HOMELAND SECURITY RESEARCH AND DEVELOPMENT AT THE EPA: TAKING STOCK AND LOOKING AHEAD

HEARING

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS

COMMITTEE ON SCIENCE

HOUSE OF REPRESENTATIVES

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May 19, 2004

HOMELAND SECURITY RESEARCH AND DEVELOPMENT AT THE EPA: TAKING STOCK AND LOOKING AHEAD

WEDNESDAY, MAY 19, 2004

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to other business, at 9:35 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Vernon J. Ehlers [Chairman of the Subcommittee] presiding.

COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

Homeland Security Research and Development at the EPA: Taking Stock and Looking Ahead

Wednesday May 19, 2004

2:00 PM – 4:00 PM
2318 Rayburn House Office Building (WEBCAST)

Witness List

Dr. Paul Gilman is the Assistant Administrator for the Office of Research and Development at the U.S. EPA.

Dr. Penrose (Parney) C. Albright is the Assistant Secretary in the Science and Technology Directorate at the Department of Homeland Security (DHS).

Dr. Charles E. Kolb, Jr., is the President and CEO of Aerodyne Research, Inc., and was a member of the National Academy of Science's (NAS) panel that reviewed EPA's Safe Buildings Research Program.

Dr. Gregory B. Baecher is a Professor and Chairman of the Department of Civil and Environmental Engineering at the University of Maryland. He was a member of the NAS panel that reviewed EPA's Water Security Research program.

HEARING CHARTER

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS

COMMITTEE ON SCIENCE

U.S. HOUSE OF REPRESENTATIVES

Homeland Security Research and Development at the EPA: Taking Stock and Looking Ahead

WEDNESDAY, MAY 19, 2004
2:00 P.M.—4:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

1. Purpose

On Wednesday, May 19, 2004 at 2:00 p.m., the Subcommittee on Environment, Technology, and Standards of the House Science Committee will hold a hearing on the homeland security research and development activities of the Environmental Protection Agency (EPA).

The hearing will focus specifically on two EPA research programs: one focused on improving the security of the Nation's critical water infrastructure and the other one focused on methods to decontaminate buildings that have been exposed to chemical or biological agents (such as anthrax and ricin). Both programs are housed in EPA's Homeland Security Research Center (HSRC), which EPA established in 2002 and plans to discontinue at the end of Fiscal Year 2005 (FY05).

The Subcommittee wants to better understand how these programs are working, how they are coordinated with the Department of Homeland Security (DHS), and the rationale for the proposed budget cut to the building decontamination program. The National Academy of Sciences (NAS) recently reviewed these programs and was critical of, among other things, EPA's focus on short-term research needs to the exclusion of needed long-term research.

The hearing will address the following overarching questions:

- What is EPA's role in homeland security research and development?
- How does EPA set short- and long-term priorities and coordinate its building and water research with DHS and the private sector?
- What recommendations has the NAS made to EPA on its building and water security research, and how has EPA responded to those recommendations?
- Why does the Administration's FY05 budget propose to eliminate funding for EPA's Safe Building Program? Who is expected to carry out this research in the future?

2. Witnesses:

Dr. Paul Gilman is the Assistant Administrator for the Office of Research and Development at the U.S. EPA.

Dr. Penrose (Parney) C. Albright is Assistant Secretary in the Science and Technology Directorate at the Department of Homeland Security (DHS).

Dr. Charles E. Kolb, Jr., is the President and CEO of Aerodyne Research, Inc. He has served on a variety of NAS panels and was a member of the panel that reviewed EPA's Safe Buildings Research Program.

Dr. Gregory B. Baecher is a Professor and Chairman of the Department of Civil and Environmental Engineering at the University of Maryland. He is a member of the NAS Water Science and Technology Board and the Board on Infrastructure and the Constructed Environment. He was a member of the NAS panel that reviewed EPA's Water Security Research program.

3. Brief Overview

- *EPA's Roles and Responsibilities:* EPA has long-standing statutory responsibilities for responding to emergencies involving releases of industrial chemicals and some radiological materials. Supplemented by recent Homeland Security legislation[1] and numerous Presidential Homeland Security Directives since 1995,[2] EPA has been assigned a variety of roles in detecting and responding to chemical, radiological, or biological threats to the water, air, buildings, and food and agricultural systems. For example, EPA has been named the lead agency for building decontamination, a responsibility which includes developing standards for when is it safe to re-enter a building. The agency also has lead responsibility for water systems security, and plays a supporting role for agriculture and food security.
- *Creation of the Homeland Security Research Center:* To respond to its growing homeland security research responsibilities, EPA consolidated its homeland security research programs into a Homeland Security Research Center (HSRC) in September, 2002.[3] HSRC's management and core staff operate out of Cincinnati, OH, although many other agency personnel are affiliated with the center. The goal of the HSRC was the rapid production of technical information, guidance and risk assessment tools to support the prevention, detection, containment, and decontamination of chemical and biological attacks against water systems and buildings. Much of the research is supported through extramural contracts. EPA originally planned the HSRC as a temporary organization that would be discontinued at the end of FY05. The original rationale for establishing a temporary center was to avoid a protracted internal organizational fight that might occur if the HSRC was viewed as a permanent entity and to begin research as soon as possible. However, given longer-term research needs, EPA is now considering whether to extend the life of the HSRC.
- *HSRC Organization:* The HSRC is organized into three major program areas: (1) the Safe Buildings Program focuses on protection of building occupants in the event of contamination with chemical or biological agents and the various stages of building cleanup, which include detection, containment, decontamination, and disposal; (2) the Water Security Research Program focuses on preventing, detecting and responding to contaminants intentionally introduced into water supply, treatment, and distribution infrastructures; and (3) the Rapid Risk Assessment Program develops information systems, risk estimates, and risk communication tools for first responders and operators of buildings and water systems. The Center also supports five Environmental Technology Verification Centers (ETVs) that verify the performance of technologies that can be used to decontaminate and monitor environments in buildings and water systems.[4]
- *DHS Roles and Responsibilities:* DHS has overall responsibility for coordinating federal homeland security R&D, including water security and building decontamination research. It coordinates with EPA through informal interactions and interagency working groups and carries out research intended to compliment the research that EPA carries out as the overall lead for building decontamination and water security. For example, DHS has focused its water

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[1] *The Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (Public Law 107–188) directed EPA to undertake research and support vulnerability assessments for drinking water systems.

[2] Presidential Decision Directive (PDD) 39, *U.S. Policy on Counter Terrorism* (1995); PDD 62, *Protection Against Unconventional Threats to the Homeland and America Oversees* (1998); PDD 63, *Critical Infrastructure Protection* (1998); Homeland Security Presidential Directive (HSPD) 5, *Management of Domestic Incidents* (2003); HSPD 7, *Critical Infrastructure Identification, Prioritization and Protection* (2003); HSPD 9, *Defense of United States Agriculture and Food* (2004); HSPD 10, *National Biodefense Strategy* (2004).

[3] EPA also established several new offices and reorganized others. In addition to establishing the HSRC, EPA created an Office of Homeland Security in the Administrator's office to advise the Administrator and coordinate Agency-wide activities, and a new division for Water Security in the Office of Water. It also consolidated emergency response and preparedness functions in the Office of Solid Waste and Emergency Response to create an Office of Emergency Prevention, Preparedness and Response.

[4] These centers are run by a variety of organizations, including Battelle National laboratory and NSF International (formerly known as the National Sanitary Foundation, a voluntary standards-setting organization). To date, the five verification centers have reviewed or are reviewing more than 35 technologies in such areas as cyanide water detectors, rapid toxicity testing, chemical air detectors, air ventilation filters, and building decontamination technologies.

security and building decontamination programmatic priorities on worst-case scenarios that could result in very large numbers of casualties (thousands, or tens of thousands), such as determining what and how biological or chemical agents could lead to high-casualty incidents. It also has focused on developing and testing protocols to improve overall system response in case of an event and on technologies for detection and decontamination where it has unique expertise.

