RUSSIA, IRAQ, AND OTHER POTENTIAL SOURCES OF ANTHRAX, SMALLPOX AND OTHER BIOTERRORIST WEAPONS

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RUSSIA, IRAQ, AND OTHER POTENTIAL SOURCES OF ANTHRAX, SMALLPOX AND OTHER BIOTERRORIST WEAPONS

WEDNESDAY, DECEMBER 5, 2001

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERNATIONAL RELATIONS,
Washington, DC.

The Committee met, pursuant to call, at 10:20 a.m. in Room 2172, Rayburn House Office Building, Hon. Henry J. Hyde (Chairman of the Committee) presiding.

Chairman HYDE. The hearing will come to order. Our subject today is Russia, Iraq and other potential sources of anthrax, smallpox and other bioterrorist weapons. I scheduled today's hearing for two reasons. First, I thought we could all benefit from an update on what foreign countries are doing in the area of biological weapons development. Second, we are all interested in learning as much as we can about the likely source of the anthrax that was mailed to Senators Daschle and Leahy and others.

The threshold question regarding the source of the anthrax is whether it is of a type that could have been produced by an individual or a group working alone. In other words, could someone like the Unabomber or al-Qaeda have produced this anthrax without the involvement of a state? If the answer to that question is no, we confront the prospect that a nation with a biological weapons program either knowingly decided to unleash this poison on the American people or has so little control over its biological weapons that they were able to fall into terrorist hands.

The $64,000 question: Which state could this be? Are there any physical characteristics of the anthrax sent through our mails that either point toward or away from the biological weapons programs of which we are aware? Press reports suggest that the anthrax had at least three distinctive characteristics. First, it was derived from the Ames strain of anthrax. Second, it appears to have been treated to make it float in the air more readily to the point where lab workers have been unable to force the spores to remain still on a slide. And, third, it was highly concentrated, up to 1 trillion spores per gram, according to one report.

Our witnesses may know of additional unique characteristics. But how does it all add up? Do the characteristics of the anthrax sent through our mails rule in or rule out the biological weapons programs of such countries as Iraq, Russia, and the United States as sources of the anthrax?

No matter the conclusion come to by the learned scientists with us today, we cannot escape one glaring fact: it is possible to terrorize the innocent people of any nation with a small amount of weapons-grade anthrax, not to speak of other horrible biological agents which are an integral part of the biological weapons programs of several rogue states.

Biological weapons pose a clear and present danger to our national security, and that is why we are here. We are fortunate today to be joined by some of the leading experts on the biological weapons programs of these countries, who can hopefully shed some light on these issues.

And so I yield such time as he may consume to the Ranking Democratic Member of our Committee, Mr. Lantos.

Mr. LANTOS. Thank you very much, Mr. Chairman. I want to commend you for calling this important hearing. It may be one of the most important of our session. Today we find ourselves in a new age of insecurity in which the most dreaded diseases to plague mankind can be used as weapons of terror and mass destruction.

Biological terrorism of this sort has already taken a toll in this country. The recent anthrax attack that killed five Americans, sickened others and placed our entire Nation in a state of high anxiety is but a preview of what awaits us if we do not eradicate the bioterrorist threat.

Today's hearing focuses on the potential sources and suppliers of bioterrorist agents such as those that invaded the U.S. Postal Service. Our chief concerns are Russia and the former states of the Soviet Union, whose governments are cooperating with us to reduce this threat, and Iraq, whose repressive regime is clearly not.

Although the extent of the former Soviet Union's biological weapons program is not entirely clear, the steps the United States must take to dismantle it are. Over the past decade, we have launched several nonproliferation programs to secure facilities, strengthen export controls and promote the employment of former weapons scientists and engineers who might otherwise be tempted to sell their services to rogue states and terrorist organizations. These programs are manifestly in America's national security interests and have served us well.

Parenthetically let me pay public tribute to my friend George Soros who gave, as I recall, a hundred million dollars to the Yeltsin regime for the sole purpose of funding Soviet scientists so they will not be hired away by rogue States. This was a public spirited and farsighted gesture.

Much more needs to be done, however, in this area. I plan on working with you, Mr. Chairman, and with other colleagues to craft new legislation that would dramatically strengthen our counterterrorism programs. It is imperative that Congress legislate on the issue of securing the former Soviet Union's biological weapons materials.

Now, Mr. Chairman, Iraq is an entirely different challenge, demanding an entirely different response. Our nonproliferation policies targeting Iraq, including our efforts to redeploy weapons inspectors buy us time but do not eliminate the underlying threat.

Unless there is a fundamental change in Iraq's government, and Saddam Hussein is gone, I have no doubt that Iraq will continue

to develop biological weapons and other weapons of mass destruction for use against its neighbors, against the United States, our forces and facilitates abroad.

Mr. Chairman, as of this month, there have been no international inspectors allowed in Iraq for 3 full years. This cannot stand. Military action may soon be required. As the President assesses the terrorist threat posed by Saddam Hussein and the steps the United States must take to neutralize it and to eliminate it, I urge him to act decisively and judiciously.

We must seek the views of countries that are relevant, but we must not be captive to those views. And we must not shy from using force if necessary.

Mr. Chairman, time is running out on our ability to meet the threat of biological terrorism. The terrorists attacks of September 11th and the subsequent anthrax attacks targeting this very body have marked the point of no return.

The future is built or destroyed by the actions the United States and our friends take from this point forward, before more perish from the scourge of biological terrorism. Thank you, Mr. Chairman.

Chairman HYDE. Thank you. Mr. Gilman, do you have an opening statement?

Mr. GILMAN. Just briefly, Mr. Chairman. I want to thank you for arranging this very timely hearing. We certainly cannot do enough in preparing to respond to any biological or chemical attack. And I am pleased that you have gathered together some excellent panelists today. We have heard from Dr. Alibek before. And I know he has some great testimony for us—as well as the other two panelists—so we welcome to the hearing our panelists who are with us today. Thank you, Mr. Chairman.

Chairman HYDE. Thank you. Mr. Menendez.

Mr. MENENDEZ. Thank you, Mr. Chairman. I want to commend you for holding this hearing. And as the Chairman of the House Democratic Task Force for Homeland Security, I would just like to touch on one or two points that I think are pertinent to this hearing and to our issue of national preparedness for biological attack.

I would like to start with a quote from the book, *Germs*, which said,

> "Plans should be prepared for the establishment of adequate laboratory and vaccine production facilities and stockpiles of essential medical supplies, and in the event some enemy attack appears imminent, prompt action should be taken to establish a civil defense committee."

Now, that was the recommendation of a Committee to Defense Secretary James Forestal in 1949. For over a half a century, it has been ignored by consecutive Administrations to this day. These measures and others are part of a bill that we have introduced, the Biological Terrorism Protection Act, or Biopac, H.R. 3255. I encourage both the House and the Bush Administration to look at this legislation, and generally, to move forward on this vitally important issue.

There are specific reasons why we must be more vigilant about this threat. Our enemies know that they cannot challenge us head on, and so look for asymmetric or unconventional ways to take us

on. This is one of them. Pharmaceutical products are manufactured worldwide and lab equipment is widely available making production of biological agents much easier than in past years.

The fall of the former Soviet Union put tens of thousands of scientists with knowledge of biological weapons development available to rogue nations or terrorist groups with evil intent. And in a parallel to computer technology, advances in biological technology will make it easier for rogue nations or terrorists groups to develop germ weapons.

So finally what can we do? I think our laws need to be toughened. Biopac's comprehensive approach to biological terrorism is needed. It addresses investments in emergency preparedness and response and public health, infrastructure protection, including agriculture and water systems, information sharing and better intelligence coordination, as well as the military's role, as well as seeking to secure abroad the biological and chemical agents that exist, and seeking to secure them; where possible, degrade or destroy them.

Finally, the Biological Weapons Convention of 1972 needs an enforcement mechanism. And I am glad to report that working with Ranking Member Lantos, Biopac includes just such a provision. I would hope that the Administration and this Committee would pursue this important priority.

The war in Afghanistan is going very well, Mr. Chairman, but I think we need to come to an understanding that while that war is going well, the preventative war here at home needs to have a heightened sense of urgency. So I look forward to the witnesses, and particularly Dr. Alibek, who ran the 60,000-strong Soviet biological warfare program and is widely respected in the U.S. biological warfare community.

I look forward to hearing some of the comments that he has to make, not only for those countries that we have identified, but other countries as well.

And I thank you again, Mr. Chairman, for holding this important hearing.

Chairman HYDE. Thank you. Does anyone else have an opening statement? If not, I am now pleased to introduce our distinguished witnesses. Dr. Richard Spertzel was the head of biological weapons inspections for the United Nations Special Commission on Iraq from 1994 to 1998. As a consultant in all matters relating to biological weapons and bioterrorism, he has served many U.S. Government agencies, including the Defense Threat Reduction Agency, the Central Intelligence Agency, and the Department of State.

Dr. Spertzel earned his Ph.D. in microbiology from the University of Notre Dame and holds a degree in radiation biology from the University of Rochester. He served in the United States military's veterinary corps for over 22 years, where he specialized in biological warfare and biological warfare defense. We welcome you, Dr. Spertzel.

Our next witness will be Dr. Ken Alibek, who is a Vice President of Hadron, Inc., and President of its Advanced Biosystems, Inc. subsidiary. He leads their development of medical and scientific research programs in biological weapons defense, analytical research and treatment of infectious diseases, and analytical research in the

areas of industrial biotechnology, microbiology and medical microbiology.

A retired Soviet Army colonel, Dr. Alibek served as First Deputy Chief of the civilian branch of the Soviet Union's Offensive Biological Weapons Program, and has more than 20 years' experience in development, management and supervision of high containment pathogen laboratories. Dr. Alibek defected to the United States from Russia in 1992 and has subsequently served as a consultant to numerous U.S. Government agencies.

He has testified before Congress on many nonproliferation issues and recently authored *Biohazard*, published by Random House. He holds M.D., Ph.D. and Doctor of Sciences degrees. We look forward to hearing from you, Dr. Alibek.

Our final witness is Ms. Elisa Harris, a Research Fellow at the Center for International and Security Studies at the University of Maryland. From 1993 to 2000, she was Director for Nonproliferation and Export Controls on the National Security Council staff. She has also held a number of research positions, including those at the Brookings Institution, Royal United Services Institute in London, and the Center for Science and International Affairs at Harvard.

She is a former SSRC-MacArthur Foundation Fellow and a former staff consultant to the House Committee on Foreign Affairs. Ms. Harris has authored numerous publications and is a graduate of both Georgetown University and Oxford, where she earned her masters in philosophy. We welcome you back to the Committee, Ms. Harris.

Dr. Spertzel, if you will begin with your testimony. I would ask each of you to try to encapsulate the things you have to say, in give or take 5 minutes, in order to leave more time for questioning.

Please be assured that your full statement will be made a part of the record and will be perused minutely. So without objection, your full statements will be included and we will start with you, Dr. Spertzel.

STATEMENT OF RICHARD O. SPERTZEL, VMD, PH.D., CONSULTANT, HEAD OF BIOLOGICAL WEAPONS INSPECTIONS, UNITED NATIONS SPECIAL COMMISSION ON IRAQ (UNSCOM), 1994–1998

Mr. SPERTZEL. Thank you, Mr. Chairman. Indeed, I will summarize my written statement.

I will start out by saying that Iraq certainly has the capability of making the kind of product that we have seen in the Daschle letter. Now, having said that, I will try to give some reasons and background behind it.

International experts from 14 different countries on 3 occasions reviewed Iraq's latest declaration of 1997, and all concluded that it was an incomplete account of what they had achieved and what their program was all about.

Iraq certainly knows how to produce 100 percent pure spores. That is a technique that they developed in a two-step fermentation process which is capable of giving them the kind of concentrations that we are seeing in the Daschle letter.

Although Iraq denied that they had attained any higher than about 10 to the 10th or 10 billion, Iraq also had the capability of drying anthrax. They denied having done it, but their contacts with foreign companies revealed that they looked into obtaining the kind of materials that would be necessary in that process, such as the kind of silica and other types of material that would give those special properties that makes it really airborne.

Now, we know from actual evidence in 1994 of a related agent, bacillus thuringiensis, a biopesticide, that they demonstrated their capability of producing a small particle using a spray dryer without milling. In that case, they used Bentonite as the additive.

We also know that Iraq was actively pursuing attempts to obtain the Ames strain as well as other highly pathogenic strains from many countries. In one case we know that they were denied from one laboratory. We do not know whether they were successful in the others because those laboratories involved not only Western Europe, but Eastern European at the time, as well as African countries.

Iraq also appears to be continuing its program. It may have been in abeyance during the time of the Special Commission inspections, but they maintained their technical staff intact as a unit, and with the destruction of their principal fermentation plant, Al Haqam, they maintained that team as employees of the National Monitoring Directorate.

In addition, they retained equipment that we could not identify specifically as being part of their vast program, and they still have that today, including a spray dryer with the capability of producing a small particle aerosol.

They also developed the indigenous capability of producing fermenters, centrifuges, and spray dryers as well as the necessary media for growing the organisms. One of the reasons for this is because that was the trigger that gave their program away and identified it to the Special Commission.

The agents of concern with Iraq have to be the organisms that cause anthrax, tularemia, brucellosis, and smallpox. With that I will conclude my statement.

Chairman HYDE. Thank you very much.

[The prepared statement of Mr. Spertzel follows:]

PREPARED STATEMENT OF RICHARD O. SPERTZEL, VMD, PH.D., CONSULTANT, HEAD OF BIOLOGICAL WEAPONS INSPECTIONS, UNITED NATIONS SPECIAL COMMISSION ON IRAQ (UNSCOM), 1994–1998

Iraq's official position as reflected in its Biological "Full, Final and Complete Declaration," includes an account of weaponization of liquid preparations of botulinum toxin, *Bacillus anthracis* spores, and aflatoxin. Additionally, Iraq acknowledges investigation of Clostridium perfringens and ricin. Three reviews from late 1997 through July 1998 by broad-based international review panels convened in New York, Vienna, and Baghdad all concluded this declaration was an incomplete and inadequate representation of Iraq's biological warfare research and development program.

Assessment by the experts seconded by their host governments to the United Nation's Special Commission (UNSCOM) concluded the account of Iraq's BW program contained in its current FFCD had serious deficiencies and inaccuracies in all areas. Even when the experts focused solely on those areas directly related to the material balance they concluded that none of the components or subcomponents of the material balance could be verified. Key elements in the material balance are the accountability for bulk agents, munitions and material. These are the weapons systems, their production, deployment and destruction as well as the production of bulk

agents and munitions, munitions filling and the acquisition of raw materials, equipment and supplies including bacterial growth media, essentially BW agent precursors.

I do not wish to dwell further on the inadequacies and inaccuracies of Iraq's biological FFCD. The question at hand is what might Iraq have in its possession today or what might Iraq be capable of producing.

Iraq's Capability: Iraq has the equipment, facilities, material, and expertise to have an active BW program. Agents of concern must include *Bacillus anthracis* spores (anthrax), *Francisella tularensis* (tularemia), *Brucella melitensis* and smallpox. Antibiotic resistant strains are well within Iraq's capability. I believe any leakage from Iraq's program would be with full concurrence of the Iraqi government.

