mr. LEE. Well, it is fairly clear from talking to the Russians, at least the ones that I have seen in recent visits over there, they are less concerned about the insider threat, the corrupt insider stealing the material, making off with it and selling it somewhere, than they are about the possibility that their local Chechen terrorists could break into a nuclear facility and use this as kind of a staging point for some demand, like removal of Russian troops from Chechnya.

I don't think the Russians take these scenarios seriously enough. I don't think they are sharing information they should be sharing

about smuggling incidents. It is a very difficult country to get information from.

Somehow, at the top level of both of our countries, we have to work out a much better information sharing system on this smuggling problem, both insider threats within nuclear enterprises and also the kind of threats that are out there. For example, al-Qa'ida, Iran, their procurement networks in Russia. I mean, what is going on? We have very little information on this.

Mr. SHAYS. Thank you.

Mr. LINDER. Dr. Juzaitis, in your testimony, you said more countries may join them. I think we know about 20 nuclear countries, ballpark. Who are we concerned about?

Mr. JUZAITIS. Well, I think our attention these days is being placed on Iran and North Korea. Two, for example.

Mr. LINDER. South Africa?

Mr. JUZAITIS. As you know, South Africa had a program and dismantled it very convincingly.

Mr. LINDER. Did they?

Mr. JUZAITIS. Yes.

Mr. LINDER. Any other nations you are worried about?

Mr. JUZAITIS. We worry about everybody who has access to nuclear energy in fact because even as we talk about securing the legacy materials of the Cold War, there is a brand new class of materials in an expanding nuclear energy world that are being produced in nuclear reactors ostensibly for peaceful purposes all across the world. So this whole latent threat of, what do we do about the material in an expanding nuclear energy economy, should also factor into our equation of how to deal with this problem.

Mr. LINDER. How effective have international organizations, such as Interpol, been in cooperating with us to detect, arrest and prosecute nuclear smugglers, each of you?

Dr. Lee?

Mr. LEE. I think I will defer on this. I have visited Interpol and the International Atomic Energy Agency, and I think they do a fairly good job of collecting information that other governments are willing to tell them, but they are not really primarily agencies involved in investigating nuclear smuggling.

We have not really gone beyond the first or second level in the business of collecting information about the internal workings of this traffic. We know really very little about it. A lot of the information is being held by law enforcement organizations in Europe and Russia that are not willing to share criminal cases they are sitting on.

A lot of the stuff needs to be brought into the light of day so that we can analyze this information and get some understanding of how these networks operate.

Mr. LINDER. Thank you.

Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

Dr. Juzaitis, you cite the need for an overarching, global architecture to counter the nuclear terrorist threat. This architecture would obviously require the Federal Government to coordinate its efforts to secure material at its source, track movements and enhance detection and interdiction efforts. While the Department of

Homeland Security would not be involved in securing material at its source, it certainly could play a role in tracking material and detection and interdiction operations.

The Department, as you know, has established the Domestic Nuclear Detection Office this year to develop the global detection architecture. I wanted to ask you, do you think the DNDO is the right step to develop a coordinated approach to combat the nuclear terrorist threat? I know you have touched on it already, but what other steps should the government take to develop a nuclear terrorist strategy?

Mr. JUZAITIS. I guess I would like to say that the DNDO, standing up the DNDO is a step in the right direction. It embodies the functions of coordinating with other agencies in the way that we at the laboratories would like to happen.

There is more work to be done, and we have to—again, we at the labs work with all of the agencies. So by the time we are thinking about the problem in its technical context, the boundaries of agencies should not—it is an integrated problem. The DNDO is a good step at coordinating multiple agencies.

The architecture itself, this is the first time that we have had multiple programs across the U.S. Government. But this has been the first time that a global architecture has been even talked about in the sense of having a risk-based integration of multiple layers that give you a defense in depth. So we applaud that function.

Mr. LANGEVIN. And do the other witnesses care to comment at all?

Mr. SCHWEITZER. Mr. Chairman, I would like to make one comment. I don't really—I am uneasy with the drift of the conversation. It is as if the United States is going to go in and do all these things. The key is the host countries taking the steps, whether it is Russia, whether it is Pakistan or whatever. What we do in Russia is trivial compared to what they do themselves. The whole thrust of the U.S. policy should be to help them get on their feet and do it themselves.

We should not be talking about how much more money we need to give to Russia. We should be talking about how much money they need to put into it, and we should adopt approaches that encourage them to do that. It should not be a Washington-driven program, as it has been for the last 15 years. It needs to be a Moscow-driven program that meets international standards.

So the idea that we are going to design the global architecture for all the other countries in the world, to me, doesn't make sense. The problem is too big. It has to be each country has to take charge of its nuclear material and be a good steward of that material.