- *National Academy of Sciences Studies:* In 2003, at EPA's request, the NAS convened two panels—one to review EPA's research agenda for its water security research program and the other to review the agenda for the Safe Buildings Program. Specifically, EPA asked the Academy to assess whether EPA's plans identified the most important research questions, and, if not, what research should be added. The agency also asked whether EPA's water security and building decontamination research was appropriately prioritized. Both reviews were completed in the fall of 2003. EPA has indicated that it waited for the NAS recommendations before obligating its FY03 and FY04 homeland security research funds.
- *EPA Funding for the Homeland Security Research Center and the Proposed FY05 Budget Cut:* Congress appropriated approximately $51 million in FY03 for the HSRC and $27 million in FY04. These figures include funding for the rapid risk assessment program, which supports both building and water security research. Building decontamination funds are transferred from the Agency's Superfund account (which traditionally funds cleanup of industrial chemical contamination), and water funds are provided from the agency's Science and Technology (S&T) account. The President's budget submission requests $22 million for the HSRC in FY05, a $6 million (21 percent) reduction. While $2 million has been added for biodefense research, the FY05 President budget proposes to eliminate funding for the building decontamination research program.[5]

HSRC Funding
(in millions)

	FY 03	FY 04	FY 05 Request
Water	$9.0	$10.5	$12.8
Buildings	$38.3	$8.2	$0.0
Rapid Risk Assessment	$4.0	$7.8	$7.5
Biodefense	$0.0	$0.0	$2.0
TOTAL	**$51.3**	**$26.5**	**$22.3**

4. Key Issues

What did the NAS conclude about EPA's building and water security research plan?

The NAS created two panels—one to examine EPA's water security research plan and the other to review the Safe Buildings Program research plan. Although the panels were asked to answer the same questions, they approached their tasks differently. The panel that examined the building program looked more at the overall plan and focused on those areas in which EPA could make the most difference in the time before the HSRC closed its doors. The water security panel examined the details of the proposed research projects and made many specific recommendations for improving individual projects.

1. Safe Buildings Program

[5] Congress also appropriated an additional $15 million in FY03 and $25 million in FY04 from the S&T account to EPA's Water Office for related water security research.

The NAS panel concluded that EPA correctly identified the major research areas essential for the Safe Buildings Program. However, it also found some important shortcomings that EPA should address. According to the panel, because the research plan contained too many short-term projects that could not be completed within the three-year life of the HSRC, EPA should narrow its research to those priority areas that could be completed within the three-year life of the center. The panel specifically recommended that EPA:

- focus on decontamination and disposal research, and support research on detection and containment only to the extent that they support research on decontamination and disposal;
- place special emphasis on the development of building decontamination standards that would help determine "how clean is safe;" and
- do a better job of setting priorities and use threat scenarios to guide its priorities.

2. Water Security Research

The NAS panel made nearly 100 specific recommendations to strengthen EPA's water security research plan. According to the panel:

- EPA's water security research plan included more research than the agency could carry out in three years;
- the plan should clearly identify short-, medium- and long-term research needs;
- the plan should identify funding levels required to the perform the indicated research;
- the plan should establish an overarching framework to describe how the individual research projects contribute to improved water security;
- research is needed on the costs and benefits of water security measures; and
- the agency must more rapidly disseminate its research findings to water utility officials.

Why does the administration propose to eliminate EPA's safe buildings program in its FY05 budget request and who will carry out this research in the future if the program is cut?

EPA's Congressional budget justification for its FY05 request indicates that the proposed $8.2 million budget decrease represents the complete elimination of homeland security building decontamination research, but offers no rationale for eliminating the program and does not explain whether this work will be carried out by other agencies in the future. At a February 2004 Science Committee hearing on the President's FY05 budget request for civilian science agencies, Dr. Charles McQueary, DHS Under Secretary for Science and Technology, expressed the view that building decontamination research is a critically important component of homeland security research, but he was not familiar with why the program at EPA was cut, or if any other agency was expected to take over these functions. At a March 2004 Environment, Technology, and Standards Subcommittee hearing on EPA's FY05 budget request, Clayton Johnson III, Deputy Director for Management at the Office of Management and Budget, explained that EPA did not need the funds for its building decontamination research program in FY05 because the agency had not yet obligated its FY03 funds. According to EPA, however, the agency delayed obligating FY03 funds because it received its FY03 funds very late in the fiscal year, and was awaiting the results of the two NAS studies and other input before deciding where to invest the funds. All EPA FY03 budgeted building decontamination research funds have since been obligated.

What high-priority research will not begin or be completed if funds are not available for EPA's safe buildings program in FY05?

The proposed elimination of funding for the Safe Buildings Program would halt many ongoing high-priority research projects and prevent the start of others, according to EPA. (See Attachment A for a comprehensive list of EPA programs that would be terminated or otherwise delayed due to the proposed FY05 budget cut). Among projects that would not be completed are field-tests of a sampling and analysis protocol for anthrax, an indoor air human exposure model for chemical and biological contaminants, and guidance on methods for using a building's air handling systems to mitigate and contain contamination. EPA would also be unable to evaluate a range of emerging decontamination methods, and would limit its analysis of methods for biological decontamination almost exclusively to anthrax.

Are there homeland security threats related to EPA responsibilities that EPA and DHS R&D programs are not addressing?

Although EPA's responsibilities for building decontamination and water system security are now formalized, there are still situations where authority and responsibility remain undefined. For example, according to DHS, it is not clear that any federal agency has lead responsibility for research on detection, response, and decontamination of an open space in a populated area such as the National Mall in Washington, DC. Any remaining gaps should be identified and prioritized relative to other research needs.

Research gaps may take other forms as well. According to many experts, the success of any response to a chemical, biological or radiological attack will also depend on more than clear formal lines of responsibility. The response to a real attack will involve a complex mix of skills of federal, State and local agencies that have little experience operating together and are not familiar with each others protocols or standards. Additional interagency agreements and more field tests of response protocols may be required to ensure that we are as prepared as possible for a real event.

5. Witness Questions

Dr. Gilman:

- Please describe the Environmental Protection Agency's (EPA's) role in homeland security research and development (R&D) in general, and provide specific details on the agency's homeland security efforts in water and building R&D.
- What are EPA's short- and long-term research plans in these areas? Are there any critical research areas not included in these plans? If so, why? How does EPA set its research priorities and coordinate with the Department of Homeland Security and the private sector?
- What specific steps has EPA taken to implement the National Academy of Sciences' recommendations on the agency's water and building homeland security R&D agendas? Does the agency agree with all the recommendations? If not, please provide examples and explain why.
- Why did the Administration's FY05 budget request for EPA eliminate funding for the homeland security building research program? What specific projects and research will not be funded because of the budget request? Has EPA identified another entity to conduct the research, or will EPA request funding in FY06 to conduct the work?

Dr. Albright:

- Please describe the Environmental Protection Agency's (EPA's) and the Department of Homeland Security's (DHS's) roles in homeland security research and development (R&D) for water systems and buildings? In which areas of homeland security R&D does EPA have the lead role for the Federal Government, and in which areas does it have a supporting role?
- Are there additional R&D needs for building and water security in either the short- or long-term? If so, is this R&D that EPA should be doing?
- Has EPA incorporated the input of DHS and the private sector into its R&D agenda? How has DHS incorporated the input of EPA into its R&D planning? Do EPA and DHS jointly fund or implement projects or programs? If so, please provide examples.
- Given the Administration's proposal to eliminate homeland security building research at EPA, how will the federal government ensure that this research is carried out in fiscal year 2005? Who will be responsible for this research?

Dr. Kolb:

- Please outline the key findings and recommendations of the National Academy of Sciences' report, A Review of Homeland Security Efforts: Safe Building Program Research Implementation Plan.
- Is there sufficient collaboration among Environmental Protection Agency (EPA), the Department of Homeland Security (DHS) and other interests to ensure that EPA is properly focusing its research agenda? If not, what steps should EPA and DHS take to improve this collaboration?

Dr. Baecher:

- Please outline the key findings and recommendations of the National Academy of Sciences' report, *A Review of the EPA Water Security Research and Technical Support Plan (Part 1 & 2).*
- Is there sufficient collaboration among Environmental Protection Agency (EPA), the Department of Homeland Security (DHS) and other interests to ensure that EPA is properly focusing its research agenda? If not, what steps should EPA and DHS take to improve this collaboration?

Attachment A

According to EPA, the following projects would be eliminated due to the proposed FY05 budget cuts:

- EPA will complete development and bench scale validation of an approved sampling and analysis protocol for anthrax. However, it would not field validate the method or develop methods for 10 additional biological agents.
- EPA has completed an evaluation of the effectiveness of residential safe havens (duct tape and plastic). However, it would not complete an evaluation for non-residential safe havens (e.g., work environment). These involve considerably more complex approaches.
- EPA has completed development of a building indoor air exposure model to estimate human exposure to chemical and biological contaminants from an attack. However, the model would not be field validated.
- EPA will provide interim guidance on the design and operation of existing building decontamination methods. However, it would be unable to evaluate a range of emerging decontamination methods nor conduct field validation of existing methods and provide final guidance. Also, methods for biological decontamination would be limited almost exclusively to anthrax.
- EPA will complete threat assessment and exposure simulations for the highest consequence building attack scenarios. However, other scenarios would not be addressed.
- EPA will complete interim guidance on methods for using building air handling systems to mitigate and contain contamination from chemical and biological attacks. However, it would not complete field verification and a complete analysis of the consequences of external (ambient) attacks.
- EPA will complete ETV commercial technology performance verifications for two chemical-in-air detectors, ten ventilation air filters and three building decontamination technologies. It would not be able to continue the evaluation of building air filters in FY04 and FY05 and would terminate the air detector verifications after FY04.
- EPA will complete interim guidance on disposal technologies for decontamination waste and residuals. However, field evaluation of contaminant transport and fate in landfills and landfill gases would not be possible, preventing completion of final guidance.
- EPA will complete laboratory evaluation of improved sterilant efficacy testing methods for pesticide crisis exemptions. Field verifications would not be completed.
- EPA will evaluate the requirements that would need to be met by existing sensors to assure adequate performance for decontamination. However, it would not evaluate new sensor technologies.
- EPA also would not complete:
    - adaptation of existing LASER and infrared sensors for building protection and decontamination
    - case studies and design guidance for retrofitting building protection systems into existing structures
    - research on the impact of building environmental conditions and human activities on the dispersal and exposure contact to chemical and biological agents
    - research on contaminant infiltration through building shells and dispersion of heavier-than-air gasses.