Anthrax: I do not believe science will identify the laboratory or country from which the present anthrax spores are derived. The quality of the product contained in the letter to Senator Daschle was better than that found in the Soviet, US or Iraqi BW program, certainly in terms of the purity and concentration of spore particles.

Speaking to the Iraqi BW program, Iraq certainly knew how to produce 100% pure spores as part of its fermentation production process. Although Iraq claims a low concentration in its final liquid product, such low levels can not be substantiated and the process used by them is capable with slight tweaking to produce the levels seen in the Daschle letter. Iraq used bentonite in its production of *Bacillus thuringensis* spores as recovered in 1994 by UNSCOM; however, Iraq through TSMID, its procurement arm for its BW program, also sought a supply of pharmaceutical grade silica in 1988 and 1989. Although suggestive evidence indicates Iraq was able to obtain such material we did not obtain definitive evidence to prove this acquisition. Iraq was also interested in obtaining other materials that would make a good additive for weapons-grade material. Iraq, unlike the Soviet and US programs, did not mill its dried product; rather the Iraqi BW team learned the method of obtaining a readily aerosolizable small particle product in a one step spray drying procedure.

Iraq had obtained anthrax and other bacterial agents from the ATCC in the US and Pasteur Institute, Paris, France. Iraq asserted that it filled aerial bombs and Al Hussein warheads with Volum strain anthrax spores (which was also planned for its drop tank weapon system). Iraq made extensive efforts to obtain the Ames strain in 1988 and 1989 as well as several other pathogenic strains from various countries of, at the time, Western and Eastern Europe and several African countries. Iraq's request for the Ames strain was denied by a laboratory in the UK; UNSCOM did not know what success Iraq had from its contact with other laboratories and countries.

Iraq claimed it did not dry anthrax spores for its weapons. Yet we know that its BW personnel knew how to produce high quality dried preparations and had the equipment and material to produce such dried preparations. Because Iraq asserted it had destroyed all such material in 1991 before UNSCOM inspectors had arrived, no samples of such preparations were obtained; if it retained any dried material, it was not in Iraq's interest to disclose the presence of such material. Dried anthrax spores remaining from its pre-1991 program would still be viable and pose a significant threat.

Smallpox: Iraq does not acknowledge any studies on smallpox. However, a smallpox epidemic swept through northern Iraq in the mid 1970s, just two to three years after it embarked on a program to acquire the capability for weapons of mass destruction. It is most unlikely that Iraq would have missed the opportunity to acquire clinical samples for any biological agent that might be of future benefit to the government. Thus it is prudent to make the assumption that Iraq possesses the necessary seed material for smallpox production. It has the necessary facilities, expertise and equipment for such development. A number of other clues strongly suggests that indeed it had an interest if not an active program in such a weapon development.

Other agents: Iraq also had an interest in many other agents such as agents that induce tularemia, plague, and brucellosis. Again, Iraq has the facilities, equipment, materials, and personnel to be conducting such development.

State versus non-state association: I have maintained from the first descriptions of the material contained in the Daschle letter that the quality appeared to be such that it could be produced only by some group that was involved with a current or former state program in recent years. The level of knowledge, expertise, and experience required and the types of special equipment required to make such quality product takes time and experimentation to develop. Further, the nature of the finished dried product is such that safety equipment and facilities must be used to protect the individuals involved and to shield their clandestine activity from discovery.

Chairman HYDE. Dr. Alibek.

STATEMENT OF DR. KENNETH ALIBEK, PRESIDENT, ADVANCED BIOSYSTEMS, INC., FORMER FIRST DEPUTY CHIEF, CIVILIAN BRANCH, SOVIET OFFENSIVE BIOLOGICAL WEAPONS PROGRAM

Dr. ALIBEK. Thank you, Mr. Chairman and Members of the Committee for having me here and for allowing me the opportunity to discuss with you the issues of biological weapons threats and biological terrorism.

In my opinion this is a very important issue now because we have already seen quite a significant event here in the United States. Fortunately, I can say that the type of delivery we have seen here in the United States is the least effective way to deploy biological weapons. But even in this case, we can see that the entire country was in constant anxiety and fear because of this small number of letters and small number of biological agents.

It is very important for us to realize that in case of a more significant event, we could see more serious, more devastating consequences after deployment of one or another type of biological weapons.

Discussing the Soviet Union's offensive weapons capability, I would like to say first, this program started in late 1920s and officially continued until the beginning of 1992, when President Yeltsin signed a decree to stop any work in the field of research and development of biological weapons by Russia.

In this case, I would like to clarify that the country which was involved in research and development of biological weapons was the Soviet Union. I cannot accuse Russia in any wrongdoing because I have no information of that, but there are some questions which are still unanswered by this country.

The Soviet Union's offensive biological weapons program was a big, very huge, sophisticated, very powerful program. It was strictly a military program, and I am talking just about the military program. There were some other programs run by the KGB, or some other entities, but the biggest one was the military program.

There were several major departments and directorates involved in the research, development and manufacture of biological weapons. Major agents involved in research and development were anthrax, plague, tularemia, brucellosis, glanders melioidoses, viral agents like smallpox, ebola, Marburg hemorrhagic fevers, some encephalitis, like equine encephalitis and Japanese encephalitis, some other hemorrhagic fevers, Bolivian hemorrhagic fever, Argentinian hemorrhagic fever, lassa fever and so on and so forth.

I know for sure that this program was downsized sometime in the late 1980s and beginning of the 1990s. I hope Russia now doesn't have any significant offensive biological weapons capability. But it still has three facilities we are not able to visit and inspect, and we cannot say what kind of work is being done now behind the closed doors of these three major biological weapons facilities.

At the same time, I would like to say Russia had a huge amount of scientists involved in research and developing biological weapons. After this program was downsized, many of them left the program. Some of them came to the United States, some of them went

to Europe, some of them went to Asia, some of them disappeared and nobody can answer the question of where these people are now.

In my opinion, we need to continue our efforts in employing former Russian biological weapons scientists to keep them, as far as possible, from being acquired by any terrorist group or rogue countries, because many of them are underemployed or unemployed.

There is another issue. In my opinion, we need groups of former biological weapons scientists who have not been reached by our efforts to employ those scientists. These scientists are everywhere in the world including—as I said before—the United States, Europe, Asian countries and so on and so forth.

So we need to find a way how to find and employ these scientists, because these specific scientists, in my opinion—keeping in mind their very sophisticated knowledge—could be perfect help to the United States in developing sophisticated biological weapons, and medical defense against biological weapons.

Talking about anthrax, I know something about this powder sent to different locations. Unfortunately I cannot disclose my source of information. I saw, let me say, some pictures. Without getting into detail, my first conclusion is that I am convinced this agent and this product cannot be considered as a Russian or an American weapon.

We discussed the concentration of about one trillion cells, but it is a different issue. In addition to the concentration, you need to know how to make this product in a fine particle size.

What I haven't seen is the fine particle size. Yes, some of this formulation was in fine particle size. But there are many particles, which were a larger size. And in this case I cannot say it was done by highly trained professionals—I would like to emphasize, highly trained professionals.

Chairman HYDE. Dr. Alibek, we have three votes which have been called over which we have no control. We will have to run over and vote. So we will stand in recess until immediately after the third vote, which I am guessing will be completed in ½ hour to 45 minutes.

So if you will rest, we will pick up with you again as soon as we get back. Thank you.

The Committee stands in recess.

[Recess.]

Chairman HYDE. The Committee will come to order.

Dr. Alibek, you were testifying and we will return to you.

Dr. ALIBEK. I would like to repeat what I said before.

My analysis shows that this product was not obtained using either American or Russian production techniques. Why I am saying this is we agreed the concentration was high, about 3 trillion spores in 1 gram. But at the same time, I don't believe it was a direct measurement where we had 1 gram and in this 1 gram there were 3 trillion spores.

If you have several particles and you measure these particles and you count the number of spores in these particles, then you just multiply and say the theoretical concentration could be 1 trillion. It is a completely different process.

What we forget is that when you have a big number of particles, you also have a huge number of empty spaces in this 1 gram. You would never be able to achieve one-thousandth when you have, let me say, particles in 1 gram size. In this case, I wouldn't say this statement: This product was 1 trillion spore concentration.

Second, I know there was quite a wide distribution in the size of these particles from, say, very small parallels 1, 2, 3 or 5, 10 microns up to 35, 50 microns. It means again that it is not a product which was done professionally.

Then, when we talk about particle form, what is important when you analyze electron microscopy, you can see in particle form whether or not there is a million process involved. And I didn't see any signs of a million process. That's third.

And fourth, we know the level of sophistication of batches of this product was different. The first product was not very sophisticated; it contained some vegetative cells or, let me say, immature spores and suggests the Daschle letter contained more or less sophisticated product, mostly in the form of spores. In this case, again, if it was done using the same strain and was done by the same group or by the same individual, it showed a process of learning in the process of manufacturing.

The first batches were not very sophisticated. Then they did additional study, additional work and then produced a more sophisticated product. Of course, this is no more than my assumption, but you know my assumptions are based on what I know about anthrax as a biological weapon.

Let me finish, saying this. This product was not manufactured by highly trained professionals, but some sort of professionals, I would say. I cannot determine the level of professionalism of these people, but they know something about technology and anthrax production. But these are not people who know a great deal about actual technological processes to develop and manufacture anthrax biological weapons.

At the same time, I cannot say it was done by a single individual. It could be, but it could be done either in the United States by so-called homegrown terrorist groups or it could be brought from overseas. Just by analyzing this product, you cannot answer this question. It would require additional study by some experts from completely different fields. Psychology or the FBI probably would be the best sources to determine who could make this product. Let me conclude by this statement.

Thank you.

Chairman HYDE. Thank you very much, Dr. Alibek.

[The prepared statement of Dr. Alibek follows:]

PREPARED STATEMENT OF DR. KENNETH ALIBEK, PRESIDENT, ADVANCED BIOSYSTEMS, INC., FORMER FIRST DEPUTY CHIEF, CIVILIAN BRANCH, SOVIET OFFENSIVE BIOLOGICAL WEAPONS PROGRAM

Mr. Chairman and members of the Committee, thank you for the opportunity to discuss the issues of biological weapons and biological terrorism with you. I am in a rather unique position to discuss these issues, since I developed biological weapons for the Soviet Union for nearly twenty years, until my defection in 1992. Since arriving to the United States, my personal and professional goal has been to make the greatest contribution I can to eliminating the danger of biological weapons.

WHAT ARE BIOLOGICAL WEAPONS?

Biological weapons are weapons of mass destruction (or mass casualty weapons, to be precise, since they do not damage nonliving entities) that are based on bacteria, viruses, rickettsia, fungi, or toxins produced by these organisms. Compared to other types of weapons (nuclear, chemical or conventional), biological weapons are unique in their diversity. Dozens of different agents can be used to make a biological weapon, and each agent will produce a markedly different effect. These differences in effect are shaped by various properties of the particular agent, such as its contagiousness, the length of time after release that it survives in the environment, the dose required to infect a victim, and of course the type of disease that the agent produces.

Biological weapons formulations are of two types: a liquid or a dry powder. For most agents, the liquid form is easier to produce, but the dry form stores longer and disperses better when deployed. The basic steps for creating a liquid biological weapon are:

- Obtaining a sample of the microorganisms to be used
- Culturing the microorganisms until there is enough for a weapon
- Concentrating the culture to make it strong enough for a weapon
- Adding certain ingredients to stabilize the culture.

For a dry weapon formulation, this liquid culture is dried out and then ground up into microscopic particles. For toxin weapons, the toxin must first be extracted from the source—either the liquid bacterial culture or a plant or animal—and then concentrated.

Biological weapons can be deployed in three ways:

- Contamination of food or water supplies, which are then ingested by the victims
- Contamination of physical objects (e.g. books, mail), leading to inhalational or contact infection
- Release of infected vectors, such as mosquitoes or fleas, which then bite the victims
- Creation of an aerosol cloud, which is then inhaled by the victims (or, if the targets are plants, the cloud then settles on and infects the plants).

By far, the most efficient and effective mode for applying biological weapons is creation of an aerosol cloud. Such a cloud is made up of microscopic particles and is therefore invisible. It can be produced in several ways, all of which involve either an explosion (a bomb or a bomb within a missile) or spraying (usually involving a special nozzle on a spray tank). The effectiveness of the cloud is determined by numerous factors, such as the amount of agent that survives the explosion or spraying, and the wind and weather conditions. The primary result of an effective cloud is simultaneous infections among all those who were exposed to a sufficiently dense portion of the cloud. In addition, agents that can survive for a long time in the environment will eventually settle, contaminating the ground, buildings, water and food sources, and so on. In some cases, these sediments can form another dangerous aerosol cloud if they are disturbed.

GLOBAL BIOLOGICAL WEAPON PROLIFERATION

Following the breakup of the Soviet Union and the end of the Cold War, the threat of proliferation of mass casualty weapons has grown dramatically. In some ways, the danger posed by the proliferation of biological weapons and biotechnology is greater than that of nuclear proliferation. For example, the acquisition, manufacture, deployment, and movement of nuclear components or weapons is much more expensive and difficult to achieve than that of biological agents. A freeze-dried vial of anthrax can easily be obtained and concealed, and the knowledge of how to turn that vial of anthrax into a biological weapon is in the possession of hundreds of scientists and technicians. The recent incidents of anthrax dissemination through the Postal Service have only served to demonstrate the reality of this threat.

The growing frustrations among scientists within the former Soviet bioweapons community add to the risks of proliferation. Despite initiatives directed by the United States government to employ some of these scientists and to shift the focus of their research to peaceful projects, more needs to be done. Many of these scientists are highly trained in biotechnology and their talents could be directed toward finding new methods of preventing or treating the diseases caused by these pathogens. Several former bioweapons scientists have emigrated to the West and

are currently under-employed. We fear that in order to feed their families, others may offer their technical skills on the open market, which could provide our enemies with technical expertise or ready-made, engineered organisms. Some Russian microbiologists are reportedly teaching students from rogue states that are interested in this expertise. Other prominent scientists have simply dropped out of sight.

In a report to the Senate Permanent Subcommittee on Investigations in 1995, the U.S. Office of Technological Assessment identified 17 nations believed to possess biological weapons. It is estimated that at least 20 countries, including China, Iraq, North Korea, and Israel, either have active research programs or were formerly involved in biological weapons research and production. In many cases, these are nations that are also engaged in chemical and nuclear programs, since they feel the necessity to protect themselves from hostile neighbors by any means necessary.

ANTHRAX

The use of anthrax as a biological weapon has gained a great deal of attention in the last 2 months. Anthrax is a bacterial infection caused by *Bacillus anthracis*, and has long been seen as one of the most likely candidates for weaponization, having been studied by the Soviet Union, United States, United Kingdom, Iraq, and others.