Therefore, I am a little worried about the notion that this is going to be a Washington-driven movement to secure nuclear material all over the world. It is just not going to happen.

Mr. LANGEVIN. Mr. Schweitzer, let me ask you, on that point, and the other witnesses can comment, do you feel that the Russians sufficiently get it, that they need to secure this material? Or is it kind of one of those issues of what they feel they don't know won't hurt them, and obviously mistakenly so? But do they understand how serious this is?

I think it was Mr. Shays, my colleague, someone raised the issue that it is questionable whether the Russians are actually spending all the money on trying to secure this material at its source that we are actually giving them.

Mr. SCHWEITZER. Talking about fissile material specifically, there is no question that the Russians from the top all the way through the ranks do not share our concern as to the vulnerability of their institutions. They don't see—they don't believe that these institutions are leaking like our experts contend they are. There is probably some halfway in between which is the truth.

But one of the—as result, the Russians say, you want to put up the money, we will upgrade them; but if we have to put up the money, why should we upgrade them? They are safe. We know how to protect facilities.

There were indeed a few incidents in the nineties in which the Russians readily confess up to of small amounts of material being taken out. There may have been other incidents which no one knows about. But in terms of Congressman Shays' comments about, are they ripping off the money, if I have any criticism of the DOE program, they are spending too much time auditing the money.

The answer is, in my belief, I don't believe they are ripping off the money. Most of the money goes to the United States; it doesn't go to Russia. I bet we have 150 visitors in the program in Russia today. We get the reports every week of how many Americans are over there auditing what is going on, and it is enormous.

So I think it is a bad rap for DOE to say their money is being ripped off. It certainly is not, at least in my view. But I do feel very strongly that it is time well past that we pass the torch to Russia; we mobilize the G-8 partners to help us and put the monkey squarely on their back to start coming up with the money. Because I think if they realize that the world doesn't share their optimism, that everything is safe, even though you walk around those 30—you go around those 30 kilometer perimeters and see holes in the fences, I think we are in trouble.

This one is just too big. If you have radioactive sources, there are tens of thousands of them out there. How are we going to police that?

Mr. LINDER. The gentleman from California.

Mr. LUNGREN. Could I switch times?

Mr. LINDER. Absolutely.

The gentleman from Connecticut.

Mr. SHAYS. If that is all right. I love people who have strong feelings and passion, maybe because I think I do, so I compliment you for that. But I think you are just totally off base, because I don't think you could even come close to documenting that they are spending the money right.

Let me just finish. Maybe I am judging it from a wrong experience, but I went with Nunn and Lugar to Russia. I looked at their chemical sites. I looked at some of their chemical sites. I looked at some of their biological sites, and I looked at Mayak. Then I went to Murmansk on another trip.

I went up there knowing we are spending millions and millions of dollars to have them break down their subs so they don't just

have them sit in water and sink to the bottom with all the radioactive material.

What they do is they chop off the front and back, take any radioactive material, open the hatch and stick it in there and let it float, and that is the way they used to get of their ships; they just let them sink in the fjords. But these are radioactive.

So, at any rate, we go and drive around. It is a huge site. I counted less than 30 people. I started to raise questions about the thousands of people that they are billing us for. They would not show me any more than the 30. To placate me, they let me see K-19—was that the ship? And the one that sunk, they let me see that. They let me see the one in the movie. But I never saw more than 30 people.

To placate us more, they showed us some of the parts they had taken apart, and we could take them. But they never documented.

So I just think you hope they are spending the money right. I don't think they have ever documented they spent the money right. Now, maybe I am mistaken in taking that experience with the breakdown of the radioactive stuff and equating it with the other areas, but then I had people in Mayak say we built the Mayak plant, so, yes, we know what we spent for it. That, I would agree with you.

I just would make one more point. When we saw the chemical sites, if any logical person could think they protect them, we saw about a million shells, give or take, hundreds of thousands. They look like wine bottles put in. They were in an old building that would be what somebody goes to when they go to summer Camp. They were on cinderblocks. They only had a padlock on the door. Someone could simply take out one of those chemical shells and just put in a dummy wood piece.

So there is nothing that gives me confidence about the Soviets taking this seriously or being believable.

Mr. SCHWEITZER. I will answer very quickly. I have walked a number of the sites in the nuclear area only, specifically, and specifically fissile material. I have no idea what they are doing up north where you were, and I have no way to doubt you.

I would agree, from my judgment, they may not be spending the money correctly, but I don't think it is going into the director's pocket. I don't think it is going into the new Mercedes, which was the worry 15 years ago, that we give money and all the Institute directors have new Mercedes. I don't think that is happening with the DOE program for protecting fissile material.