Chairman EHLERS. I apologize for the delay. We are supposed to wait for a member of the minority to show up, so we will have a slight pause.

I am pleased to open this hearing. I would like to welcome everyone to this hearing—today's hearing on Homeland Security research and development at the Environmental Protection Agency, which everyone refers to as EPA. One of our Federal Government's most fundamental duties is to protect our citizens. Since September 11th, 2001, how we perform this duty has changed drastically, because threats that we once found only in movies are now unmistakably real.

Perhaps the most significant change was the creation of the Department of Homeland Security to lead our national effort, but many other agencies, such as EPA, are also crucial to the success of our effort.

EPA is, in fact, the lead federal agency for protecting our nation's drinking and wastewater systems, and for decontaminating buildings that have been exposed to chemical or biological agents, such as anthrax. EPA's research programs help set standards, assess risks, develop methods for measuring contaminants, and test and deploy technologies for responding to chemical or biological events.

Today, we will examine these programs to learn how EPA sets its priorities and coordinates its work with the Department of Homeland Security.

We will hear from experts from the National Academy of Sciences who reviewed EPA's water security and building decontamination research plans, and made recommendations to improve those efforts.

We also want to understand why the President's Fiscal Year 2005 budget proposes to eliminate funding for EPA's building decontamination program. This seems particularly troubling, given EPA's designation as a lead federal agency for building decontamination.

Finally, we are concerned that EPA plans to close its Homeland Security Research Center at the end of Fiscal Year 2005. The center was created in 2002 to coordinate and conduct EPA's homeland security-related research. Closing it so soon, when so many research questions remained unanswered, makes no sense to me. It also raises the larger question of who will carry out and coordinate this vital research, if EPA closes this center.

I look forward to the testimony and hope we can answer these important questions. I would also like to note that Mr. Boehlert has a deep interest in this topic, and wanted to be here, both to make a statement and to answer questions, pardon me, ask questions. And unfortunately, he had to attend an Intelligence Committee meeting at this point.

The only bright part of this is that we do have intelligence in the House, and everyone should be grateful for that, but we are sorry that he is not able to be with us, and without objection, we will make—we will have him, and any other Member who wishes to submit a statement, be able to do so, and to submit questions in writing to our witnesses.

At this point, the Chair recognizes the gentleman from Colorado, Mr. Udall, the Ranking Minority Member on this subcommittee. His opening statement.

[The prepared statement of Chairman Ehlers follows:]

PREPARED STATEMENT OF CHAIRMAN VERNON J. EHLERS

Welcome to today's hearing on Homeland Security research and development at the Environmental Protection Agency (better known as EPA). One of our Federal Government's most fundamental duties is to protect our nation's citizens. Since September 11th, how we perform this duty has changed drastically because threats that we once found only in movies are now unmistakably real.

Perhaps the most significant change was the creation of the Department of Homeland Security to lead our national effort. But many other agencies, such as EPA, are also crucial to the success of our effort.

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I look forward to the testimony and hope we can answer these important questions.

Mr. UDALL. Mr. Chairman, thank you for convening this hearing regarding EPA's homeland security activities. I, too, join you in welcoming all of our panel members today.

I would especially like to thank you—those of you who have served on the National Research Council Board, who reviewed EPA's research implementation plan. The comments and suggestions in all three NRC reports were insightful, and should facilitate the implementation and enhance the usefulness of EPA's homeland security programs.

As you know, and as the Chairman mentioned, EPA has primary responsibility for the cleanup of buildings and other sites intentionally contaminated by chemical or biological agents. EPA also has primary responsibility for protecting the Nation's water system from acts of terror.

So, I am concerned that EPA's Safe Buildings and Water Systems Security research programs will cease to exist after Fiscal Year 2005. In September 2002, these programs were introduced with only a three-year time span. I don't see how three years is sufficient time to achieve either the safe buildings or water systems security that the titles of these programs suggest.

We don't have to look far to see the importance of these programs. The cleanup of the Hart Senate Office Building after the October 2001 anthrax attacks required three months of cleanup at a cost of approximately $27 million. The Brentwood Postal Facility

took over two years and approximately $130 million before it could be reoccupied, and the privately owned America Media Incorporated headquarters in Florida to this day remains boarded up and unoccupied.

These tragic anthrax events are a case study for the continuing needs and requirements for effective rapid response, coordination, standardization, and decontamination research and development for both public and private spaces. It is interesting to note that on the same day that a ricin-laced letter closed Senate offices, the Administration asked Congress to eliminate the very program whose primary mission is the cleanup of contaminated buildings, EPA's Homeland Security Building Decontamination research program. I intend to fully explore the rationale and ramifications of the Administration's plans to eliminate this program.

I am also concerned about interagency coordination. Active interagency dialogue and coordination are critical to avoid duplicative efforts, eliminate potentially dangerous security gaps, and improve response and recovery time in the event of an attack.

I look forward to the testimony from our distinguished witnesses. I know that the panel will offer this committee valuable insights into agency coordination and suggestions for improvements to EPA's homeland security missions.

Thank you, Mr. Chairman, and again, I want to welcome the panel.

Chairman EHLERS. Thank you, Mr. Udall. And if there is no objection, all additional opening statements submitted by Subcommittee Members, either present or not present, will be added to the record.

Without objection, so ordered.

At this time, I would like to introduce our witnesses. We are fortunate to have a very good panel on this topic. We begin with the representative from the EPA, and I just mentioned that I will be granting a little extra time to him because of the amount of material that he has to present to us. Dr. Paul Gilman, who is the Assistant Administrator for the Office of Research and Development at the U.S. EPA, and directly responsible for the issues before us today. And we will have grant him seven minutes instead of the normal five.

Next, we have Dr. Penrose Albright, who is the Assistant Secretary in the Science and Technology Directorate at the Department of Homeland Security. I am very pleased to have you here, and we take special pleasure, because this committee created your position, which unfortunately was left out of the original bill, and we are very pleased to have you and the Department represented.

The next two members have spent considerable time reviewing EPA and the issues before us. First is Dr. E. Kolb, Jr., President and CEO of Aerodyne Research, Incorporated. He has served on a variety of NAS panels, and was a member of the panel that reviewed EPA's Safe Buildings research program.

And then we also have Dr. Gregory Baecher, Professor and Chairman of the Department of Civil and Environmental Engineering, at the University of Maryland. He was a member of the NAS panel that reviewed EPA's Water Security research program.

We will start with Dr. Gilman. He will receive seven minutes, as I mentioned. All the others will have five minutes. We ask you to summarize your written testimony, and try to stay within the time limits. And when you have completed your testimony, the procedure, as I suspect you know, is that Members of the Committee will ask questions, and they each will have five minutes for their questions.

With that, we will proceed with Dr. Gilman.

STATEMENT OF DR. PAUL GILMAN, PH.D., SCIENCE ADVISOR TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY AND ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AGENCY

Dr. GILMAN. Thank you, Mr. Chairman. I am going to use some viewgraphs for purposes of this presentation.

[Slide]

This first one really lays out the areas of responsibility the Environmental Protection Agency (EPA) has in the arena of homeland security. My testimony goes into some detail on the legislative basis for all this. Most people are familiar with the National Incident Emergency Response that the Agency does.

They are used to seeing the coats with EPA on the back at the scenes of hazardous waste spills and the like, but not in the homeland security area of protecting water infrastructure, decontamination and cleanup following either a chemical or biological attack, our principal areas of responsibility. Constructing a water systems surveillance infrastructure is also an area of responsibility, as is looking at the question of environmental laboratory analysis capacity and the methodology for environmental analysis, and then last, and the principal area for my discussion today, is research in support of decontamination and water systems.