The infection can take one of three forms, characterized by the route of entry into the body: cutaneous, gastrointestinal, and inhalational. Cutaneous anthrax, the form seen in newsrooms in New York City, is characterized by a formation of a skin lesion, or eschar, at the site of infection. This is the most common form of infection, caused when anthrax spores gain entry to the skin via a cut or scrape while the person is handling anthrax-contaminated material, normally an infected animal carcass. Cutaneous anthrax is easily treatable with antibiotics and has a low mortality rate.

Gastrointestinal anthrax is associated with consuming food contaminated with anthrax spores. This is the rarest form of infection, and is also treatable with antibiotics if seen early enough.

Inhalational anthrax is the most serious form of anthrax infection, seen in the cases in Florida and Washington DC. The disease begins when aerosolized anthrax spores are inhaled. Once in the lungs, immune systems cells called macrophages, whose normal function is to ingest, kill, and degrade invading pathogens and activate other immune system cells. However, instead of being killed, the spores reactivate and grow into live bacterial cells. The macrophages transport the bacteria to the lymph nodes, where they proliferate and spread, eventually breaking out of the lymph system into the bloodstream. During this period of lymphatic replication, the patient only displays non-specific symptoms much like the flu. Once in the bloodstream, the bacteria proliferate further and begin producing anthrax toxin. Eventually the bacteria spread through the entire circulatory system at high concentrations. Death from inhalational anthrax is associated with shock and multiple organ failure. When untreated, inhalational anthrax is almost 100% fatal, and though antibiotics (such as ciprofloxacin) can have an effect if administered early enough (as has been the case for the recent survivors of anthrax exposure), once the patient shows specific symptoms of anthrax infection, it is usually too late. Cases of inhalational anthrax were much more numerous at the end of the 19th century, when the disease was associated with occupational exposure to contaminated animal hides and wool (leading to its being termed woolsorters' disease).

THE REAL EFFECTS OF BIOLOGICAL WEAPONS: THE SOVIET/RUSSIAN PROGRAM

The Soviet biological weapons research program lasted for over fifty years until its official dissolution by Boris Yeltsin in 1992. In that time, the Soviet program not only caught up with the U.S. program (which was halted in 1969), behind which it had lagged by about five years, but it became the most sophisticated biological weapons program in the world by far. However, there are still questions as to the true status of research at the laboratories formerly involved in the program. Therefore, it would not be prudent to consider that Russia presents no military threat whatsoever. In addition, as noted above, biological weapons technology can possibly proliferate from Russia to other countries less friendly to the U.S. For these reasons, it is important that we continue to collaborate with Russia to reduce the threat of proliferation.

There are three main reasons that I am concerned about possible biological weapons research and development in Russia today. First, many of Russia's former biological weapons facilities have never been subjected to international inspections. Second, Russia continues to publicly deny the size or even existence of many aspects of the former Soviet program. And third, among Russian scientists' published work,

there are many studies I feel are dual-purpose or even outright offensive biological weapons work.

To gain insight into the extent and sophistication of the weapons research performed in the Soviet Union, consider the following excerpt from an interview published in the 3 March 1998 issue of the Russian newspaper Izvestiya with Lieutenant General Valentin Yevstigneyev, head of the 15th Directorate of the Russian Ministry of Defense until 1992. At that time, this directorate was the military arm of Russia's biological weapons program. He was the Deputy Director of the Ministry of Defense's NBC Defense Directorate. The interviewer is questioning Yevstigneyev about the 1979 anthrax incident in Sverdlovsk (now Yekaterinburg), which is now widely known to have been the result of an accidental release of anthrax spores from a military production facility there. At that time, the Sverdlovsk facility was producing and stockpiling scores of tons of anthrax biological weapon formulation annually. Yevstingeyev describes the weaponized anthrax being developed at Sverdlovsk at that time as possibly being 100% lethal:

> *Interviewer:* Do you claim, as before, that in 1979 on the Sverdlovsk-19 military base, no explosions of munitions with a "biological" filling nor massive deaths occurred?
>
> *Yevstigneyev:* People who don't know much about bacteriology might be able to believe the newspaper stories (which, by the way, is indeed happening now). The professionals simply laugh.
>
> International experts found four different strains (of the virus culture—author's note) of anthrax. Four different bacteria! Different, you understand? If a bomb exploded, would there really be four strains? How can you explain that people fell ill 50 kilometers away, but on the military base, where this explosion supposedly occurred, no one fell ill? Next door to the base is a tank division—two fatal cases . . . Believe me, if this was a single military release, two or three days and everyone would be finished!

Additionally, Peter Burgasov, former Chief Sanitary Physician of the Soviet Union and a researcher in the biological weapons program, became the first official in the program to admit to the development and testing of weaponized smallpox in a November 2001 interview in the Russian newspaper "Courier." Burgasov describes a 1970's test of a smallpox weapon on Vozrazhdenie (Rebirth) Island, a biological testing site in the Aral Sea:

> *BURGASOV:* On Vozrazhdenie Island in the Aral Sea, the strongest recipes of smallpox were tested. Suddenly I was informed that there were mysterious cases of mortalities in Aralsk. A research ship of the Aral fleet came 15 km away from the island (it was forbidden to come any closer than 40 km). The lab technician of this ship took samples of plankton twice a day from the top deck. The smallpox formulation—400 g of which was exploded on the island—"got her" and she became infected. After returning home to Aralsk, she infected several people including children. All of them died. I suspected the reason for this and called the Chief of General Staff of Ministry of Defense and requested to forbid the stop of the Alma-Ata—Moscow train in Aralsk. As a result, the epidemic around the country was prevented. I called Andropov, who at that time was Chief of KGB, and informed him of the exclusive recipe of smallpox obtained on Vozrazhdenie Island.
>
> This is a real biological weapon! The minimum radius of contamination was 15 km. One could imagine what would have happened if instead of one lab technician, it was 100–200 individuals. Also, in Manchuria in 1912, 110,000 people died of smallpox at one time.

The above can be considered evidence that a new assessment of the biological weapons and defense capabilities of the former Soviet republics is long overdue.

Chairman HYDE. Ms. Harris.

STATEMENT OF ELISA D. HARRIS, RESEARCH FELLOW, CENTER FOR INTERNATIONAL AND SECURITY STUDIES, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND

Ms. HARRIS. Thank you, Mr. Chairman. I would like to express my appreciation for the invitation to testify and note that it is a real pleasure to return to the Committee where I began my professional career 25 years ago. I would like to start this morning by

talking about the potential implications of the September 11 attacks and then say a few words about policy recommendations.

The September 11 attacks on the World Trade Center and the Pentagon and the subsequent anthrax incidents have focused renewed attention on the threat of biological weapons. But whether we have crossed a threshold, whether the longstanding taboo against the use of disease as a weapon of war and terror has been irrevocably eroded is in my mind far from clear.

First, there is little evidence in the public domain indicating that the threat from national biological weapons programs has increased dramatically in the last few years.

Second, there is little information publicly available indicating that any subnational group or terrorists, other than the as yet unidentified perpetrators of the current anthrax attacks, pose a real biological weapons threat today. Although it may be too early to predict on the basis of a single set of events that the biological weapons threat is growing, the fact that the anthrax incidents here in the U.S. involve relatively pure, highly concentrated anthrax powder capable of creating an aerosol simply from the mere act of opening a letter is indeed a cause for concern.

We don't know, of course, who is behind these attacks. But both the current attacks and any future bioterrorism incidents would have to come from one of three potential sources. The first potential source is countries that are both state sponsors of international terrorism and that have an indigenous biological weapons program.

Dr. Spertzel has mentioned Iraq. That is one country which fits into this category, but there are others as well—North Korea, Iran, Syria and Libya. All of these countries have been identified by U.S. Government officials as both terrorism and proliferation concerns.

A second potential source of assistance for foreign or domestic terrorists comes from the past U.S. and former Soviet biological weapons programs.

And the third and final possibility is, of course, that of a purely homegrown effort, what White House Press Secretary Ari Fleischer described as a "Ph.D. microbiologist with a well-equipped lab." Clearly, both the material and equipment needed to make biological agents are publicly available. That said, knowing what is needed to make biological agents is not the same as knowing how to do it, as was demonstrated by the Aum Shinrikyo's failed attempts to use biological weapons in the 1990s.

In the time that I have left, I would like to concentrate on some policy recommendations for dealing with the biological weapons threat. In my view, because of the catastrophic potential of biological weapons in the hands of national or subnational groups, the first line of defense to deal with this problem must be prevention, specifically, trying to deny groups the ability to acquire biological weapons. I would like to suggest four policy options that can help achieve this goal of prevention.

First, we must strengthen the international ban on the development and possession of biological weapons, as embodied in the 1972 Biological and Toxin Weapons Convention. As you know, efforts have been under way since 1995 to conclude a protocol to strengthen the BWC. Unfortunately, in July, the Bush Administration rejected this draft protocol effort. I believe that given the very real

potential for national biological weapons programs to be a source of technical and material assistance to aspiring biological terrorists, more effective international measures to enforce the BWC's prohibition on developing and possessing biological weapons clearly are required. I hope the Bush Administration abandons its opposition to an ongoing process that would allow both U.S. proposals to strengthen the BWC and other ideas to be discussed, and an acceptable set of solutions to evolve over time.

My second policy recommendation is to strengthen oversight of laboratories conducting research involving dangerous biological pathogens. Various rules, disclosure requirements and monitoring arrangements exist in the biological area, but almost none are geared toward preventing deliberate or inadvertent misuse of biotechnology research for destructive purposes.

We need only look at the work the Soviet Union did to develop a genetically modified, vaccine-resistant strain of anthrax or the inadvertent development of a new, highly virulent mousepox pathogen by Australian scientists to realize that the potential for misapplication of biotechnology research is very real. These developments underscore the need for an oversight arrangement in this particular area.

Third, we need to strengthen controls over biological pathogens themselves. The U.S. should extend the current regulations governing facilities that transfer pathogens to other facilities that also possess select agents. We should also seek support for stronger international measures to safeguard culture collections and other sources of dangerous pathogens.

Finally, we should expand efforts to prevent the proliferation of expertise and materials from the former Soviet biological weapons program. During the Crawford summit last month, Presidents Bush and Putin agreed in a joint statement to expand their cooperation in this area, but no concrete manifestations of that enhanced cooperation have been announced.

One obvious area, which Dr. Alibek referred to, would be to build upon the programs begun by the Clinton Administration to prevent the proliferation of capabilities from the former Soviet biological weapons program. This will not be cheap. I would suggest, based on my experience overseeing these programs over the last 8 years, that upwards of $750 million in additional funding could well be required to approach this in a comprehensive fashion. But given the real potential for critical elements of the former Soviet program to contribute to national or terrorist biological weapons efforts, I believe such an investment would be a prudent step.

Thank you, Mr. Chairman.

Chairman HYDE. Thank you very much.

[The prepared statement of Ms. Harris follows:]

PREPARED STATEMENT OF ELISA D. HARRIS, RESEARCH FELLOW, CENTER FOR INTERNATIONAL AND SECURITY STUDIES, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND

Mr. Chairman, I would like to thank the Committee for inviting me to testify today about the recent anthrax attacks here in the United States. In my testimony this morning, I will begin by considering the potential implications of September 11 and the subsequent anthrax attacks. I will then explore possible means by which terrorists might acquire the capability to use biological weapons, either here at

home or against U.S. targets overseas. In concluding, I will discuss several policy options for preventing or impeding terrorist efforts to acquire biological weapons.

POTENTIAL IMPLICATIONS OF SEPTEMBER 11 AND BEYOND

The September 11 attacks on the World Trade Center and Pentagon and subsequent anthrax attacks in Florida, New York and Washington have focused renewed attention on the threat of biological weapons use by terrorists or other sub-national groups. In a statement on November 1, President Bush declared: ". . . the threat is growing. Since September 11, America and others have been confronted by the evils these weapons can inflict. This threat is real and extremely dangerous. Rogue states and terrorists possess these weapons and are willing to use them."

It is certainly the case that, over the past two months, America has had a glimpse of what it can mean to use disease for hostile purposes. Before October, no American ever died as a consequence of a terrorist attack with biological agents, although some 750 people were poisoned with salmonella by the Rajneeshee cult in Oregon in 1984. Today, five people are dead from inhalation anthrax. Five others have been treated for the inhalation form of the disease and another ten are recovering from the cutaneous or skin form. In addition, tens of thousands of media, postal and government employees have been prescribed powerful antibiotics prophylactically because of possible anthrax exposure.

But whether we have crossed a threshold, whether the longstanding taboo against the use of disease as a weapon of war and terror has been irrevocably eroded, is far from clear. First, there is little evidence in the public domain indicating that the threat from *national* biological weapons programs has increased dramatically in the last few years or, for that matter, since the end of the Cold War. In June, Secretary of Defense Rumsfeld told Congress that at least thirteen countries are seeking biological weapons. This compares with statements in 1997 from Clinton Administration officials to the effect that about a dozen countries were pursuing a biological weapons capability. Most of these programs date to the 1980s, some even earlier. Some, such as Iran's program, are more mature and thus pose a greater potential threat than in the past. However, the most serious and direct biological weapons threat to the United States, from the former Soviet Union, has all but disappeared.

Second, there is little information publicly available indicating that any *sub-national* group or terrorists, other than the as yet unidentified perpetrator of the current anthrax attacks, pose a real biological weapons threat today. Since September 11, much attention has been focused on the possibility of Osama bin Laden's al-Qaeda network acquiring biological weapons. On November 11, Secretary Rumsfeld publicly stated that it was "reasonable to assume" he might very well have "chemical or biological" weapons. Rumsfeld emphasized, however, that it's "one thing to have the chemical or biological capability. It's another thing to have figured out how to weaponize it or develop the ability to deliver it." According to various press reports, intelligence officials assess that al-Qaeda has a "crude chemical—and possibly biological—capability." Information obtained from Afghanistan itself in recent weeks has done little to clarify the situation.

According to the London *Times*, instructions for preparing ricin, a biological toxin, have been found in an abandoned house once used as a terrorist training center in Kabul. However, it has been known for a number of years that jihad or holy war manuals contain sections devoted to biological and chemical warfare, including instructions on how to prepare toxins, toxic gas and drugs. Various documents related to anthrax, including how to use it as a weapon, as well as diagrams that seem to show a possible method for dispersing some type of biological or chemical agent from the air have been found in the abandoned Kabul offices of an organization with ties to Afghanistan's Taliban government. According to the *New York Times*, however, words scribbled on the diagram appear to say "cyanide," which is a World War I era chemical agent. Central Command officials are said to have identified more than 40 *potential* weapons of mass destruction sites in Afghanistan and are conducting tests of samples from such sites. Thus far, however, no actual chemical or biological weapons or agents have been found.

As far as is publicly known, other than the Rajneeshee salmonella incident in 1984, the only significant terrorist effort to acquire and use biological weapons occurred in the early 1990s, when the Japanese cult Aum Shinrikyo tried on nearly a dozen occasions to develop and disseminate biological agents, including anthrax and botulinum toxin, among the Japanese population. Despite ample financial and technical resources, including a Ph.D. microbiologist, the Aum failed spectacularly: none of their biological attacks produced a single casualty.