Mr. SHAYS. Why? You just don't think it, or why? On what basis can you come to that conclusion?

Mr. SCHWEITZER. We have seen the expenditure records and we have seen the actual upgrades. But I am not saying they did the right thing. I mean, that is a different issue. There are lots of places where you can see where this detector was put in mistakenly or whatever.

I guess I have become a defender of that program, even though I am usually considered a critic.

Mr. SHAYS. Thank you.

Mr. LINDER. The gentleman from California.

Mr. LUNGREN. Thank you, Mr. Chairman.

I would like us to focus on something, Mr. Schweitzer, that you talked about in your presentation, at least in your written remarks, about selecting the dirty bombs to be the theme for your presentation. I take it from what you have written, you believe this scenario of a dirty bomb being exploded is more likely than another type of device that we might include in the overall subject we have today. Is that correct?

Mr. SCHWEITZER. Yes, I think a dirty bomb is more likely than some kind of a device to disperse, a fan type device to disperse radioactivity or certainly a fissile device. Yes, I think it is the most worrisome in the near term, not in terms of consequences, but in terms of likelihood.

Mr. LUNGREN. I understand.

Doctor?

Mr. JUZAITIS. I think that is very logical. These kinds of dirty bombs would be more—that kind of an attack would be more probable. However, the consequence is not the same as an improvised nuclear device that would deliver yield.

The saving grace of that though is the amount of materials. The radioactivity represented by the sources that would be used in dirty bombs is also easier to detect, and therefore nature gives us a chance at identifying those things before they wreak havoc. Therefore, that also argues for a layered defense mechanism or a global architecture where we actually have radiation detection within our borders, because the kind of materials that one would use for a dirty bomb do not just originate outside our shores.

So a comprehensive architecture would include detection capabilities within our shores, and given the nature of the material to be used in those bombs, they are easier to detect than one would in special nuclear material for bombs.

Mr. LEE. Radiological materials, our systems of detection that we are placing abroad, and I guess to some extent at our own borders, they can detect this material quite easily. On the other hand, highly enriched uranium, which is the materials the terrorists are most likely to use for a nuclear bomb, this material is much harder to detect, and our systems we have are not really sensitive enough to detect well-shielded plutonium. So it is a different order of problem we are talking about here.

Mr. LUNGREN. What would you, Mr. Schweitzer, describe as the effects of a dirty bomb? The reason I ask that is because I think in your presentation, in the written presentation, you talk about the uncertainty, the lack of knowledge, the reaction from the people in the presence of a dirty bomb. Frankly, it reminds me a lot of the things that we are confronted with the two large natural disasters—well, the natural disaster we had 10 days ago and the one we might have right upon us now. How would you describe the consequence of a dirty bomb of some reasonable size?

Mr. SCHWEITZER. I would suspect that there would not be many more people killed that weren't killed by the explosion itself. So I wouldn't expect many deaths from radiation either in the short or long term. But I would expect, he did, depending on a lot of things, large-scale contamination, and that would, I think, immediately result in cordoning off multi-block areas of cities and people would

want to get away from it, people don't know what radiation is, they just know it is bad, get out of here.

Mr. LUNGREN. How long would we have to cordon off the areas?

Mr. SCHWEITZER. It could be a week, a month or longer. How long did the buildings in the Congress have to stay off limits because of the anthrax attacks? If the material gets embedded into the buildings and continues to radiate, it could be a long time. But the initial uncertainty would certainly result in a lot of chaos.

In terms of the analogy with the response to the hurricane, et cetera, I think you have to keep in mind that these become crime zones, and you could imagine a crime zone overlaid on top of the hurricane, that is a real problem. People don't want to go back in there if it is a crime zone. People may not be allowed to go back in.

I think the analogy doesn't go too far. Also you are worried about a second one. You have had one of these bombs go off, people are worried, will there be a second one. Plus you have the uncertainty of, can you go back in, and then you have the people investigating it.

Mr. LUNGREN. If you had a dirty bomb exploded in the midst of the Super Bowl, what would be the impact on the people that were there? What would be the loss of life, what would be the—

Mr. SCHWEITZER. I think the contamination problem would not be great because you are pretty well confined. But I think the deaths would be primarily from the explosion. How many people would die from the explosion? It depends on the size, how much TNT you have, how much dynamite you have. So I don't think the death toll is really the—it is always a concern, but it is not the concern like it is on a fissile bomb where you kill hundreds of thousands of people.

Mr. LINDER. I thank all of you, Dr. Lee, Dr. Juzaitis, Mr. Schweitzer. You have been very helpful. We are grateful.

This meeting is adjourned.

[Whereupon, at 3:34 p.m., the subcommittee was adjourned.]