In going about our research agenda, and in establishing our Homeland Security Research Center, we set it up using several key operating principles—we would be focused on short-term results, high intensity activity, looking very much at applied solutions, and key to that was understanding the potential user's needs for technologies and methodologies and the like. We wanted to turn out high quality, useful products quickly, and that is really the key, Mr. Chairman, to the notion that we put a three-year sunset on the Homeland Security Research Center. We wanted our folks associated with this somewhat virtual center across EPA's research organization, to have that sense of urgency that comes with knowing that you are trying to do as much as you can in as short a period of time as possible.

Key to achieving those things in the short period of time was partnering within the Office of Research and Development, across the Environmental Protection Agency, and very importantly, to other federal agencies and the private sector.

I think we have done all of those things quite effectively, and I hope my testimony provides you with enough examples of that that we really can demonstrate that to your satisfaction. And ultimately, in that short timeframe, we were trying to isolate key and most important gaps in our knowledge and in our technology, and pursuing those accordingly.

In order to set our research priorities, we started first by going to the stakeholders, as they are called, and trying to assess their needs. In this case, it was both inside the EPA, talking to our Office of Water, talking to our Office of Emergency Response, to the Department of Homeland Security, and outside stakeholders, the water companies themselves, folks involved in the design and operation of buildings, and other stakeholders that we could identify along the way.

We then took that user-driven research strategy before the National Research Council. You will hear from the chairs of the two efforts there looking at our building program as well as our water program, and actually, one of the recommendations coming from them was to build another approach to trying to prioritize our work, so-called threat scenario analysis, and we have now done that. It is somewhat unique in the research community associated with homeland security, and we are very proud of it. We looked at over 130 contaminants of interest, 3,500 different potential scenarios, looked at the potential economic and human health-related consequence of those different scenarios to, again, determine which were of the highest priority, and then even laid out simulations against those high priority ones to see which really were the ones that needed our nearest term attention.

[Slide]

This slide, really, is just intended to demonstrated somewhat graphically the number of partnerships we have created in order to carry out this work. It ranges from the Center for Disease Control to the Department of Homeland Security, Department of Energy, DARPA, DOD, the Army, the Air Force Research Lab, the Food and Drug Administration. I can go on for, actually, a couple of slides, to demonstrate really significant and formal relationships between ourselves and other agencies.

Our goal, at the end of our three-year period, is to turn out a set of products for the water industry, for the industry associated with building decontamination, and on this slide here is an example of the kinds of products that we are in various phases of completing, as I speak to you. Examples include a web-based catalogue of technical resources for the water community, for the buildings community, an interactive web site, actually, for them to explore their needs. We have recently completed, and will be publishing very soon an assessment of residential safe havens for all those folks who heard about using duct tape and plastic. We have actually analyzed that scenario, looked to the circumstances in which it works well, and those in which it doesn't, in order to provide more concrete guidance in that arena. Developing early warning systems and operational guidance in the water arena for water systems, and on down the list. As you can see, there is quite a range of them, ranging from our three major areas of responsibility, water systems, building decontamination, and the development of risk assessment tools for first responders and planners in the arena of homeland security.

What I thought I would do next is demonstrate a circumstance where we take existing research that is ongoing in the Agency, and have in effect used it for a dual purpose.

[Slide]

This slide is actually a visualization of a sort of standard model for understanding pluming, in this case, it is the aftermath of the collapse of the World Trade Center. The input data for this is meteorological data from nearby airports, New York's LaGuardia, Kennedy, Newark, and the like. NOAA, the Department of Energy, and others are trying to upgrade these models by providing more significant meteorological inputs to them.

At the time of the World Trade Center collapse, EPA was actually working in midtown New York on better understanding, if you will, the greater granularity of exposure to the EPA criteria air pollutants in an urban setting, in urban canyons, if you will. And what you will see here is actually a simulation that was done as we moved that work downtown to make some relevance to the World Trade Center site, and as you can see, the streamlines and the vectors in this simulation really demonstrate the complexity that you can't really capture in that earlier plume simulation for that urban environment. So we are working now with NOAA, the Department of Homeland Security and Department of Energy to integrate these kinds of tools into the kind of plume modeling that we are all thinking of in a more traditional sense.

[Slide]

Now, this numerical modeling, this fluid dynamics model, done in silico, if you will, is all well and good, but to try and bring it back to reality, we utilized a wind tunnel in a collaborative effort with NOAA, a number of whose employees are located in Research Triangle Park, North Carolina, built a scale model of the World Trade Center site, and then built, in effect, the physical model to run against that computer model of the site, and working back and forth between the two, we were able to retrospectively—because we didn't have the kind of monitoring on hand at the time of the collapse of the buildings—look at the relative dilution of contaminants coming from the site at a time when we didn't have actual on-scene monitoring at the level that we subsequently had in the weeks following the collapse of the buildings. What this graphic demonstrates is, happily, that the exclusion zones that were set up around the World Trade Center site coincide very nicely with areas of highest concentration, and also that the dilution of the contaminants flowing from the site was quite rapid, as you left the site. In this case, the 100 represents the highest level of concentration. The green line at a factor of 10 is a factor of 10 reduction, and then the blue line at 1 is a further factor of 10 reduction in the concentration from that site.

This kind of numerical modeling is also being used by us in collaboration, in this case, with Rutgers University, to try and reconstruct what the exposure might have been from the actual collapse of the building, for people in the immediate vicinity, and really looking at dust exposure. So, the simulation I am going to show you here, this is not a graphic, this is, again, a numerical model that demonstrates just what happens from first principles at the time of collapse.

We are now working our way back into this to try and assign to it concentrations, so that we can begin to get at least in relative terms some notion of how people in the immediate vicinity of the building were exposed to the building materials from the collapse.

Let me return to what you mentioned in your testimony about the three-year character of the Homeland Security Research Center. We are, as we always planned to be in the midst of an analysis of what are our products to date and what are our research needs for the future. We are doing this in collaboration with the Department of Homeland Security, the Homeland Security Council at the White House, the Department of Defense, a number of other organizations, intelligence organizations trying to understand evolving threats, and in light of the most recent Presidential Decision Directives in the arena of Homeland Security.

So far, our stakeholder input has been that there is a continuing need for the research that we have been doing, and we will be taking that input into account as we prepare our Fiscal Year '06 budget for submission to the Congress.

And that is the end of my statement, Mr. Chairman.

[The prepared statement of Dr. Gilman follows:]

PREPARED STATEMENT OF PAUL GILMAN

INTRODUCTION

Good Morning Chairman Boehlert and Members of the Committee. I am Paul Gilman, Assistant Administrator for Research and Development and Science Advisor to the Administrator, United States Environmental Protection Agency (EPA). I welcome this opportunity to appear before you today to discuss how homeland security-related research and development (R&D) is prioritized, coordinated, and executed at EPA. Before I begin addressing the specifics of our R&D homeland security efforts, I would like to briefly discuss the genesis of EPA's role in homeland security and provide a brief history of the Agency's efforts in this important arena, as these factors have played an important role in directing EPA's R&D homeland security efforts.

For over 30 years, EPA and our federal, State, local and tribal partners have made great progress toward a cleaner, healthier environment for the American public. Under the Federal Water Pollution Control Act, the Comprehensive Environmental Response, Compensation, and Liability Act (also known as CERCLA or "Superfund"), the Superfund Amendments and Reauthorization Act (SARA) of 1986 (which includes the Emergency Planning and Community Right-to-Know Act (EPCRA), the Clean Water Act, as amended by the Oil Pollution Act of 1990 (OPA), the Safe Drinking Water Act, and other authorities, EPA is responsible for preparing for and responding to emergencies involving the release of oil, hazardous substances, and certain radiological materials into the environment—any of which could be a component of a weapon of mass destruction. EPA has more than 200 On-Scene Coordinators (OSCs) at over 25 locations throughout the country, who are ready to quickly respond to release notifications. OSCs are the federal officials responsible for evaluating, monitoring or directing responses to oil spills and hazardous substance releases reported to the Federal Government. OSCs coordinate all federal efforts with, and provide support and information to local, State, tribal, and regional response communities. EPA also has specialized Environmental Response Teams and a Radiological Emergency Response Team available at all times. Working with other specialized federal resources, these teams and experts are available and trained to respond to incidents involving hazardous substances. EPA can also provide direction, coordination, and support on hazardous release situations as needed. EPA is also the lead agency for Hazardous Materials Response under Emergency Support Function (ESF) #10 of the Federal Response Plan, under which we assist the Federal Emergency Management Agency in managing the consequences of major emergencies and disasters by providing environmental monitoring, decontamination, and long-term site cleanup.