The Aum Shinrikyo did, of course, have somewhat more success with chemical weapons. In April 1995, the cult disseminated the nerve agent sarin in the Tokyo

subway at the height of morning rush hour, killing a dozen Japanese citizens and injuring another 1,000. Following this attack, many experts confidently predicted that the normative and technical barriers to the development and use of chemical weapons had been dealt a fatal blow, and that it was not a matter of whether, but when, terrorists would use chemical weapons again. Six years later, those barriers are not only still in place, but have been strengthened by the entry into force and implementation of the Chemical Weapons Convention.

POTENTIAL SOURCES OF ASSISTANCE

Although it may be too early to predict, on the basis of a single set of events, that the biological weapons threat is growing, the fact that the recent anthrax incidents here in the U.S. involved relatively pure, highly concentrated anthrax powder capable of creating an aerosol hazard from the mere act of opening an envelope is a cause for serious concern. At the present time, we do not know who is behind these attacks, how they acquired the high quality anthrax found in the letters to Senate Majority Leader Daschle and Senator Leahy, or whether they have access to additional anthrax or other biological agents. That said, both the current attacks and any future bioterrorism incidents would have to come from one of three potential sources.

One possible source is countries that are both state sponsors of international terrorism and that have indigenous biological weapons programs. Senior Pentagon officials, including Secretary Rumsfeld, have spoken publicly about this possibility. On September 30, during an appearance on "Meet the Press," Rumsfeld noted that several nations that support international terrorists are also trying to acquire chemical, biological or nuclear weapons, and that "it doesn't take a leap of imagination to expect that at some point those nations will work with those terrorist networks and assist them in achieving and obtaining those kinds of capabilities." Although Rumsfeld did not name names, Iraq, North Korea, Iran, Syria and Libya are the key countries identified in U.S. government reports as both terrorism and proliferation concerns. Any one of these countries could in theory provide assistance of various kinds, including actual biological agents, to foreign or domestic terrorists. As a practical matter, however, the programs are at various levels of maturity.

On one end of the spectrum is Iraq, whose biological weapons program first began in the mid-1970s and was restarted again in the 1980s, during the Iran-Iraq War. Although Baghdad repeatedly denied having a biological weapons program, following the defection of General Hussein Kamal in 1995, Iraq finally acknowledged having produced some 30,000 liters of concentrated BW agent, including anthrax and botulinum toxin, and having filled it into missile warheads and bombs. Iraq also admitted to having conducted R&D on a range of other agents, including ricin, clostridium perfringens, which causes gas gangrene, T–2 toxins, and camelpox, which is in the same virus family as smallpox. There have been widespread reports in the press that Iraq has rebuilt some of the dual-use facilities used to develop and produce these agents. Iraq's expulsion of UNSCOM inspectors in December 1998 and its subsequent refusal to accept inspections from UNMOVIC, the UN follow-on organization, have precluded the international community from pursuing concerns about the status of the Iraqi program.

At the other end of the spectrum is Libya, which has not been able to move beyond the R&D phase in its biological weapons program, although it may, according to Under Secretary of State John Bolton, be capable of producing small quantities of biological agent. In between are North Korea, Iran and Syria. North Korea has been pursuing a biological weapons capability since the 1960s. In a recent speech, Under Secretary Bolton stated that the United States believes that North Korea has developed and produced, and may have weaponized, biological agents, and can produce military quantities of agent within weeks of a decision to do so. Bolton said Iran, whose biological weapons program began in the 1980s, probably has produced and weaponized biological agents. In recent years, Iran has actively sought dual-use materials and expertise from institutes formally associated with the Soviet biological weapons program. According to Bolton, Syria's biological weapons program is believed to be in the R&D stage, although it may be capable of producing small quantities of agent.

A second potential source of assistance for foreign or domestic terrorists comes from the past United States and former Soviet Union's biological weapons programs. The U.S. program, which began during World War II, investigated a variety of biological agents including anti-personnel agents like anthrax and tularemia, anti-crop agents such as wheat stem rust and rice blast, and anti-animal agents like foot and mouth disease. Following President Nixon's 1969 decision to terminate the offensive biological weapons program and renounce unconditionally any future use of biologi-

cal or toxin weapons, U.S. biological agent stocks, including some 220 pounds of anthrax, were destroyed and U.S. facilities were shut down or converted to public health or biological defense activities.

The Soviet program was the largest in the world, employing upwards of 60,000 personnel at its height in the 1980s. Much of the R&D and production of biological weapons was undertaken at secret facilities run by the Soviet military or at civilian facilities under the management of an organization known as Biopreparat. The Soviet program explored the full-spectrum of traditional anti-personnel biological agents, ranging from lethal agents such as anthrax, smallpox and plague to incapacitating agents such as tularemia, glanders and Venezuelan equine encephalitis. Soviet biological weapons scientists also undertook extensive efforts to develop anti-plant and anti-animal agents and used genetic engineering techniques to modify traditional agents, for example by imparting antibiotic resistance, and to explore possible cocktails or combinations of agents.

In April 1992, Russian President Boris Yeltsin ordered the termination of the offensive program. In the years that followed, some research and production facilities were deactivated and many others underwent severe personnel and funding cuts. However, the U.S. government continues to be concerned that some elements of the former Soviet program remain.

The final possibility is that of a purely homegrown effort, what White House press secretary Ari Fleischer described, in relation to the recent anthrax incidents, as "a Ph.D. microbiologist" with a "well-equipped microbiology lab." Clearly, both the materials and the equipment needed to make biological agents are publicly available. Seed cultures of biological pathogens can be purchased from among the more than 1500 culture collections around the world operated by commercial enterprises and research institutions. Both the nutrient media in which the pathogens are grown and the fermenters or bioreactors in which the production process occurs also are widely available, owing to their role in legitimate research and commercial activities. Finally, equipment to transform the liquid agent into a dry powder of the optimal particle size for inhalation into the lungs is also available in the pharmaceutical and other industries.

That said, knowing what is needed to make a biological agent is not the same as knowing how to do it, as was demonstrated by the Aum Shinrikyo's failed biological weapons attacks in the early 1990s. To be successful, an aspiring bioterrorist would have to: select the right strain (some are more virulent and thus more effective at producing casualties than others); produce and purify the required amount of material; and dry and mill the agent or take other steps to reduce the particles to the optimum size and maximize their ability to create a sustained aerosol hazard. The technical challenges would not, however, end there. The terrorist would also have to select a delivery system for the agent and then disseminate it without either contaminating himself or degrading or killing the agent (some agents are highly vulnerable to meteorological conditions such as UV light, heat and humidity).

Whoever is behind the recent anthrax attacks has demonstrated an ability to disseminate a small quantity of high quality anthrax on a limited scale. Whether a "biological Unabomber" could effectively mount a large-scale attack is unclear. In 1999, the General Accounting Office deemed it unlikely, concluding that terrorists working outside a state-run laboratory infrastructure would have to "overcome extraordinary technical and operational challenges to effectively and successfully weaponize and deliver a biological agent to cause mass casualties."

POLICY RECOMMENDATIONS

The anthrax incidents have shown how much needs to be done to improve our ability to defend against and manage the consequences of the use of biological weapons. However, it would be a grave mistake to stop there. The catastrophic potential of biological weapons in the hands of national or sub-national groups is so great that the first line of defense must be prevention, specifically, trying to deny such groups the ability to acquire biological weapons. I would like to suggest four policy options that can help achieve this goal.

First, strengthen the international ban on the development and possession of biological weapons, as embodied in the 1972 Biological and Toxin Weapons Convention (BWC). As you know, the BWC lacks enforcement provisions, but efforts have been underway since 1995 to conclude a legally binding protocol to strengthen the Convention. In July, the Bush administration rejected the draft protocol, arguing that it was both too weak and too strong—too weak to catch cheaters; too strong to avoid putting at risk sensitive U.S. trade secrets or biological defense activities. In its place, the administration has proposed, at the Review Conference for the Convention currently underway in Geneva, an alternative package comprised primarily of

recommendations for national measures to be undertaken by individual BWC parties.

The administration's proposals for measures to increase national control over activities that could be misused for biological weapons purposes are a useful first step, but they can and should be made more robust. For example, in addition to national legislation criminalizing activities prohibited under the BWC, the U.S. should propose and other parties support the Harvard-Sussex Program's proposal for a multilateral convention that would make it a crime under international law for any persons knowingly to engage in prohibited biological weapons activities and would subject such individuals to prosecution or extradition.

The Bush administration has also proposed international measures to clarify concerns that another party is violating the BWC and for investigating suspicious disease outbreaks or the alleged use of biological weapons. However, these proposals do little to advance existing mechanisms in the BWC itself or that have been agreed internationally. As such, they fall seriously short of what is required.

Given the very real potential for national biological weapons programs to be a source of technical and material assistance to aspiring biological terrorists, more effective international measures to enforce the BWC's prohibition on the development and possession of biological weapons clearly are required. Ultimately, these international measures, whether related to criminalization, the exchange of information, or on-site activities, must be embodied in a legally binding form. Institutional arrangements will also be needed to ensure that these measures are implemented effectively.

It is critical that BWC parties make provision at the Review Conference to continue their efforts toward a more effective regime. Clearly, this matter cannot wait for the next Review Conference in five years. I hope the Bush administration will abandon its opposition to an ongoing process so that both the U.S. and other proposals for strengthening the Convention can be discussed and acceptable solutions evolve over time.

Second, strengthen oversight of laboratories conducting research involving dangerous biological pathogens. Various rules, disclosure requirements and monitoring arrangements exist in the biological area. However, almost none are geared toward preventing the deliberate or inadvertent misuse of biotechnology *research* for destructive purposes. Within the United States, federal oversight of activities involving biological pathogens is focused largely on the safety of laboratories and the manufacturing process and the safety and efficacy of pharmaceutical products themselves, as opposed to the potential implications of the scientific research that ultimately results in those products. For example, there are OSHA regulations governing the safe handling and containment of pathogens in laboratories and FDA requirements for Good Manufacturing Practices at facilities that produce drugs and other products being licensed for human use. There also are FDA requirements for prior notification of human clinical trials and for oversight of those trials by Institutional Review Boards, and for reviewing documents and research to ensure the safety and efficacy of biological products licensed for human use. In terms of basic research, however, only a narrow set of facilities working with biological pathogens—those engaged in certain types of recombinant DNA research that receive NIH funding for their work—are subject to mandatory federal prior approval requirements.

Three developments in recent years highlight the ambiguities and risks posed by certain types of biological research, including the potential for biotechnology research to be misused for hostile purposes. They also underscore the critical need for oversight arrangements in this area. In 1997, scientists at a once-secret military research center near Moscow published an article describing the development of a new type of anthrax that could overcome the standard Russian and American vaccines. Earlier this year, Australian scientists exploring ways to sterilize mice revealed that they had discovered how a new, highly dangerous pathogen might be made. And this past fall, the *New York Times* reported on secret American biological defense research, including plans to replicate the Russian work on a genetically modified version of anthrax. Each of these developments raises legitimate questions and concerns.

To be effective, new oversight arrangements for biotechnology research must be developed and implemented with input from and support by the scientific community. Such arrangements should include agreed rules to govern work with dangerous pathogens, disclosure requirements to permit independent scientific review of that work, monitoring requirements to provide confidence in the accuracy of the information disclosed, and legal rules and institutional procedures to specify legitimate uses and assure protection of proprietary aspects of that information. Ultimately, such an oversight regime would have to be global in scope, given that arrangements set only within the United States or among a limited group of countries would not pro-

vide adequate protection or be politically acceptable. Work to develop a prototype regime for preventing destructive applications of biotechnology research is being carried out under the direction of Dr. John Steinbruner at the Center for International and Security Studies at Maryland.

Third, strengthen controls over biological pathogens themselves. Following Iraq's use of chemical weapons against Iranian military forces and its own Kurdish population during the Iran-Iraq War, the United States and other Western countries imposed export controls on equipment and materials that could be used to make chemical, and subsequently biological, weapons. Today, 33 countries participate in the so-called Australia Group, an informal multilateral body that seeks to harmonize national export controls over chemical and biological-related exports.

In addition to this informal multilateral arrangement, since 1997 the United States has required facilities that send or receive particularly dangerous pathogens—the 36 microbes and toxins on the so-called Select Agent List—to be registered with the Centers for Disease Control and Prevention and to report all domestic transfers of such materials. However, as the recent anthrax incidents have shown, U.S. facilities that sent or received dangerous pathogens before 1997 are not subject to this reporting requirement. Moreover, most of the more than 1500 culture collections around the world make biological cultures available to researchers with few restrictions or controls.

In October, the Congress moved to tighten domestic controls over access to biological pathogens by passing legislation prohibiting felons, illegal aliens, individuals from terrorist countries and other restricted persons from possessing or transferring biological pathogens on the CDC Select Agent List. The blanket restriction on access to pathogens by individuals from terrorist countries working in the United States has been criticized by scientific organizations, which rightly fear that specific individuals may be prevented from undertaking work that could result in important public health or national security benefits. The ability to waive this provision should be added to the legislation.

More broadly, the U.S. should extend the current regulations governing facilities that transfer pathogens to cover facilities that also possess Select Agents. We should also given the CDC the resources it needs to be able to conduct the necessary inspections of registered facilities. In the five years since adoption of the original regulations, only about 60 of the approximately 250 registered labs reportedly have been inspected. Finally, we should seek support for stronger international measures to safeguard culture collections and other sources of dangerous pathogens around the world from terrorists or national biological weapons programs.

Fourth, expand efforts to prevent the proliferation of expertise and materials from the former Soviet biological weapons program. Since 1994, the United States has utilized a variety of nonproliferation assistance programs to prevent former Soviet biological weapon scientists, relevant equipment, and pathogens from contributing to foreign biological weapons activities. Under these programs, managed by the Departments of State, Defense, Energy, HHS, and Agriculture, more than 5,000 scientists have received funding for collaborative research both on public health threats and on biodefense related projects. In addition, the world's largest anthrax production facility, at Stepnogorsk in Kazakhstan, has been dismantled. Efforts have also been undertaken to tighten the security at the various culture collections around the former Soviet Union. Much more, however, remains to be done.

During the Crawford summit last month, Presidents Bush and Putin agreed, in a Joint Statement, to expand their cooperation to prevent and defend against the threat of bioterrorism. No concrete manifestations of this enhanced cooperation have, however, been announced. One obvious area would be to build upon the programs begun by the Clinton administration to prevent the proliferation of capabilities from the former Soviet biological weapons program. Senator Kennedy and his staff have been working on this issue, and have developed a number of valuable ideas. They include dismantling and redirecting additional former biological weapons production facilities, expanding collaborative research on global diseases such as HIV and TB, broadening work with U.S. scientists on vaccines and other medical countermeasures to biological weapons, facilitating commercialization activities at former biological weapons facilities, and strengthening the security at culture collections and other sites that maintain dangerous pathogens. A comprehensive program of this type would not come cheap—upwards of $750 million would be required over the next five years. However, given the very real potential for critical elements of the former Soviet program to contribute to national or terrorist biological weapons efforts, such an investment would be a prudent step.

This concludes my prepared statement. I would be happy to try to answer any questions you might have.

Chairman HYDE. Mr. Lantos.

Mr. LANTOS. Thank you very much, Mr. Chairman. Let me first express my very sincere commendation to all three of our witnesses. They have presented outstanding papers, and I am deeply grateful to them for their willingness to share their knowledge. We are in awe of your technical expertise, but we are bumbling in the dark when it comes to policy recommendations, as you are, because clearly your technical expertise takes us only a certain way in making policy decisions with respect to how we protect the American people from these horrendous future possibilities. So let me think out loud and then invite all three of you to comment.

I take it we must begin with the assumption that the capability of producing these weapons of mass destruction is a necessary, but certainly insufficient precondition for using them against the United States and the American people. We would not be worried if the British had these capabilities or if the Australians had these capabilities. So we have to look for motivation and we have to look to the historic record.

Now, I would like to begin the speculation by quoting our Secretary of Defense, Don Rumsfeld, who basically said that several nations that support international terrorists are also trying to acquire chemical, biological and nuclear weapons; and it doesn't take a leap of imagination to expect that at some point those nations will work with those terrorist networks and assist them in achieving and obtaining those kinds of capabilities. This is a very profound statement by Don Rumsfeld, because what he does, he marries up rogue states with terrorist networks and assumes that there will be some collaboration between those two sets of entities.

Now, there is one more sort of obvious fact that we have to deal with and that is the timing of the anthrax letters. It would be an extraordinary coincidence if the timing of the Daschle letter and the Leahy letter would be just a happenstance having nothing to do with September 11. You really must have either an unbelievable degree of naivete or sort of a bizarre twist of mind to think that these two events just happened to coincide.

I do not believe that they just happened to coincide. I believe that there is a relationship between the attack on the Pentagon and the Towers and the anthrax letters. I can't prove it, but logic would indicate that there is a very strong probability that there is a relationship. We then need to ask, since we don't know who did it, what country among the rogue countries is more likely to have the capability to have been a participant in this monstrous attack.

I would like to ask each of you—and I know this is difficult, and you are guessing as a layman is guessing, more or less—what country would you put on the top of the list, Dr. Spertzel, as the most likely candidate for having been implicated in this?

Mr. SPERTZEL. I said in the very beginning, when I first heard the description of the Daschle letter, that I believed it had to be an overseas connection, state sponsorship. And like you, sir, I also found the timing to be the most fantastic coincidence that I had ever seen.

Now, having said all that, I then said I could name several possible sources, but clearly number one on my list would be Iraq. Now that has received some further credence in my mind because

either on the 19th or the 20th of September, an article that appeared allegedly written by Uday in the *Babel Newspaper* referred to a "virus that would"—the exact wording to the effect that

> "A virus would attack the raven and it would respond to antibiotics at first, but in later times, would no longer be controlled by antibiotics."

Now, that is again a horrible coincidence, if you like, on the 19th or 20th of September. And yet the first anthrax publication, or in the media or that the government knew about, was in October and, to me, that just adds further credence. And then when you combine that with the repeated contacts between Iraq personnel by some of their security agents and the al-Qaeda network, it even adds to that, as well as the three defectors that have all independently made the allegation of Iraq training terrorists, non-Iraqi personnel, at one of my favorite locations in Iraq, Salman Pak Peninsula.

Mr. LANTOS. Thank you very much.

Dr. Alibek.

Dr. ALIBEK. In my opinion, I would say this letter sent, this product could be manufactured by some terrorist groups, not by any country itself. But at the same time, what I would like to say, these people could be trained by some people with knowledge of how to develop biological weapons in another forum.

In this country it is absolutely agreed that one of these countries could be Iraq. It could be Libya or Syria. It is very difficult to say, but they have got this capability. But I wouldn't limit this just by these countries.

What we need to keep in mind is that some al-Qaeda or some other terrorist groups—let me say not highly trained experts, not very professional experts—could develop something by themselves, of course, not in the cavities of Afghanistan. In this case, what we need to look for are very different groups either supported by one of these countries I mentioned or working independently like the al-Qaeda group that has one or another cell involved in manufacturing biological weapons.

Mr. LANTOS. Ms. Harris?

Ms. HARRIS. As I said in my statement, there are three possible scenarios here. One is the rogue state scenario. And clearly Iraq would top, I think, everyone's list.

Mr. LANTOS. Would Iraq top your list also?

Dr. ALIBEK. Correct.

Mr. LANTOS. All three of you are in agreement that Iraq is the most likely source?

Ms. HARRIS. If it is, in fact, a deliberate effort by another state to inflict harm on the United States, then Iraq clearly had the most advanced biological weapons program outside of the former Soviet Union. I think, as you mentioned in your statement, if a link to Iraq, which hasn't been made yet, does eventually emerge—and I am somewhat more skeptical than Dr. Spertzel on that point—but if it does emerge, it just reinforces the importance of getting U.N. inspectors back into Iraq.

It has been 3 years since the inspectors were kicked out. We don't have as clear an idea as we should of what is happening in Iraq. And we have absolutely no capacity to stop the reconstitution

of the dual-use facilities that were central to Iraq's nuclear, chemical and biological programs. I applaud the Administration's recent efforts to give renewed emphasis to getting an inspection force into Iraq.

Mr. LANTOS. May I just ask one quick question, Mr. Chairman? I know I have overrun my time, but think it is relevant to developing this story.

Since one of the factors we decision-makers have to rely on is past history of all the rogue nations, of all the nations on the state sponsors of terrorism list, which ones have a history of using biological or chemical weapons?

Dr. Spertzel.

Mr. SPERTZEL. Well, I am not 100 percent that I know all of them, but certainly again we come back to Iraq, which used chemical weapons against the Kurds in the north. Some reasonably good evidence is beginning to accumulate to suggest that they may also have used a biological agent that is aflatoxin, although that is not definitive yet. At least Iraq is one of those countries.

And I would also like to add, if I may, that getting inspectors back into Iraq is not worth a darn unless they can go in with the kind of authority that we had up until October 1996.

Thank you.

Mr. LANTOS. Dr. Alibek.

Dr. ALIBEK. First, we suspected and still suspect that the Soviet Union, not Russia, used biological weapons during World War II. Of course we are now talking about Russia, because it is an improbability that Russia would share this information officially—I would say officially—with terrorist groups. Of course, it is highly unlikely.

Iraq is a real case because for Saddam Hussein, of course, there was no question of deploying either chemical or biological weapons. In this case, there is no moral limitation for this country, for this dictator to either use or to share biological weapons and knowledge with terrorist groups. In my opinion, it is important to know.

But additionally, I would say, when we discuss terrorist groups and especially when we say it is very difficult, for example, to deploy biological weapons, we often refer to the Aum Shinrikyo case. I would like to suggest it is not overwhelming information that Aum Shinrikyo made a significant and, let me say, dramatic mistake in that they were not able to find an avirulent strain of anthrax, they didn't test their anthrax strain, and they actually developed their weapon based on a non-virulent strain. In this case, of course, nobody would be killed; that is absolutely obvious. And we should stop using Aum Shinrikyo's impossible case to prove that biological weapons may not work.

Ms. HARRIS. Just to respond to Dr. Alibek, my point was that the Aum Shinrikyo illustrated the technical hurdles that need to be overcome by a terrorist group. And I think the Aum's failure to secure and deploy effectively a virulent strain of anthrax, simply underscores the challenges that have to be met in this area.

Responding to your question, Mr. Chairman, clearly both Iraq and Iran used chemical weapons during the Iraq-Iran war in the 1980s. There are also reports of Libyan use on a smaller scale of chemical weapons in Chad in the same time period. My prepared

statement addresses the biological capabilities of those countries. Clearly Iraq is at a different end of the spectrum in terms of its bio program than, for example, a country like Libya, where we have successfully, I think, slowed down their program through export controls and other mechanisms during the 1990s.

Mr. LANTOS. Thank you, Mr. Chairman.

Chairman HYDE. Thank you.

I would like to ask the panel collectively whether it isn't a reasonable possibility that a country that wants to manufacture weapons grade anthrax couldn't do it and hide it from many inspectors? Or is it such an undertaking that it cannot be concealed from inspectors?

Dr. Spertzel?

Mr. SPERTZEL. It depends on the scale to start with. But at a moderate scale, if they had an appropriate laboratory that was unknown to the inspectors or that the inspectors were not allowed to inspect because of restrictions placed upon them, yes, it would be possible to conduct such a program without being found by the inspectors.

And if you were to allow, as I believe the latest protocol called for, notification of the basis of a challenged inspection through the oversight panel serving Iraq, you may just as well have sent it directly to Baghdad—in which case, within 24 to 48 hours, you wouldn't find anything. You could have all the suspicions you wanted; you would not find evidence.

Chairman HYDE. Well, we know that Iran is a signatory to the Nonproliferation Treaty, and yet we know that Russia is cooperating with her on nuclear technology. And we know that the international inspectors have given Iran a clean bill of health because they can't get to the places where the development of the nuclear weapons is going on. We kid ourselves with all these paper treaties that don't have a meaningful inspection regime without having to give them a tip-off as to when you are coming or where you are going. This is worse than nothing, because it deludes you into believing you are protected.

And that is really what worries me. My nightmare scenario is a vial of very poisonous anthrax coming in a diplomatic pouch to the U.N. and just being placed in the water supply and watching the chaos that would go on.

You are shaking your head. You mean that couldn't happen?

Mr. SPERTZEL. It would be very difficult to have any significant effect by placing it into the water supply. Now if there were other means of delivering it, I would agree with you.

Chairman HYDE. How about the air conditioning?

Mr. SPERTZEL. That is a different situation.

Chairman HYDE. We will switch. That is a substitute for water. I just wanted to make a point that taking refuge behind treaties when the signatories to the treaties are determined to defeat them is worse than nothing and very dangerous.

Ms. HARRIS. Could I jump in on this point, Mr. Chairman?

Chairman HYDE. Yes, my whole line of questioning was directed to you.

Ms. HARRIS. Clearly, treaties don't provide a 100 percent guarantee of finding smoking-gun evidence of noncompliance, but we do

learn an enormous amount as a consequence of arms control and nonproliferation treaties. We get information through data declarations that supplements information we obtain through national means. We have legally binding mechanisms for being able to pursue compliance concerns. And although those on-site inspections may not produce smoking-gun evidence, you learn an awful lot going on inspections about what a country may be trying to do in a particular area. We know this from actual experience, doing inspections in Russia.

You can learn enough from these inspections to help target and guide your intelligence collection, or help focus your export controls, or inform your biodefense efforts. Inspection regimes need to be seen not as a be-all and end-all in and of themselves. Instead, those regimes and the treaties that contain the provisions for those inspections should be seen as part of a broader set of tools, the synergy of which really does advance your efforts to first characterize the nature of the threat and, secondly, be able to respond to it.

Chairman HYDE. Don't those treaties require cooperation between the signatories, so you come into my lab and you see what I am doing, and I get to go into your lab and see what you are doing; and maybe you make out pretty well on that kind of a deal?

Ms. HARRIS. Obviously, inspection requirements are almost always reciprocal. But let us be concrete here.

The Chemical Weapons Treaty and the draft protocol for the Biological Weapons Convention both contain very robust protections that enable us to safeguard both proprietary commercial information and national security information. Let me give you an example.

I know from talking to chemical industry representatives before the Chemical Weapons Convention came into force in 1997 that their biggest concern was loss of commercial proprietary information. If you talk to chemical industry representatives today, they will say it hasn't happened. The treaty has very important protections for proprietary information, and all those protections and more were built into the draft protocol for the Biological Weapons Convention.

Chairman HYDE. I have heard that some countries have developed their weapons going to school on what other countries have. Is that correct, Doctor? Are you indicating an ambiguity there?

Mr. SPERTZEL. Well, I have got to confess that I have not been overwhelmed with either the proposals being put forth for the BWC nor those implemented under the CWC. I was dismayed when I learned that under the CWC, you can go to this building, but you can't go to that building which is on the same compound.

I go back to my Iraqi experience. They tried to pull that with us, that this building of chemicals, biologists can't go in there; and what they started to do is start to move stuff from one building to another depending on which team they thought was going to arrive. And that, to me, is not very productive.

Chairman HYDE. Very well. I will move on. We could have——

Dr. ALIBEK. I have been on the Russian side when we first started discussion of visits between the United States and the Soviet Union. My personal experience was that as soon as the United States and other countries agreed just to visit some facilities, the

Soviet Union decided to start developing a completely new type of mobile biological weapons facility, which would never be detected by any inspection. When you have 48 hours for 4 inspectors just to visit one of the facilities, in my opinion it is a mockery. You would never be able to detect anything having such a short time frame because, believe me, I know how this facility could be hidden—especially if it is a small mobile facility. You can mask the facility by the production of any products.

In this case, I am not against treaties, but they must be different from what we have now. For example, could you imagine a situation where you come to Russia or China having 48 hours and four inspectors to inspect a huge facility, you would never be able to find any definitive information. This is the biggest problem.

But at the same time it gives you a wrong understanding that we are doing something against the threat of biological weapons. In my opinion, it will be a significant mistake if we sign this existing protocol developed in Geneva.

Chairman HYDE. Was there not an anthrax production facility in the then Soviet Union at Sverdlovsk?

Dr. ALIBEK. After the Soviet Union stopped developing anthrax at the facility in Sverdlovsk, it relocated its production to develop a completely new weapon in Stepnogorsk.

Chairman HYDE. We never got to inspect that. In fact, it was denied for years that it was manufacturing anthrax.

Dr. ALIBEK. That is the biggest problem. It is the principle of two sides discussing this issue and saying, we know you are developing and manufacturing this weapon. No, we didn't do this; find the proof.

In this case, what we will have is well an ongoing situation because with Russia—everybody knows about the Soviet Union, what facilities, what kind of capabilities, what kind of weapons, so on and so forth.

Has it helped us to force the Russians to admit that they headed a huge offensive biological weapons program? No.

Chairman HYDE. I am trespassing on my colleagues' time, and I don't mean to do that. I just want to ask one quick question of Dr. Spertzel, and then we will get to you; and then I will humbly apologize to my colleagues for taking the time.

Did they have mobile biological weapons manufacturing facilities in Iraq?

Mr. SPERTZEL. We did not have absolute proof that they did. At an unguarded moment, General Omar al-Saudi, who is senior advisor to Saddam, made the statement that he directed the bio group to evaluate the possibility of mobile laboratories for production purposes.

We also know that they imported three mobile production laboratories, but I don't know what the production was for. The terminology was on some documents that we obtained. So I can't say definitively they did, but we have every reason to believe they might have.

Chairman HYDE. Ms. Harris?

Ms. HARRIS. I just would like to make three points.

First, I think our inability to go to Sverdlovsk, despite concerns about the release of anthrax from a military facility there in 1979,

underscores and demonstrates very clearly why we need some sort of international, legally binding mechanism to be able to pursue concerns about evidence we have that another country is developing or producing biological weapons.

Secondly, Dr. Spertzel said that when Iraq knew we were coming to a particular building, it moved things somewhere else. That is exactly the point. We watched them move things. We used other intelligence assets to follow what was going on.