In 1995, EPA was identified as one of six key federal agencies with roles in counter-terrorism. Since then, EPA's homeland security emergency response and infrastructure protection roles have been reaffirmed and expanded in PDDs 62, 63 and the more recent Homeland Security Presidential Directives (HSPD)–5 *Management of Domestic Incidents,* –8 *National Preparedness,* –9 *Defense of United States Agriculture and Food,* and –10 *National Biodefense Strategy.* We played a vital role in the federal response to the World Trade Center, anthrax and ricin incidents and continue to work hard to enhance our capabilities to respond to multiple nationally

significant incidents if necessary. Under PDD 63 and the more recent HSPD–7 *Critical Infrastructure Identification, Prioritization, and Protection,* EPA has also been designated the lead agency for enhancing the protection of the Water Supply Sector of the Nation's infrastructure. Under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, EPA is assisting community water systems to conduct vulnerability assessments and develop emergency response plans. Other homeland security activities towards which EPA expertise has been applied include sample collection for the multi-agency program, BioWatch, an early warning system for the release of biological agents to outdoor air; the collection of environmental counter-terrorism evidence; and the decontamination of indoor building environments. HSPD–9 *(Defense of United States Agriculture and Food)* tasks EPA with additional homeland security responsibilities for the water sector. The recently issued HSPD–10 *National Biodefense Strategy,* assigns EPA to lead the interagency effort for the development of strategies, guidelines, and plans for decontamination following a biological weapons attack.

With the post-September 11, 2001 increase in the pace and scope of EPA's activities, EPA faced a significant internal, as well as external, coordination challenge. In the weeks following the attacks, EPA's Administrator established a Homeland Security Working Group that included senior representatives from each of EPA's program offices involved in homeland security efforts. The group, led by the previous Deputy Administrator of EPA, developed a strategy for fulfilling our homeland security responsibilities while still fulfilling our traditional mission.

In response to EPA's increasing responsibilities in homeland security, the Agency determined that it was necessary to modify EPA's internal structure in specific areas. An Office of Homeland Security was established in the Administrator's Office to advise the Administrator and continue to coordinate a consistent national approach to homeland security policy development across the Agency. The Office of Solid Waste and Emergency Response consolidated its emergency response and preparedness functions to create the Office of Emergency Prevention, Preparedness and Response (OEPPR), in order to focus many of the Agency's oil and hazardous substances emergency prevention, preparedness, and response duties. The Office of Water created a new division for Water Security, which created a permanent home for the activities that were being accomplished by the ad hoc Water Protection Task Force EPA created after September 11, 2001, to oversee protection of America's drinking water and wastewater systems. Finally, the Agency has established the National Homeland Security Research Center, which reports to me, to conduct and oversee research directly related to homeland security.

EPA has also made important additions to our response capabilities to address the threats presented by terrorism. EPA is establishing a National Decontamination Team of highly specialized personnel who will provide decontamination expertise and assistance for buildings and other infrastructure following a weapons of mass destruction event. Further, EPA has recently made significant improvements to the Agency's Emergency Operations Center to assist in overall coordination of EPA's activities during nationally significant incidents. We also augmented our existing two Environmental Response Teams by establishing a third Team location in Las Vegas, co-located with the western component of our Radiological Emergency Response Team, to improve our ability to respond to emergencies in the western United States.

EPA HOMELAND SECURITY RESEARCH ACTIVITIES

EPA research and development in support of the national homeland security effort is primarily conducted by the National Homeland Security Research Center (NHSRC) in the EPA Office of Research and Development (ORD). ORD is also collaborating with the EPA Office of Water, Office of Solid Waste and Emergency Response and Office of Pollution Prevention and Toxic Substances in a variety of science and technology efforts related to homeland security.

The NHSRC was formed in October, 2002 in response to September 11th and the anthrax letter attacks to address critical science and technology knowledge gaps that became apparent in the emergency response and cleanup actions for those events. The goal of the research program is to rapidly provide appropriate and effective technologies, methods and technical guidance to understand the potential risks posed by potential chemical and biological terror attacks on buildings and water infrastructure and to improve our ability to detect and contain contaminants and decontaminate these facilities as necessary in the event of such attacks. Because of the urgency of generating this information, the Center was formed by reassigning some of the most experienced scientists and engineers from across ORD, including staff knowledgeable in environmental sampling and analysis, microbiology, chemistry, risk assessment, indoor air pollution, water supply and environmental clean-

up. Staff were not asked to relocate. Instead they operate as a "virtual" organization across seven cities, with the greatest concentration in EPA's two major research facilities in Cincinnati, Ohio and Research Triangle Park, North Carolina This approach was important because it enabled the organization to be operational almost immediately, enabling some important research results to be produced and delivered within two months of the reorganization. To further emphasize the critical nature of this work, EPA established a goal for the research effort to produce important results for key stakeholders in the emergency response, building owner and water utility communities within the first three years. The need for research beyond that time was to be evaluated at mid-point in light of accomplishments, the magnitude and remaining research and technology gaps, and needs identified by DHS and other internal and external clients.

The EPA homeland security research program is focused on chemical and biological contaminants that could be used by terrorists including: weaponized and non-weaponized pathogenic bacteria and viruses, biochemical toxins, chemical warfare agents and certain widely-available toxic industrial chemicals that could potentially be used in attacks. In addition, radiological contamination of water infrastructure is also being addressed. There are three primary components of the research effort:

(1) The Safe Buildings Program addresses technology and methods to enable cost-effective cleanup for reoccupation following contamination events;

(2) The Water Security Program, in close collaboration with EPA's Office of Water, develops methods and technologies to warn/detect an attack on water and wastewater systems and to facilitate system decontamination; and

(3) The Rapid Risk Assessment Program develops data, methods and models to rapidly characterize public health risks posed by contamination events and inform decision-making on necessary decontamination and cleanup goals.

There are two important ways EPA homeland security research priorities have been established: (1) stakeholder/user needs input and (2) a comprehensive threat scenario analysis. Early on, staff interacted extensively with stakeholders and experts in the emergency response community, water industry, key federal agencies with expertise in chemical and biological weapons and with organizations representing building owners and managers. These discussions, along with an evaluation of lessons learned from the World Trade Center and anthrax letter events as well as an evaluation of known attempts to intentionally contaminate water systems, revealed a number of key research and information gaps that needed to be addressed as quickly as possible. Most of the early research resources available to EPA were directed to these consensus needs, which included work such as development and evaluation of anthrax sampling, analysis and decontamination methods; assessments of the treatability of contaminants in water treatment and distribution systems; establishment of a program to verify the performance of commercially available homeland security technologies, and other near-term critical needs.

The second and more comprehensive manner in which priorities have been established is through the identification and analysis of threat scenarios. There are literally thousands of possible combinations of facility types, attack agents and attack methods that are possible for buildings and water infrastructure. Each combination (threat scenario) represents a range of possible consequences in terms of human health and economic (i.e., from clean-up, disruption) impact. The research program is designed to focus its attention only on the most probable, highest consequence events.

In recognition of the importance of peer review, EPA submitted its Safe Buildings Research Plan and its Water Security Research and Technical Support Action Plan to the National Academies of Science. Two independent panels were formed and provided extensive input to enhance the research plans. The water panel stressed the need to quantify the multiple benefits and costs attributable to the proposed research. The buildings panel recommended that the primary focus of EPA's research be decontamination and disposal and that detection and containment efforts should be primarily targeted towards this end. Each panel also provided a considerable listing of specific recommendations to EPA. EPA has conducted an extensive analysis of these recommendations and has incorporated nearly all of them into our research implementation plans.

Leveraging with other agencies and organizations is also critical to our success. This helps us avoid duplication, accelerate the pace of research outcomes and build on complementary work. Important collaborations have already been put in place with 17 federal research organizations in the Department of Defense (DOD) and Department of Energy (DOE), as well as with the Centers for Disease Control and Prevention (CDC), National Institute for Standards and Technology (NIST), the U.S.

Geological Survey (USGS) and the Food and Drug Administration (FDA). In fact, nearly 35 percent of EPA's homeland security extramural research budget is being utilized to support over 36 interagency projects to enhance and expand our research effort. Much research is also being conducted in collaboration with water industry associations including the Water Environment Research Foundation and the American Water Works Association Research Foundation.

As stated previously, the Department of Homeland Security (DHS) is a critical partner for EPA's homeland security research program. Our primary interaction on homeland security research is with the Science and Technology Directorate. EPA has shared its research plans with DHS, and the organizations hold regular joint-briefings on the status of research and future plans. The most recent briefing was held last month in Washington. Shorter, individual project briefings are held with key DHS staff as important results come in. EPA and DHS have established and also co-chair the Intergovernmental Building Protection and Decontamination Workgroup that meets monthly to share information and help prioritize building protection and decontamination research across the nine participating agencies. These include DOD, DHS, EPA, Department of State (DOS), General Services Administration (GSA), CDC, U.S. Postal Service (USPS), NIST and Federal Emergency Management Agency (FEMA). DHS is also a member of the Distribution System Research Consortium established by EPA to coordinate government and non-government research on water distribution system contamination prevention.