Did we know the details of what they were moving and all the particulars? No. But the existence of those inspection provisions forced the Iraqis to take steps that we were then able to pick up through our own national intelligence means.

Third, Dr. Alibek pointed out that when the Soviets knew we were going to be inspecting certain facilities, they then moved their illegal work to other types of facilities. That, too, underscores the value of inspection arrangements.

Part of what you want to try to do in arms control and nonproliferation is complicate the efforts of a cheater, of a proliferator. By forcing a country to move their production or research activities from one place to another, you make it harder and more costly for them to pursue that program.

Chairman HYDE. We have a new doctor in security and complications. Mr. Tancredo.

Mr. TANCREDO. Thank you, Mr. Chairman. I have just one quick question.

Recognizing our ability to destroy the physical plant in which these chemical and biological agents are produced of course begs the next question, and that is, can we feel secure in the knowledge that the physical destruction of the plant itself would also actually destroy the biological or chemical element that we are going after? Is there a possibility that in the destruction of the plant there is a disbursement of the element?

Mr. SPERTZEL. I think I would have to differentiate between two different types of plants, one that precedes the finished product and then one that may have the finished product. But blowing up a production facility, a fermentation plant may contaminate the local soil for some reasonable distance around, but is unlikely to create a significant aerosol hazard for exposing the populace to inhalation.

If, on the other hand, you were dealing with a stored, dry material of the nature that is rarely airborne from an explosion, where you would destroy some of the material, you would still have a significant aerosol release associated with that. There are procedures that could minimize the effort.

But to answer your question, yes, it would be possible.

Dr. ALIBEK. When we discuss biological weapons today, we need to distinguish biological weapons facilities from possible bioterrorist facilities, because when we talk about military-type biological weapons, these weapons require large production capabilities, large reactors for cultivation, large equipment for concentration, drying and so on and so forth. Military deployment is usually to deploy biological weapons in large amounts using different deployment techniques.

But when we talk about a terrorism-type of facility, could we locate it? By destroying a large production capability, we could reduce the threat of possible use of large amounts of military biological weapons. But bioterrorism threat, bioterrorism facilities, we probably need to do some work to find where they are located and how they can be eliminated.

Mr. TANCREDO. Thank you very much, Mr. Chairman.

Chairman HYDE. Mr. Delahunt.

Mr. DELAHUNT. Thank you, Mr. Chairman; and let me compliment the Chair for putting together another extraordinary panel, one that I find very informative. And also let me suggest that the Chair has, I think, focused on what I consider the fundamental issue here, which is, where do we go from here?

We can speculate as to who is responsible, whether it is Iraq or some homegrown terrorist group, as to what has happened; and hopefully our intelligence agencies and our law enforcement agencies are going to investigate this, and we will move forward. But I think the fundamental issue is the value of treaties, if there is any value in treaties—and there seem to be shades of disparate opinion.

First, Ms. Harris, I would suggest that $750 million ought not to deter us from protecting ourselves as best we can from bioterrorism or bioattacks. I would remind us all that we have spent, since September 11, in excess of $55 billion and, most unfortunately, the loss of 5- or 6,000 American lives. So let us put that in focus.

It was the Ranking Member, Mr. Lantos, who said that we should be concerned about which nations have these capabilities. Well, I would advocate the position that I would hope that no nation would have these capabilities, whether it be Great Britain or Australia or the United States. I see no good coming from those kind of capabilities. What I do see is leakage, leakage to terrorism groups, to infiltrators. I just don't think it makes any sense at all.

There ought to be a total and complete prohibition of the development in the research into these kind of weapons. They don't belong anywhere on this Earth.

But, again, to get back to the treaty issues, you seem to advocate in behalf of the treaties; and I do see your point that even if there is a violation, the activity of violation has the potential to prompt intelligence opportunities, to find out what is going on and why are those things happening. Violations would serve as a red flag to intelligence agencies to either intensify our intelligence or to take the appropriate steps, whether it be under the auspices of the treaty, or to take bilateral steps to raise this issue.

But the Chairman makes a good point. If it is just on paper, what value is it? I think it was Dr. Alibek that said, well, he supports treaties, but I guess this argument is coming down to, how do we enforce the compliance mechanism? Clearly, I think, that is the direction that we want to go in.

But let me start with you, Dr. Harris, and ask, what is your assessment of the proposal, the current protocol that I understand that the Bush Administration has rejected? And is there a protocol that meets a certain comfort level in terms of verification of compliance that you could outline or that you could imagine?

And I would ask the same question to Dr. Alibek and Dr. Spertzel, because I would be interested in seeing that protocol. I think we are making a mistake not putting forth something that we could live with.

Ms. HARRIS. Thank you, Congressman.

I should say in the interest of full disclosure that during my 8 years working on the Clinton NSC staff, the BWC protocol was one of my primary areas of responsibility. So it will come as no surprise to you that I believe that a set of legally binding obligations for countries to disclose information and to open up their relevant facilities to on-site activity is an important part of a broader strategy for dealing with the biological weapons threat.

That said, I think it needs to be understood that biological weapons pose the most difficult verification challenge of any weapon of mass destruction. If, by "verification," we mean being able to determine on short notice with high confidence that a country is violating their obligations, I am not sure that it is possible to create any international, legally binding regime that will give you a high-confidence verification capability.

What I think you can achieve and what, in fact, the Clinton Administration and our allies in the U.K. and throughout NATO, Japan and elsewhere were pursuing was a protocol that would help make it harder for cheaters to continue to cheat. The goal was to raise the risk of detection, to make continued illegal activity more expensive and more difficult, and thus try to deter it.

Today, I want to emphasize, most of the countries that are of biological weapons proliferation concern are parties to this treaty—the vast majority of them. However, there is nothing standing in their way. There are no enforcement provisions whatsoever in the 1972 treaty.

So they have a free hand. It was the judgment of many that putting in place a set of legally binding transparency arrangements, data declarations complete with the ability to go on-site, would have made it harder for cheaters to cheat, would have complicated those programs, and would have given us access to information that we could have added to our own national intelligence information about these programs. The protocol would have given us a capacity to go somewhere in Iraq or Iran, both of which are BW parties, or force them to refuse an inspection, which in and of itself would have said something to the international community about what these countries were up to.

So is verification in the traditional sense possible in the biological weapons area? Very, very difficult. But there are still important benefits to be achieved from a set of legally binding dislosure and inspection arrangements.

Thank you.

Dr. ALIBEK. In my opinion, any treaty is futile concerning biological weapons and would never protect us against bioterrorism, because there are some organization that don't sign treaties.

When we talk about countries, for example, it is possible. But in that case we are talking about real biological weapons activities that are military activities. But when we discuss biological terrorism, these facilities would be very small, tiny places you would never uncover. In this case, we need to be absolutely clear that any

treaty would never protect us against bioterrorism in terms of verification, if we developed a verification processes.

When we talk about whether or not we need to have treaties, yes, we do need to have treaties. But it must be a completely different type of treaty, in my opinion.

Again, as I said before, I come in with knowledge on both sides, in Russia and in the United States. When you have got three or four inspectors, when you have got large facility, and you have got 48-hour notice, you have got a short time. In such case, you have no time to distinguish this facility. Of course, you can have your suspicions, but you never will be able to have a definitive answer whether or not this facility is a biological weapons facility or a legitimate facility.

Just as a small example, well-known, is Iraq. We sent in many inspection teams, a lot of them. We found something. But the actual sites with programs, we started getting only after Saddam Hussein's son-in-law defected from Iraq. That was the starting point. In that case, of course, we had nearly full access to all facilities and sites within Iraq.

Could you imagine something like this in Russia or China? No, I don't think so.

Mr. LEACH [presiding]. Dr. Spertzel, could you respond briefly?

Mr. SPERTZEL. Yes, I will.

For the most part, I agree with what Dr. Alibek has said. I think it is worth adding, however, in the case of Iraq, I think that is a good example. Yes, in theory on paper we had the right to immediate access, unannounced, unchallenged. But it was a paper authority. It was not reality. Every time we approached something that had some indication that there was something there, we would know it because we would be challenged, and we would be stopped. It was just repeated. So unless there are some teeth behind the protocol, it isn't worth the paper that it is written upon.

It comes back to the question that was raised, that is, what is the enforcement mechanism behind it? And I am sorry to say, don't count on the U.N., because I think we saw ample illustration of that in the case of the Iraqi situation. From October 1996 on, we were wasting our time, and if the UNMOVIC gets back into Iraq, unless things change, it will be one of the larger criminal actions, in my opinion, fostered on mankind, because it will be a complete sham.

Mr. LEACH. Thank you.

Mr. Cantor.

Mr. CANTOR. Thank you, Mr. Chairman.

I have two questions; and I think, Dr. Alibek, the first one is directed toward you. I think before the Committee broke for the vote you had been talking about the fact that the delivery of the anthrax through the Daschle and other letters was not perhaps the most efficient way of getting the anthrax here; and I would ask you, does that in any way tell us anything about the perpetrators of this act?

Also, perhaps Chairman Hyde had talked about his biggest nightmare. What should we be trying to ready ourselves for, or perhaps take steps to apprehend individuals who might be up to trying to deliver the anthrax in a more "efficient manner"? And do you

think that a State Department-type awards program similar to that that we are offering to prevent acts of physical terrorism against our facilities would work in this field trying to track some of the biological agents and those who might try to use them against America?

Dr. ALIBEK. Yes, you are absolutely right. I said that letter-borne anthrax is the least efficient way to deploy anthrax. Why? It is very difficult to say. But I can assume that this group or this individual used this way to deliver for one or two important reasons.

First, it would be very difficult to trace mail back to find this individual, because he could be everywhere. Whether you live, for example, in California, or in Iraq, a letter is sent from one location. In this case, there is no person or individual who was at the place of deployment at the time of actual deployment. It would be very difficult to find this individual, or group of these people.

Second, in my opinion, it was accidental, or it was a major idea. They understood the American psychology, mentality. Because what they understood in this case, this deployment, as I said it before, it was not an actual biological weapon attack, it was a psychological economic attack using biological agents. They achieved something in this specific case, in my opinion.

But when we talk about some other techniques to deploy, I feel some reluctance to discuss them. But because it has been already published and discussed on TV, unfortunately, we will have many vulnerable places. It could be administrative buildings. It could be commercial buildings, and so on and so forth. We need to start thinking out of the box, in my opinion.

If there is an event, of course, we start at this point. But when the event starts going away, we start calming down. Of course, it is our past, because this past would be our future again, but in a completely different forum.

We need to do many things in terms of our preparedness, our possible response, training people, informing people, developing new treatments and so on and so forth, because there are many areas we have not covered yet.

In my opinion, I would like to repeat once again, what we haven't done yet is doing some work with Russian scientists. We started funding some Russian entities—just to keep them employed in Russia. But what we need to keep in mind, in my opinion, it is a major point. I would like to emphasize that many Russian scientists previously involved in developing biological weapons, now they are overseas, some of them in the former Soviet Union countries, some of them in the United States, in Canada, France, some in other countries. In this case, we have no idea what they are doing. We have no idea whether or not they have been reached by somebody just to sell their expertise.

But you know, just to reduce this threat, we need to develop our new program. It wouldn't be a very expensive program. But what we need to do, we need to find a way to find these Russian scientists, to invite them to the United States, to employ these scientists here in the United States. Because, keeping in mind their knowledge in many fields of biological weapon threats and biological weapon defense, we would have a significant boost in our biological weapons defense study.

Especially I would like to say, our theory about anthrax and smallpox, in my opinion, is dead wrong. Because there are many different agents that could be used in bioterrorist attacks. In this case, we need to reevaluate our understanding of the biological weapons threat. We need to develop a new concept of protection against biological weapons.

Mr. CANTOR. Thank you.

Mr. LEACH. Thank you.

Did you have further questions, Mr. Cantor?

Mr. CANTOR. No, that is okay, Mr. Chairman. Thank you.

Mr. LEACH. Mr. Schiff.

Mr. SCHIFF. Thank you, Mr. Chairman.

I very much appreciate all of your testimony today, and I agree with my colleagues.

Mr. LEACH. Withhold for a second, Mr. Schiff. We will go to a second round if you have another question.

Mr. CANTOR. Thank you, Mr. Chairman.

Mr. SCHIFF. Thank you.

Again, I appreciate your testimony. I agree with my colleagues that the anthrax terrorism is not unrelated to September 11th. I may disagree to some extent in that the fact that this is not wholly a separate event from September 11th, although it does not mean that it was a coordinated event.

I think, frankly, it is more likely that this was an opportunistic terrorist event related to the 11th in that it provided a great opportunity to enhance the terror of September 11th and bootstrap itself onto that date. Much as I would love to believe this was international, it grieves me to think that the greater likelihood may be this is domestic, and that someone born on American soil may have given this kind of aid and comfort to our enemies.

We talked a fair amount already about state sponsorship. I think you were all in agreement if there was a state sponsor, the most likely candidate was Iraq, even though their evidence is extraordinarily sparse.

I wanted to ask about a couple of things. One, if there were no state sponsor, who would the most likely organizations be without a state sponsor? And, also, if this were domestic, what would the perpetrator—what would their profile look like?

To give form to those questions, I wanted to mention a couple of things. My suspicion that this is domestic rather than international has much to do not with the quality of the anthrax, which is some of what you have talked about, but the nature of who the targets are, the somewhat haphazard nature of the attack itself, and some of the written correspondence that accompanied the attack.

And I gathered, Dr. Alibek, from your statement—and this had not been apparent to me before—that the emerging quality of the anthrax indicates someone who has been experimenting perfecting. And if that is the case and they came up with a better product which ended up being sent to Senator Daschle, the question is raised, why would they send the inferior product to some of the other targets unless, perhaps, there was not an infinite supply of anthrax.

I wanted to ask you, number one, whether that indicated not only someone who was improving their craft but also may not have unlimited access to anthrax.

I also think I heard you say that there was no uniformity in the size of the anthrax spores, indicating that it was professional but not highly professional; and I wanted to ask you, in the event that it were domestic, would someone, for example, of your training or someone else's training in a research lab in the United States be able to go out on their own, in their own basement and gather the materials necessary to produce this on their own?

Would, for example, former scientists of the Soviet Union or a disgruntled U.S. Scientist be able—in the privacy of their home—to produce what we have seen here? And also, if not, if this would require a complex lab, could a lab worker on their own within a domestic lab in the United States, without likely discovery of other workers, be able to produce this and sequester it away from the lab?

Dr. ALIBEK. There is an expression that politics is the art of the possible. And in this case I would say bioterrorism, unfortunately, is the art of the possible, too. You know what I mean in this specific case. It would depend on the equipment you have got, the strain you have got. For example, if it is a well-known, well-trained expert, but he or she or this group doesn't have sufficient equipment, the specific equipment to manufacture anthrax using regular production techniques, if this person is knowledgeable, he or she or this group would use some materials they understand could be used to manufacture not very sophisticated anthrax. In this case, there are many different possibilities.

Mr. SCHIFF. If I may just focus in on that real quickly.