DHS has also sought EPA review and advice on DHS funding priorities. EPA has contributed to topical areas incorporated into DHS research solicitations and has participated in proposal review panels for the DHS National Laboratory Program, the University Grants Program and the Homeland Security Advanced Research Projects Agency (HSARPA). At the request of DHS, EPA has submitted a number of FY 2004 research proposals to supplement EPA efforts in building decontamination, water security and risk assessment. Decisions on these proposals are currently under review at DHS. EPA and DHS also recently agreed to jointly fund a Request for Applications (RFA) for research in the area of biological risk assessment.

SPECIFIC EPA RESEARCH COLLABORATIONS AND ACCOMPLISHMENTS

EPA is supporting collaborative research across the Federal Government in all of the components of its homeland security research program. These components are: detection containment, decontamination/disposal, risk assessment, commercial technology verification and science support to emergency response. Several examples are provided below for illustration.

Detection Research

One critical need that arose from the anthrax cleanup activities in the postal facilities and the Capitol Hill complex is the need for improved, validated surface sampling and analysis protocols to inform decontamination decisions. EPA and CDC have collaborated to develop these protocols and are working in concert with the U.S. Army at Dugway Proving Ground to validate and modify the protocol as necessary. Drafts of the protocol have been provided to the response community as interim guidance.

Similarly, water utilities have expressed concern for a lack of validated water sampling and analysis methods for chemical and biological terror agents. These methods are needed to detect or confirm attacks and inform cleanup and response decisions. The EPA NHSRC and the Office of Water have combined forces with the CDC and the U.S. Army's Edgewood Chemical and Biological Center (ECBC) to develop and field-validate methods for both chemical and biological agents. The Office of Water is also collaborating with the DOD Technical Support Working Group (TSWG) to evaluate concentration/extraction methods for chemical contaminants in water. Furthermore, a cross-government work group, led by ORD, has just completed the development of a Compendium of Standardized Analytical Methods for Use During Homeland Security Events. The Compendium identifies standard and best available methods for analysis of chemical and biological agents in water, dusts, and aerosols. It is an important step in establishing a national environmental sampling and analysis capacity for responding to terror events.

Finally, EPA and the U.S. Army Research Laboratory are jointly conducting research to adapt laser-based detection methods for rapid and specific identification of biological agents on surfaces. This research, which is being conducted at EPA's research facility in North Carolina, is showing great promise for improving the speed and cost of clean-up.

Containment Research

In the event of biological or chemical attacks on buildings or water, it is important to understand how to contain the release and minimize the potential human exposure and the amount of infrastructure that will potentially need to be decontaminated. In the case of water systems, our attention is focused on understanding the effectiveness of existing water treatment systems to deactivate or remove contaminants introduced into water systems. EPA and CDC are collaborating to jointly determine the effectiveness of various disinfection methods for deactivating biological warfare agents including anthrax. Much of the work is nearing completion, and key findings relating to particular water system vulnerabilities have been provided to the EPA Office of Water and DHS. The Office of Water is also collaborating with the DOD Office of Naval Research to develop mobile treatment units for providing alternative water supplies in the aftermath of contamination events.

Once contaminants enter water systems, containment strategies rely on the ability to predict where and how fast contamination will propagate. EPA is conducting extensive in-house research to adapt EPA-developed water distribution models to better understand fate and transport of contamination in complex water distribution systems. The DOE Argonne National Laboratory and the Sandia National Laboratory are also collaborating with EPA to enhance the capabilities of the model and to develop approaches to optimize the cost and deployment of early warning sensors in distribution systems. The U.S. Geological Survey and EPA have agreed to team in the field deployment and testing of these technologies.

In the case of building contamination, EPA and the DOD-sponsored Technical Support Working Group are collaborating to evaluate the effectiveness of filtration systems for removal of chemical and biological agents from air entering building air supplies. These systems will provide an important first line of defense against large scale external releases of many chemical and biological agents. EPA has also interacted extensively with the DOD Immune Buildings Program to extend military facility protection technology to domestic building contaminants.

We have also been able to take advantage of complementary work being conduced under ORD clean air research to enhance our homeland security research efforts. EPA building air flow and ventilation models developed as part of our indoor air pollution research program have been adapted to both create building air contamination simulation models for threat scenario analysis and evaluate the fate and transport of contaminants in buildings for a number of key contaminants and attack methods. This work will be synthesized into an interim Building Protection Design and Operational Guidance Manual that will be provided to building owners in 2005. Similarly, an urban canyon modeling field study underway in mid-town Manhattan at the time of the World Trade Center collapse enabled ORD to rapidly deploy on-the-ground air sampling in lower Manhattan and incorporate these and other air quality data into a detailed plume model. This model has since been enhanced to provide an important tool for simulating and predicting the fate and transport of hazardous air pollutants in urban terrain following large scale outdoor releases.

Decontamination Research

Decontamination research is a major focus of EPA's homeland security research program. EPA has significant scientific and operational experience in cleanup methods for industrial chemicals in the environment, and the military has developed a substantial body of knowledge and technology for decontamination of personnel, equipment and facilities in warfare situations involving biological and chemical weapons agents. The challenge is to extend this common knowledge to the relatively untested domestic application of decontamination of public buildings and water systems. In the case of buildings, techniques for hard surface decontamination are available, but methods for porous surfaces, sensitive or high value property and large areas are relatively unproven and expensive. Questions remain over the effectiveness, design and operational requirements, cost, and potential secondary health effects of available techniques such as chlorine dioxide and vaporous hydrogen peroxide fumigation. To help address these needs, EPA is working with the U.S. Army Edgewood Chemical and Biological Center to conduct studies of the effectiveness of these techniques for important organisms, surface types and environmental conditions. This work, in combination with lessons learned in the Capitol Hill and postal facility cleanups, will lead to interim design and operational guidance that will enable more optimized cost-effective decontaminations in the future. In addition, EPA's Office of Pesticide Programs is collaborating with ORD and the Food and Drug Administration to develop methods to more quickly, effectively and even prospectively develop the data necessary for EPA to make crisis exemption determinations for fumigants and anti-microbials as required under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA).

While shock disinfection and flushing are possible decontamination methods for water systems, little is known about the effectiveness of these methods and others that will need to be developed for decontaminating biological and chemical weapons agents or non-traditional persistent water contaminants in water systems. EPA has greatly expanded its unique in-house water system research facilities to initiate detailed studies of the effectiveness of available and emerging decontamination methods including chlorination, surfactant and enzyme treatment approaches. We are collaborating with the American Water Works Association Research Foundation to survey existing decontamination performance information and identify innovative approaches. EPA is also collaborating with the U.S. Army Edgewood Chemical and Biological Center, the Army Corps of Engineers and with the National Institute of Standards and Technology to evaluate decontamination methods for both chemical and biological agents in distribution systems and for internal building piping and appliances.

The goal of EPA's decontamination research is to produce interim design and operating guidance for decontaminating buildings and water systems by the end of 2005. Longer-term research will need to focus on broadening the suite of chemicals and biological agents for which data are available, evaluating evolving innovative technology, field validating the effectiveness and cost of decontamination methods and examining methods for decontamination of outdoor areas.

In addition to these efforts, the EPA Office of Radiation and Indoor Air is working on improvements in radiological detection and decontamination methods. This work includes development of a portable radiological scanning technology for gamma radiation isotopic analysis, "rapid alpha" technology for quick plutonium detection, and development of a series of documents to update technical guidance on radiological cleanup and decontamination methods. Portions of this work are being conducted in collaboration with the DOE Savannah River Laboratory.

EPA is working with a number of other agencies, in addition to DHS, to develop improved methods to quantify the dose received by people exposed to harmful gases and particles in urban areas, both outside and inside buildings. For example, EPA and NOAA are collaborating on wind tunnel modeling in support of Homeland Security activities, focusing on Manhattan and parts of the National Capital Region (specifically, the Pentagon) to assist in dispersion forecasts.

Risk Assessment Research

EPA's risk assessment research program is focused on two key homeland security needs: methods to rapidly assess the potential human health risk associated with chemical and biological attacks, and identification of appropriate methods and data to support cleanup level determinations. EPA has considerable experience in health effects and environmental risk assessment. While much information exists regarding the toxicity and hazard associated with chemical and biological warfare agents, considerable effort is needed to adapt information collected for warfare situations and transform it in a scientifically transparent way for use in domestic contamination situations. EPA has established collaborations with DOD and the DOE Argonne National Laboratory to help with this effort. Both the Edgewood Chemical and Biological Center and the Center for Health Promotion and Preventive Medicine (CHPPM) are working with EPA to develop rapid risk assessment methods for civilian inhalation exposures to microbial agents. Working with the Argonne National Laboratory, EPA is working to develop short-term (1–30 day) exposure level inhalation guidance for a list of key chemicals and chemical agents. Further, we are collaborating with the National Academies of Science and the EPA Office of Pollution Prevention and Toxic Substances to develop Acute Exposure Guideline Levels (AEGLs) for inhalation exposures to key chemical warfare agents. All of these data are critical inputs to a rapid risk assessment expert system that EPA is developing for use by the emergency response community. Similarly, this information supports a cross-EPA effort that the Deputy Administrator has asked me to direct to establish cleanup levels for chemical and biological agents that may be used in terror attacks. This initiative is also being coordinated with a cross-government effort under the leadership of the Office of Science and Technology Policy (OSTP) Subcommittee on Standards.

Technical Support & Technology Verification

Finally, EPA is also providing direct scientific support to the emergency response and technology user community. EPA has augmented its existing Environmental Technology Verification (ETV) Program to rapidly provide objective performance evaluation information for commercially available detection, containment and decontamination technologies applicable to homeland security needs. By the end of this calendar year, over 40 technologies will have been evaluated, including six hand

held detectors for cyanide in water, ten air filtration technologies and eight rapid toxicity monitors for water. Results of evaluations to date are posted on EPA's ETV web site.

In addition, EPA's research and development program has established a capacity to provide real-time science and engineering support to EPA's emergency response and cleanup personnel in the Office of Solid Waste and Emergency Response and in our ten Regional Offices. A 24-hour seven day a week emergency call-in line has been established and three "Red Teams" composed of ORD technical staff have been formed and trained to be available to provide direct support in areas such as sampling and analysis, microbiology, engineering, decontamination, medicine, health effects and exposure modeling. ORD staff also participate with the EPA Emergency Response Teams in national training and exercises. ORD will also work closely with the new EPA National Decontamination Team to validate decontamination technology and design guidance being developed by the NHSRC.

The Office of Research and Development continues to provide advice to the anthrax cleanup efforts at USPS facilities and the Department of State (SA–32), as well as the recently initiated cleanup of the American Media International (AMI) Building in Florida. ORD staff also provided rapid support to the cleanup effort for the Ricin attack on the Senate Office Building in the form of preliminary risk assessment and sampling and analysis methods.

Future Homeland Security Research at EPA

There is a critical need for delivering technical information and guidance to users in the water industry and emergency response community as soon as possible. In recognition of this, EPA established a goal at the formation of its homeland security research program to deliver as much of the important guidance as possible within three years. We recognized that this was a difficult charge, but felt it was critical to setting the necessary pace and focus for this important research. We also recognized that it was likely that not all of the critical research could be completed in that time frame and committed to a mid-term evaluation of the need to continue beyond the three years. This evaluation has been underway for several months.

The analysis has focused on two key elements. The first involves assessing stakeholder and user community views of the completeness and relevance of ORD outputs delivered or anticipated by the end of our third-year. ORD has consulted on this with individual EPA Program Offices and Regional Offices, as well as with DHS and a broad range of other Federal agencies and external users. This assessment also included a half-day meeting with over two dozen key clients and partners in April to gather additional input. The overall stakeholder conclusions that have resulted from these discussions have been that: (1) EPA efforts to establish a sound, focused and responsive homeland security research program in only 18 months are impressive; (2) the guidance and information developed and anticipated are relevant and important steps toward protecting facilities and responding to chemical and biological terror attacks; (3) the scope and magnitude of remaining and evolving science needs are significantly beyond what ORD can provide in three years; and (4) EPA should continue its research beyond three years to improve protection and decontamination guidance and begin to address the new and evolving needs identified by the participants.

The second element in the analysis involved an evaluation of strategic homeland security research priorities at the Federal level. This included an examination of DHS science and technology (S&T) priorities and expectations of EPA, as well as EPA taskings and related S&T needs associated with Homeland Security Presidential Directives, specifically HSPD–7, –9 and –10. From these examinations, it is clear that EPA will have continuing and, in fact, increasing responsibilities to support the national effort. These include lead responsibilities for coordinating water surveillance for infrastructure protection and decontamination following chemical and biological agent terror attacks. Each of these responsibilities carries with it the need for research to develop improved data, technology and protocols for characterizing the environmental impact of an attack; assessing risk; and determining appropriate, cost-effective approaches for response and decontamination.

EPA is in the process of analyzing and considering all of these inputs and will work closely with the Homeland Security Council and the Department of Homeland Security to determine what future level of effort is needed.

SUMMARY

EPA's homeland security effort is strategically designed to address the most important scientific and technological gaps facing decision-makers charged with protecting buildings and water systems from possible chemical and biological terror attack. Program priorities are threat-based and closely coordinated with national pri-

orities established by the Department of Homeland Security. EPA's research is based upon strong scientific peer review and is highly leveraged with the skills and resources of nearly two dozen key federal research organizations. We are rapidly developing relevant, user-oriented tools, data, and technology to help detect, contain, decontaminate and understand the potential health risks associated with chemical and biological terror attacks on buildings and public water supplies.

I thank you for this opportunity to describe our scientific and technological efforts in homeland security.

BIOGRAPHY FOR PAUL GILMAN

In April 2002, Dr. Gilman was sworn-in to serve as the Assistant Administrator for the Office of Research and Development which is the scientific and technological arm of the Environmental Protection Agency. In May 2002, he was appointed the Agency Science Advisor. In this capacity, he will be responsible for working across the Agency to ensure that the highest quality science is better integrated into the Agency's programs, policies and decisions.

Before his confirmation, he was Director, Policy Planning for Celera Genomics in Rockville, Maryland. Celera Genomics, a bio information and drug discovery company, is known for having decoded the human genome. In his position Dr. Gilman was responsible for strategic planning for corporate development and communications.

Prior to joining Celera, Dr. Gilman was the Executive Director of the life sciences and agriculture divisions of the National Research Council of the National Academies of Sciences and Engineering. The National Research Council is the operating arm of the National Academies which were chartered to provide independent advice to the government in matters of science and engineering. Dr. Gilman's divisions focused on risks to health and the environment, protection and management of biotic resources, and practical applications of biology including biotechnology and agriculture.

Before Joining the National Research Council, Gilman was the Associate Director of the Office of Management and Budget (OMB) for Natural Resources, Energy, and Science. There he coordinated budget formulation, regulatory, and legislative activities between agencies such as the Environmental Protection Agency, National Science Foundation, Agriculture, and Energy with the Executive Office of the President.

Dr. Gilman served as Executive Assistant to the Secretary of Energy for technical matters before joining the OMB. His responsibilities included participating in policy deliberations and tracking implementation of a variety of programs including the Department's environmental remediation and basic science research.

Gilman has 13 years of experience working on the staff of the United States Senate. He began that time as a Congressional Science Fellow sponsored by the American Association for the Advancement of Science in the office of Senator Pete V. Domenici. Later, as the Staff Director of the Subcommittee on Energy Research and Development, he was involved in the passage of the Nuclear Waste Policy Act of 1982 and oversight of energy technology and environmental research. Later he served as the chief-of-staff for Senator Domenici.

Dr. Gilman matriculated at Kenyon College in Ohio and received his A.B., M.A., and Ph.D. degrees in ecology and evolutionary biology from Johns Hopkins University, Baltimore, Maryland.

Chairman EHLERS. Thank you very much. Dr. Albright.

STATEMENT OF DR. PENROSE (PARNEY) ALBRIGHT, ASSISTANT SECRETARY, SCIENCE AND TECHNOLOGY DIRECTORATE, DEPARTMENT OF HOMELAND SECURITY

Dr. ALBRIGHT. Good morning, Chairman Ehlers, Congressman Udall, and Members of the Subcommittee on Environment, Technology, and Standards. I am pleased to have this opportunity to appear before you today to report on how the Science and Technology Directorate of the Department of Homeland Security and the U.S. Environmental Protection Agency are coordinating on homeland security research and development activities in the areas of water systems and building security.

I commend you for your interest in and support of the federal effort to protect the Nation's water supply and critical facilities from chemical, biological, or radiological nuclear attack, and ensuring that the proper systems are in place to respond effectively in the event of any such attack.

A chemical, biological, or radiological, or nuclear attack against our water supply or on private or public facilities could result in—clearly in large scale loss of life or economic damage. Central to the Department's mission is to reduce security threats and to produce—and to protect the United States from terrorist attacks, including those directed at our water supply and buildings, and we are committed to working with agencies at all levels to prevent any such attack from occurring.