Let's say you had a disgruntled U.S. researcher who had the expertise but did not have the equipment, couldn't do it within their own lab without discovery. Is there any of this equipment, other than the anthrax itself, that would be proscribed from purchase, from mail order or on-line sales? Or couldn't you assemble your own lab without anyone ever noticing by purchasing the equipment from various suppliers?

Dr. ALIBEK. Let me explain it this way. If you are an expert in biotechnology—I am not discussing what level of knowledge you have got—you need to understand what are the major parameters you need to achieve just to get a workable product.

For example, if you work with anthrax, you know what kind of parameters you need to achieve the conditions you need to have just to grow this agent. You know that you can use one type of equipment, another type of equipment, a third type of equipment or no equipment whatsoever. That is possible, too.

When you start analyzing what kind of product you want to get and how much of this product you need to get, of course, you can use a principle completely different from our process of thinking. We think by analyzing the situation from the point of what kind of equipment is needed just to manufacture this type of product.

But their process of thinking could be completely different—what kind of parameters needed just to have this product. And proceeding from this you realize very simple equipment, just regular containers for growing, bought at one——

Mr. SCHIFF. But, Doctor, to obtain the quality of the anthrax that we have seen sent to Senator Daschle, would you need any equipment beyond which you can order on the open market without causing any attention to yourself? In other words, if you have access to anthrax in a laboratory and you are able to obtain some, is there any technological or economic bar to obtaining the rest of the equipment you need to do this in your own home?

Dr. ALIBEK. You know, that is a very important point, because just to get this type of product, there is no necessity to have any sophisticated equipment. I have said this several times before this anthrax scare. It could be done if this person knows how to do this, using very simply techniques, very simple equipment, and this product could be obtained in any amount.

Mr. SCHIFF. One of the reasons that I introduced legislation a couple of weeks ago, which is a parallel of Senator Feinstein's, Senator Kyle's legislation to improve lab security in the United States, is really for exactly this point. I think the investigation thus far has revealed, number one, that we didn't know how many labs actually had it, even in this country, and that there are still not adequate safeguards to know who has it, who is working on it for what reason. Is it a legitimate research purpose?

What do you think—and I know this is very gross speculation—but if you had to speculate, if this were domestic, what would the profile be of someone with the knowledge base to do this? In other words, would it have to be someone who had experience in a weapons program? Could it be somebody who simply worked at a university laboratory doing research? Given the quality of what has been produced, what do you think the profile would need to be?

Dr. ALIBEK. It's very difficult to answer this question because I am not an FBI agent or expert in psychology, but just——

Mr. SCHIFF. I don't really mean——

Dr. ALIBEK. As a regular citizen, if I may, with some knowledge in this field, I would imagine somebody who has some knowledge in this field, not necessarily in the field of anthrax, but not a person who was not trained at all. I am talking about the lowest level of expertise. It could be a lab technician. It could be a technician working at one of the hospitals. It could be a technician working at one of the companies or even somebody who worked before, many years before, in this field.

But what is important in this case, is to get some information on how to do this. Recently, there was a publication in the New York Times that one individual from Utah was selling some manuals on how to make anthrax. When this manual was analyzed, it was absolutely obvious to me that it was a primitive process, but it was a workable process. In this case, if somebody bought this manual and has some knowledge, has some time and training, this person would be able to develop this product. It would take some time, but especially by paying attention——

There were two different products. First product was not very sophisticated and contained many vegetative cells, and second one was more sophisticated. It could mean that there was some sort of training process, some time for getting smart for this group or this individual, just to go from a less sophisticated product to more sophisticated product.

Mr. SCHIFF. Mr. Chairman, if you will indulge me——

Mr. LEACH. I'll tell you what. I would prefer, Mr. Schiff, because you have gone 15 minutes, that I address some questions. Mr. Delahunt has some questions. And we will come back to you.

Mr. SCHIFF. Thank you, Mr. Chairman.

Mr. LEACH. Let me go into a little bit of history, if I may.

In 1969, when President Nixon unilaterally decided that the United States should not pursue a biological weapons development program, he did it based upon a scientific panel that was constructed which came to the conclusion that it was much too dangerous to experiment with this, even in this most sophisticated country in the world. I raise this because there came to be a Biological Weapons Convention of 1972, of which I was a member of the delegation and negotiated.

From a simple moral perspective, it is inconceivable to me that any moral scientist anywhere would attempt to experiment with biological agents. And I stress this because the simple morality is that these agents can be too easily escape from a scientific enclave and if used can too easily backlash on the entire world community.

Now, I again raise this because the subject has been raised of scientists for hire. I think it is very impressive that there has been very little evidence of this. And sometimes we think about trying to hire people to avoid things. But I think a Russian patriot would be unlikely to want to participate at any price with another country in this venture, because they would know the implications of it. In fact, there are some stories of Russian scientists going 6 to 8 months without pay.

So sometimes when we think about ways to assist, and I think we can—for example, by hiring scientists in as constructive a way as possible, but we ought to do it with great respect that no moral scientist would enter this field.

But I want to go into something that I wanted to ask you about, Dr. Alibek. The 1972 convention was the Biological and Toxic Weapons Convention. By 1979 there was growing evidence that toxic weapons were being used and toxins being biologically derived from dormant agents in Southeast Asia, and then some indications possibly later in Afghanistan, agents that came originally from the Soviet Union. Would you have any knowledge of this? Can you speak on that subject, the subject of yellow rain?

Dr. ALIBEK. I have been asked this question many, many times; and, unfortunately, I cannot provide you with any conclusive information saying that there was no such yellow rain. I came to work for this program in 1975, and I have never heard about any microtoxin weapons developed by the Soviet Union. And, here in this case, I cannot say yes or no because there were many different enterprises involved in the research and development of biological weapons. Something could have been done by the Minister of Agriculture. But I cannot say that there was yellow rain, and the Soviet Union used this biological weapon in Southeast Asia.

Regarding using biological weapons in some other places, I cannot say I do know this, because it was not official discussion between some minister of defense officials of the Soviet Union and myself. One of them mentioned that Glanders biological weapons were used in Afghanistan. It was just on one occasion, I would say.

But what results they obtained they had no idea, because they used Glanders in some remote locations of Afghanistan.

Mr. LEACH. The term is Glanders? Could you spell that?

Dr. ALIBEK. G–L–A–N–D–E–R–S. You know, it is a bacterial infection. It is not highly lethal, but lethal enough. And mostly it is an infection.

But to address your statement regarding moral issues, the different moral issues, in my opinion, it is a very important statement. But, we shouldn't make a mistake, because when we talk about scientists, we usually refer to scientists working in the West.

And you know the scientists here in the West probably would feel it morally unacceptable to being involved in any, let me say, bioterrorist activity or biological weapons activity. But we shouldn't apply American moral ethical standards to any other countries, like some Middle East countries, and scientists in the Middle East or scientists of the former Soviet Union.

I don't want to accuse anybody. But, for example, using my own knowledge in the Soviet Union, this was not the case. Okay. We understood that there was no such program in the United States, that it was terminated in 1969. But even after that, when we found out that there was no program, many Russian scientists still believe that they have done something very important. They have no psychological problems. They have no moral problems. They have no ethical problems. They are proud, and they consider themselves as veterans of the Soviet Union.

Mr. LEACH. Well, thank you. That is very thoughtful.

Let me turn to the more immediacy of the present. Several days ago the New York Times reported that the very high concentration of anthrax spores in the Daschle and Lahey letters suggested that possibly this came out of a United States biological laboratory. Do you agree this concentration level could or could not have been achieved by Iraq?

Dr. ALIBEK. First, I wouldn't overestimate this finding. The problem is this.

First, I don't believe it was possible just to have one gram of this product, to measure the actual concentration in one gram. In my opinion, it was a matter of recalculation of the count. When experts find some particles of this product, what they usually do, they measure size, then they calculate how many spores this particle could house, then multiply this amount in just such a way to find out how many spores would be in one gram of such formulation.

In my opinion, there is a significant technical mistake here. You cannot directly transfer this number to one gram, because if you count a number of spores in several particles, even knowing the size, the problem is when you have one gram of those particles, you would see a huge number of empty spaces between the particles. In this case, the real concentration in one gram would be completely different—it wouldn't be 1,000 spores.

There are many other factors, but because of time limits I will not elaborate. But I will say there is no evidence that this product was obtained using American production techniques.

Mr. LEACH. Dr. Spertzel, would you care to comment? In your opening statement you indicated you thought it was quite possible

that this could have come from a country like Iraq. Is that your basic feeling?

Mr. SPERTZEL. Yes, it is. Iraq basically used a two-step process in the fermentation procedure which enabled them to get 100 percent spores from their material. And by a slight tweaking of that system you can increase the production level by a couple of orders of magnitude higher than what Iraq claims that they got. So, basically, they can start out with about 10 to the 11th before they dry it, and the drying process should increase it by about another load. At least that appears to be the situation.

Beyond that, we don't know—what Iraq has acknowledged that they got was much lower than that.

The other way that Iraq can attain this is by preparing anthrax stern stream vaccine by growing the material on the surface of auger plates. Going with this procedure, you would in fact have no trouble getting to 10 to the 12th concentrations.

Mr. LEACH. You also noted in your prepared statement that Iraq does not mill anthrax, but rather uses a spray drying process. Does this process produce anthrax with different characteristics than the milled anthrax, and does this give any indication of whether or not the anthrax that we have seen may or may not have come from Iraq?

Mr. SPERTZEL. As Dr. Alibek has indicated, and I believe, both the U.S. and Soviet Union milled theirs. Iraq did not. I don't know whether the Daschle product has been milled or not. It is my understanding, but this is unofficial, that it doesn't show the kind of evidence that you should be able to see that would indicate that it was milled. But that doesn't mean this necessarily points specifically to Iraq. It may be an arrow pointing in that direction.

But, again, as Dr. Alibek has already indicated, there are some other procedures whereby you can dry small product, small quantities, and not use a milling device in doing so.

Mr. LEACH. Well, finally, relating back to your prepared statement, you indicated that Iraq used Bentonite in its production of biological weapons and may have attempted to use silica. How does this relate to the anthrax that was mailed here in the United States, and are there any hints in that direction that ought to be looked at?

Mr. SPERTZEL. Well, it has been reported—in fact, it initially was reported that there were signs of rings around the particles that suggested they were similar to those rings seen in the one sample that we brought back from Iraq that contained Bentonite.

On the basis of not finding alumina in further analysis, it was concluded that this was not Bentonite. That may or may not be true, because there are procedures—in fact, there is pharmaceutical material being prepared that contains only trace amount elements of alumina because alumina has been extracted from Bentonite.

But, in addition to that, as I have indicated in my written statement, Iraq made serious efforts to obtain silica, pharmaceutical grade silica, in 1988 and 1989. In that era, had they tried to get it, I see no reason that they would not have been successful, because there was no prohibition of any kind against selling this type of material.

Mr. LEACH. Just one final follow-up in this category. What do we know about the medium in which the anthrax sent through the mail was grown? And was a similar medium used by Iraq or other countries?

Mr. SPERTZEL. As far as I know, we don't know anything about the media upon which this was grown. Iraq does not particularly use an unusual form of media. They used either a nutrient broth or a tripsum soya broth, both of which are readily available anywhere, as the initial growth component. They would then transfer a portion of that into their final production which contained much less energy, a so-called modified G media.

But, I would not expect evidence of this media to adhere in sufficient quantity to be indicative one way or the other, and particularly if they washed the spores, which they may or may not have done.

Mr. LEACH. Thank you.

Well, let me just conclude, before turning to Mr. Delahunt, one other aspect. I mentioned earlier the morality of experimenting with this sort of thing. In our country we have a great curiosity factor among young people and older people with new theories of logic and science, and I just think it has to be stressed, even though some Americans in college have literally attempted to build atomic bombs, that there is no area whatsoever that it is more dangerous to try to experiment with than to make one of these kinds of weapons or to develop an anthrax or any other disease, and it is a place where curiosity must stop.

It is not only immoral, it is illegal under our law and under international sanctions. There should be no temptation whatsoever to stretch the imagination for anybody anywhere to try to develop those kinds of things.

Mr. Delahunt.

Mr. DELAHUNT. I thank the Chair for indulging me. I would like to associate myself with your final observation. I think it is important that it be emphasized.

Just very briefly—and I thank you for your patience—I want to make sure I am reaching the right inferences. In the hypothetical scenario that Mr. Schiff put forward relative to Utah, I drew the inference that it can be done even in a very primitive way. But if we were to look at either individuals or terrorist organizations, their resources, their capacity to weaponize, whether it be anthrax or other weapons is somewhat limited. That it really is a nation state, whether it be Iraq, the Soviet Union, the United States, whomever, that would have the resources to provide a level of sophistication in terms of the development of these things, these items, to the point where they have a very high degree of deadliness with the potential to impact a large percentage of the population.

So we can make a distinction between groups like al-Qaeda, individuals, someone like the Unabomber, versus the capacity of nation states. Am I being accurate with that conclusion?

Mr. SPERTZEL. Yes, I think so. I am personally not a believer in the mad Unabomber-type situation. Because, while you may not need the equipment, it does have to be done with some degree of safety, not necessarily for yourself. If you are the perpetrator, you

can find ways of protecting yourself, albeit cumbersome, while working on this. But you don't want to give yourself away either.

Mr. DELAHUNT. But the point is, as Dr. Alibek indicated, you know there are manuals out there, how to do it. And I understand it is primitive. But I think you have answered my question, and I don't want to indulge any more.

Mr. SPERTZEL. If I may. The critical part of this is not in growing the organism. The critical part is making that final dried product. And that is what, I contend, tends to rule out or argues against—not ruling out, argues against the home-grown terrorist, unless you envision somebody who is working and operating not in his garage, not in the basement of his house, but in isolation maybe in the western desert, where there is nobody around him for 50 or 100 miles.

Mr. DELAHUNT. In a more sophisticated environment.

Let me just ask one final question. Back to the enforcement and compliance mechanism of treaties, let's presume that we could design and develop a mechanism that would meet all of your concerns. What would you recommend or suggest as sanctions for failure to comply? Because I think that the United States has lost or is losing the argument in terms of world opinion regarding sanctions on Iraq for failure to comply with that particular United Nations resolution.

Would there be or could there be a series—and I will direct this to Ms. Harris to begin with, and then you, Dr. Spertzel—a sanctions regime that would be invoked automatically for failure to comply? Let's say, for example, the denial of a visit to a particular site? Or am I just going off into some area that it just can't happen?

Ms. HARRIS. Congressman, I think that most countries would be reluctant to agree in advance to an automatic sanctions regime in which this particular activity would result in that particular penalty. For a variety of foreign policy reasons, countries prefer to retain flexibility in how to respond to situations. So I think automatic sanctions are very unlikely.

What I think we do need is more of a debate about the types of responses that would be appropriate to given events. Clearly, if a country used biological weapons on a large scale, the response should be much more robust and direct and painful than if you were looking at a violation of a different type.

We need to think more about sanctions and how to tailor sanctions to the specific nature of the violation. But I am skeptical that countries would agree in advance.

Mr. DELAHUNT. Well, what about even a mechanism that required a transparent debate about what would be an appropriate assessment? In other words, don't put the onus on the United States, for example, in the case of Iraq. But put it in a forum that it is not a mandated—for example, it is not a mandated violation but that it becomes subject to an open process and one that results in a meaningful sanction. I think we have got to think out of the box a little bit on this.

Ms. HARRIS. I agree with you, sir. But I think the starting point has to be an ability to pursue concerns about violations before you

can get to the point of saying, here we have the evidence, and let's talk about how to respond.

So the first step has got to be to try and construct a regime that makes it harder for countries to pursue these kinds of capabilities and gives you some prospect for being able to pursue concerns when you get information from your own intelligence means.

We simply don't have that capability today. And the proposals that the Bush Administration has brought to Geneva that are being discussed this week won't get us there either.

Mr. DELAHUNT. Thank you.

Mr. SPERTZEL. I don't mean to sound terribly fatalistic, but maybe that is what I am. I personally don't believe that there is anything beyond replacing them that you can do to a truly rogue regime that doesn't care what happens to its people. Because Saddam could have had the sanctions lifted a long time ago if he would have only complied with the inspection system. But he doesn't care.

Now, furthermore, those sanctions on Iraq are not half as effective or maybe even a quarter as effective as what the general population, the world population, believes they are.

We used to inspect the central distribution point for vaccines, antibiotics, and other medications that Iraq was claiming that they couldn't buy because of the sanctions regime, and these were going out of date sitting on the shelves not being distributed. Why? Because it did not suit his public relations aspect, and he didn't care what it did to his people.

If you have a rogue state of that nature, I don't know what you can do to it. And if you don't have something that basically is enforceable on the people who don't comply, that is, if you have a sanctions regime and you find that Russia or France or China is violating that sanctions regime, unless you can bring some kind of a punitive effort against them, you can't enforce it; and that is exactly what we have seen with Iraq.

Mr. DELAHUNT. Thank you.

Mr. LEACH. Thank you.

Mr. Sherman.

Mr. SHERMAN. Thank you, Mr. Chairman.

Just a quick comment about the Iraqi regime's sanctions. I think we have probably saved millions of people by requiring that the money that Iraq gets for selling its oil goes into a fund which can be used only for food, medicine, et cetera. I am confident that if Saddam Hussein was allowed to spend that money on anything he wanted, perhaps nothing would be spent on food and medicine, and it would all be spent on palaces and on his weapons development program.

The phenomenal failure of the United States to explain that to the rest of the world is kind of shocking for a nation that is able to make sugar water with bubbles and call it Coca-Cola and sell that around the world for a hundred years. So our ability to explain ourselves in one area is considerably greater than another.

I am going to ask a question or two that go beyond the exact scope of these hearings, but when I have such a learned panel I would like to take advantage of it.

All of the anthrax that has been detected in the United States, is it all the Ames strain?

Mr. SPERTZEL. You mean in terms of?

Mr. SHERMAN. The recent terrorist actions.

Mr. SPERTZEL. As far as I know, they are Ames-like.

Mr. SHERMAN. Ames-like.

Mr. SPERTZEL. I am not that certain. They have not yet performed a complete genetic profile, and until that is done you cannot say that it is identical to what I prefer to call the Ames isolate. Because, in fact, Ames-like anthrax is found throughout much of the western states. I believe the outbreak in cattle in Texas in the year 2000 and in California in year 2001 I believe is an Ames-like strain.

Because early on, in this current letter situation, it was announced that what they had found was a strain that was similar to one isolated in Iowa in the 1950s, as well as being found in Texas and Haiti.

What I am getting at is, unless you do a complete genetic profile and make the comparison, Ames-like strains can be found many places.

Mr. SHERMAN. And how long does it take do this complete genetic profile? Should we assume that that is being done at each—I see your colleagues nodding her head. But how long does it take to do this complete genetic analysis?

Mr. SPERTZEL. It is my understanding that it is being done. I am not certain how long it takes. I am not a molecular biologist. I cannot answer your question.

Mr. SHERMAN. I believe in addition to the anthrax terrorism in the United States, there has been one international letter that went from Switzerland to South America, not to mention a few other rumors that I believe have all been disproved. Do we know whether that was Ames strain? And I realize this is out of the scope of this hearing and not what you came here to discuss.

Mr. SPERTZEL. According to what I have read in the newspapers, CDC has said it is not the same as the Daschle material and the New York Post material. They did not say whether it was a vaccine strain or a pathogenic strain. It is just different.

Mr. SHERMAN. Shifting back to Iraq, if Saddam Hussein agreed to the most wide-open type of investigations and inspections, that the inspectors could go anywhere and look at anything anywhere in Iraq, would we be able to stop a determined effort to develop bioterrorist weapons simply because the United Nations had been granted that kind of carte blanche inspection?

Mr. SPERTZEL. Not necessarily. As Dr. Alibek has indicated, the quantities that would be needed—and I am really not even talking about grams, so you could go up to even a half kilogram or kilogram—to produce that kind of quantity would not take a particularly large facility. It would have to have safety conditions that would confine the spores so that they would not reveal their presence.

But, again, with detection methods for bioagents, field detection methodologies are not that good. So you would actually have to visit the site and be collecting samples to go back to the laboratory, which means you would have to have some evidence, probably some intelligence guiding you, to get there.

Mr. SHERMAN. So you would inspect the laboratories that you knew were places where this work could be done, but if somewhere in a Bagdad suburb a new laboratory was created, you wouldn't know to go look there, and you can't very well knock on the door of every suburban home surrounding Bagdad.

But I see Ms. Harris also may have a comment.

Ms. HARRIS. Could I just jump in here, Congressman?

Clearly, if U.N. inspectors had unlimited access to any facilities they wanted, you couldn't have a hundred percent guarantee that you would stop the Iraqi BW program. I agree with Dr. Spertzel on that point.

But if you did have very robust inspection rights in Iraq, coupled with ongoing monitoring of the dual-use facilities that have been central to Iraq's biological weapons program in the past, or that could be used in the future for biological weapons efforts, I think this would substantially degrade Iraq's capabilities in this area and, therefore, reduce the threat to us and to our friends and allies in the region.

So I think it is important that we not look at this in black-and-white terms. The fact that you can't catch everything doesn't mean that having an inspection presence and, most importantly, ongoing monitoring of the dual-use facilities, won't have a major security benefit for us in terms of the BW threat.

Mr. SHERMAN. Is there certain equipment that is needed where there are limited numbers of that item of equipment in Iraq and we know where each one of those items of equipment is, that dual-use facility perhaps?

Mr. SPERTZEL. Well, one of the principles behind the monitoring regime that we had established was based on equipment and technology know-how. We had developed quite an extensive list, a rather broad list, and any facilities that had any item of that list of equipment were required by Iraq to be declared.

That didn't mean they always did it. In fact, we were continually finding, right up through 1988, new items of equipment that had never been declared. We always perceived monitoring not as a prohibition absolute but rather as a deterrent, that they would be playing a game of roulette and risk being caught.

But that only applies to either the known facilities that you as a monitoring regime know about or that the country has voluntarily seen fit to declare, and we have ample evidence many times over of new facilities that were not declared. In fact, one of those was actually the nearest thing to a high containment facility that Iraq had, and they never bothered declaring it. We stumbled on it accidentally in either late 1996—I believe it was early 1997.

Mr. SHERMAN. Thank you.

I thank the Chairman for his indulgence.

Mr. LEACH. Thank you.

I wanted to leave with just one thought about treaties, and for some reason it never gets addressed.

I think it is self-evident that treaties in this area cannot be comprehensively perfect on evil countries. On the other hand, to the degree that they serve as a deterrent as part of international law, they make it more difficult for evil countries, but they also may make it less likely that a quasi-difficult country might develop

these weapons. And it is in the interests of the United States and the world community and civilization in general not to have these weapons developed in quasi-difficult countries or in countries that generally follow the rule of law; there are some stunningly dangerous. So that, in and of itself, is a plus.

With regard to the truly evil country, it also serves, when you have international legal regimes established, as a basis for actions against those countries. So whether they be sanctions that may or may not be perfect or whether they be interventions that may or may not be difficult, there is a case that is always profound for developing international agreements, and I think arguably in this area, above any other conceivable area, because these weapons have the potential capacity of destroying mankind, and that has to be understood. Plagues can be developed for which there may not be a perfect antidote, and so we all have an obligation to be profoundly alert to this particular issue. And it happens in a very minor way, that it has been evidenced to date.

Finally, let me just say that, as I understand it, the good news about anthrax is that it is incommunicable. The bad news is not quite like nuclear isotope where you have a 10,000 year half-life. These spores do last, though, for decades, if not longer and, in perfect circumstances, for very, very much longer. So anthrax is not a very happy circumstance. But there are more unhappy ones that are conceivable, and that is the basic realm we are dealing with.

In any regard, I want to, on behalf of Chairman Hyde, thank all of you. You have been exceptional witnesses, and the Committee is very appreciative for your testimony.

The Committee is adjourned.

[Whereupon, at 1:25 p.m., the Committee was adjourned.]

APPENDIX

MATERIAL SUBMITTED FOR THE HEARING RECORD

PREPARED STATEMENT OF THE HONORABLE DONALD M. PAYNE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. Chairman, I thank you for calling this hearing today on the very important issue of Russia, Iraq and Other Potential Sources of Anthrax, Smallpox and Other Bioterrorist Weapons. I appreciate the opportunity to address this subject.

I, like all of my colleagues who are here today to address the deadly anthrax and related viruses, am concerned about the acquisition of and capability to produce biological weapons. I am especially concerned about their potential to affect our nation, our citizens, and our way of life, and want to express my deep concern over the possibility that biological agents could find their way into the hands of rogue nations or terrorists.

Realizing that the potential for leakage of agents, material, equipment and technology to produce biological weapons to terrorists from several former states of the Soviet Union (including Russia, Kazakhstan , Uzbekistan) and from Iraq, and realizing that Russian defectors in the 1990's revealed that the Soviet Union and subsequent Russian governments violated the 1972 Biological Weapons Convention (BWD) by developing and maintaining the world's largest offensive biological weapons program, we have a lot to be concerned about.

My concern is further heightened by the fact that most public information on the Iraqi biological weapons programs comes from the now-defunct United Nations Special Commission (UNSCOM) which, from 1991 until Iraq banished international inspectors in December 1998, UNSCOM sought to locate and verify the destruction of Iraq's nuclear chemical, and biological weapons programs.

It is frightening to know that although UNSCOM sought to locate and verify the destruction of Iraq's nuclear, chemical, and biological weapons programs, its officials were never satisfied that they discovered the full extent of the Iraqi biological weapons program, and strongly suspected that Iraq retained a significant covert biological weapons capability.

It is very important that the Committee closely examine the implications of this new terrorist threat, which has affected us all, in ways that none of us could have ever imagined.

Mr. Chairman, I look forward to hearing the testimony of today's witnesses, in hopes that we can come to grips with this situation, as soon as possible.

PREPARED STATEMENT OF THE HONORABLE EARL BLUMENAUER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. Chairman, I congratulate you and Ranking Member Lantos for organizing this hearing. It is an important topic that warrants our discussion at this time in our quest to assure the safety of U.S. citizens.

The use of biological weapons dates back centuries. In 1346, for example, the bodies of Tartar soldiers who had died of the plague were thrown over the walls of the besieged city of Kaffa (now Fedossia in the Crimea) to infect the populace within. In the 1767 French and Indian War in North America, both the English and French used blankets infected with smallpox to spread the disease among the native population.

We mourn the deaths of the five individuals who have been killed here in the United States this fall by anthrax. In order to carry out their attacks, the perpetrators of these heinous crimes needed the dangerous strains of anthrax with the extraordinarily high concentration of deadly spores. They also needed technological ex-

pertise. There are actions we can take to restrict access to these weapons and the technology necessary to use them and therefore minimize the risks of bioterrorist attack.

We certainly need to identify any weak links in our system here that could allow dangerous substances to be accessed by the wrong people. We need to institute strict federal controls and inspections of any biowarfare materials, including those used for research.

A good health care system, as well as an effective disease detection and medical response program, are the primary requirements in a country's bioweapon protection strategy. These should be coupled with resources for intelligence, anti-terrorism, civil biodefense and emergency programs.

However, no single government will be able to totally protect its citizens from the nightmare of biological terrorism or warfare by these means alone. Multi-level and interlinked national and international strategies are required. Countries must exercise the political determination to establish and enforce stringent multilateral controls on the transfer of biotechnology, and must protect the absolute international prohibition on biological weapon development and use. The best defense against a biological weapons attack is to prevent terrorists or rogue states from acquiring bioweapons or their components in the first place.

On the international level, in order to better protect ourselves, the U.S. should provide greater support for the Nunn-Lugar program and other similar programs, and we need to support the mechanisms agreed to by a multilateral group to ensure effective verification of the Biological Weapons Convention.

During FY94–99, the U.S. provided about $20 million for the Departments of Defense, Energy, and State for alternative and collaborative research projects. Included among these is the Nunn-Lugar Cooperative Threat Reduction (CTR) program, established by Congress in 1991. It authorizes the use of Defense Department funds to assist with the safe and secure transportation, storage, and dismantlement of nuclear, chemical and other weapons in the former Soviet Union. We funded the CTR program at $443.4 million last year. It is an excellent investment and we should do more.

Another important program I want to mention is the Civilian Research and Development Foundation, a nonprofit charitable organization that encourages opportunities for former weapons scientists to transition to productive civilian research. It is funded in the State Department at $16 million this year, $1 million more than its FY01 budget.

The fifth review conference of the Biological Weapons Convention (BWC) in Geneva, Switzerland will conclude this week. This conference is considering a proposal for developing legally binding verification measures. The U.S. has opposed the mechanisms agreed to by a multilateral group that would ensure effective verification. Just as the U.S. expects international cooperation in its war on terrorism, so too should the U.S. be a partner in non-military, practical international measures like this that would slow the spread of dangerous biological weapons.

The BWC, a multinational disarmament treaty to ban the production and use of biological weapons, was completed during the Nixon Administration. The treaty entered into force in 1975, without an agreed-upon means to verify compliance. In 1994, after evidence of treaty violations by Iraq and the former Soviet Union, parties to the treaty met to discuss creation of legally binding verification measures. Over the past seven years, 22 meetings have been held. Yet, today, there are still no monitors traveling the globe, checking to see that dangerous substances are accounted for, securely stored and being used only for legitimate purposes.

Over the years, the group meeting to strengthen the BWC has disagreed over compliance measures, the issue of cooperative exchange of biotechnology and materials, and export controls. However, by last spring, most nations other than the U.S. had agreed to a draft protocol. The U.S. has continued to resist inspections as being burdensome and risky to U.S. pharmaceutical and biotechnology firms that fear the theft of trade secrets. The Department of Defense believes that, without the presence of U.N. inspectors, Iraq may have reconstituted its BW facilities and again begun covert BW production. Despite that, the Bush Administration has rejected a draft verification protocol now being concluded by Convention Parties.

I hope that the time will come to give real teeth to the Convention. We must not squander these review conferences.