Building security is also an integral part of any plan to protect the homeland. We know that landmark buildings and buildings that draw large numbers of people are attractive targets for terrorists. The nation needs new and improved technologies to protect these structures. Homeland Security Presidential Directive 10, HPSD–10, which deals with biodefense in the 21st Century, was issued last month and provides a comprehensive framework for biodefense, and among other things, delineates the roles and responsibilities of federal agencies and departments in continuing their important work in this area.

Decontamination and water security are key elements of the President's integrated biodefense strategy, and the need for biodefense and the challenges we face implementing it are great. Part of that, of course, is affordable, timely approaches for cleaning up contaminated areas, and that remains a serious challenge. Congressman Udall, for example, pointed out the issues surrounding the decontamination of the Brentwood Post Office following the anthrax mail events of October 2001. And recent studies have identified the need for more effective measures to safeguard our water supply against such attacks.

These three presidential directives designate the agencies responsible for leading and supporting the effort to address the potential threat of biological attacks, attacks on our water supply, and affordable, timely decontamination should such attacks occur. Specifically, HSPD–7, which addresses critical infrastructure protection, HSPD–9, which is focused on agricultural and food protection, have assigned EPA as the lead agency to enhance the protection of the Nation's water supply. HSPD–10, biodefense, has likewise designated EPA as the lead agency to coordinate the development of strategies, guidelines, and plans for decontamination following a biological attack. We fully support the EPA in these efforts.

Recognizing the multidisciplinary nature of the challenges before us, these presidential directives also specify that other departments and agencies will support EPA in these efforts. That is, while EPA provides overall leadership and coordination, the Departments of Homeland Security and Defense will assist by providing needed detection and decontamination technologies to EPA, as well as integrated systems approaches to these issues.

And the Department of Health and Human Services assists in the understanding of the environmental microbiology and resulting

health effects. The actual coordination of these roles and efforts is done at multiple levels and through multiple vehicles, that include high level interagency policy and planning committees and working groups.

The Department of Homeland Security's Science and Technology Directorate is working very closely with EPA's National Homeland Security Research Center in all of these venues.

Water security and building decontamination are the most two significant areas of coordination and collaboration for EPA and DHS. The EPA's Safe Buildings Program addresses three areas of importance to near-term improvements in building decontamination. These include materials compatibility, of the current leading candidates for decontamination, with the various materials present in a building, the appropriate sampling techniques and protocols for sampling the variety of porous and non-porous surfaces encountered in a building to assist in any residual decontamination effects, issues. And methods for reducing the amount of contaminated waste.

DHS has a number of complementary activities in these areas. In collaboration with EPA, the Centers for Disease Control, NIOSH and San Francisco International Airport, we are conducting an integrated systems program to develop pre-approved plans and decontamination agents for restoration of airports as a first step in extending these capabilities to a broad range of facilities.

In support of this, DHS has commissioned the National Academy of Sciences to conduct a study titled "How Clean is Safe?" to better aid us in our understanding and—for establishing appropriate cleanup levels for the biological decontamination of public facilities.

DHS is also sponsoring studies on improved gas phase decontamination technologies and delivery systems. An important vehicle in coordinating these and other activities is the Building Protection Working Group, co-chaired by DHS and EPA, and it also includes DOD and DARPA, the Defense Advanced Research Projects Agency. Another area of focus addresses radiological decontamination and DHS Federal Government requirements for research, development, test, and evaluation needs in this area.

EPA's strong R&D program in water security encompasses threat assessments and prioritization, modeling the flow of water with potential contaminants through complicated water distribution systems, and field testing and refining these models in real world systems and collaborations, at the U.S. Army's Edgewood Chemical and Biological Defense Center. To complement these activities on the biological front, DHS is conducting an end-to-end systems study of high treat water contamination scenarios to characterize all aspects of the problem, from agent introduction through detection and response, to decontamination and restoration. DHS has also been getting an integrated systems demonstration to explore and test concepts for near-term monitoring architectures, again, in close coordination the EPA.

In addition to these targeted water security activities, DHS was BioWatch, a major biological threat detection program, operating in numerous U.S. cities. Many of the concepts and approaches used in BioWatch, we believe are applicable to water monitoring systems that will be available in the near and longer term. And as with the

building protection activities, an active working group, the Water Distribution Systems Research Consortium, is focusing on this issue.

Because of a sense of national urgency, the activities I have addressed here have focused on optimizing currently available technology for improved near-term solutions. They do not address the longer term needs inherent in an affordable and timely integrated biodefense, and the responsibilities actually called out in the HSPD–10. For example, building decontamination systems under development today will still be too costly and slow for large scale cleanups, although they are a significant improvement over those used for Brentwood.

Furthermore, the underlying experimental database for setting cleanup standards and performing risk assessments is extremely sparse. Little is known, for example, about the dose response levels at which individuals get sick, or about the persistence of an agent, once it is released into indoor and outdoor environments, or in our water distribution systems, yet these are critical to executing the responsibilities called out in HSPD–7, –9, and –10.

In closing, I would like to say that the Department looks forward to continuing to support EPA in its role as lead agency in the areas of building decontamination and water security. We view these collaborative work as necessary and vital for safeguarding the health and safety of the American public, and an important part of our mission, to prevent, protect against, respond to and recover from acts of terror against the Nation.

Mr. Chairman, Members of the Subcommittee, this concludes my remarks.

[The prepared statement of Dr. Albright follows:]

PREPARED STATEMENT OF PENROSE ALBRIGHT

Good morning Chairman Ehlers, Congressman Udall, and Members of the Subcommittee on Environment, Technology and Standards.

I am pleased to have this opportunity to appear before you today to report on how the Science and Technology Directorate of the Department of Homeland Security (DHS) and the U.S. Environmental Protection Agency (EPA) are coordinating on homeland security research and development activities in the areas of water systems and building security. I commend you for your interest in and support of the federal effort to protect the Nation's water supply and critical facilities from chemical, biological or radiological/nuclear attack and to ensure that the proper systems are in place to respond effectively in the event of any such attack.

A chemical, biological or radiological/nuclear attack against our water supply or private public facilities could result in a large-scale loss of life and be detrimental to our economy.

Central to the Department's mission is to reduce security threats and to protect the United States from terrorist attacks—including those directed at our water supply and buildings. We are committed to working with federal, State, tribal, and local authorities to prevent any such attack.

Building security is also an integral part of any plan to protect the homeland. We know that landmark buildings and buildings that draw large numbers of people are attractive targets for terrorists. The Nation needs new and improved technologies to protect these structures.

Homeland Security Presidential Directive 10

Homeland Security Presidential Directive 10 (HSPD–10)—Biodefense for the 21st Century, issued last month, provides a comprehensive framework for the Nation's biodefense and among other things, delineates the roles and responsibilities of federal agencies and departments in continuing their important work in this area. Decontamination and water security are key elements in the President's integrated

biodefense strategy. The need for biodefense and the challenges we face implementing it are great:

- Biological attacks could potentially contaminate significant portions of an urban area;
- Affordable, timely approaches for cleaning up contaminated areas remain a serious challenge. For example, the decontamination of the Brentwood Post Office, following the anthrax-in-the-mail events of October 2001, cost about $100 million, and took over a year to accomplish.
- Recent studies have identified the need for more effective measures to safeguard our water supplies against attacks.

Roles and Responsibilities

Three presidential directives designate the agencies responsible for leading and supporting the effort to address the potential threat of biological attacks, attacks on our water supply, and affordable timely decontamination should such attacks occur. Specifically, HSPD–7 Critical Infrastructure Identification, Prioritization and Protection and HSPD–9 Defense of United States Agriculture and Food, have assigned the EPA as the lead agency to enhance the protection of the Nation's water supply. HSPD–10 Biodefense in the 21st Century, has likewise designated EPA as the lead agency to coordinate the development of strategies, guidelines and plans for decontamination following a biological attack. We fully support the EPA in these efforts.

While the HSPDs designate EPA as the lead in these areas, they also specify the other departments and agencies that will support EPA in these efforts. The directives recognize the multi-disciplined nature of the challenges before us and the need to effectively utilize the particular expertise and capabilities of the other departments and agencies. Thus while EPA provides overall leadership and coordination, the Departments of Homeland Security and Defense will assist by providing needed detection and decontamination technologies to EPA as well as integrated systems approaches; and the Department of Health and Human Services can assist in the understanding of the environmental microbiology and the resulting health effects.

The actual coordination of these roles and efforts is done at multiple levels and through multiple vehicles that include high-level interagency policy and planning committees, interagency working groups on specific project areas, and collaboration on individual projects. The DHS Science and Technology Directorate is working closely with EPA's National Homeland Security Research Center in all these venues.

EPA and DHS Science and Technology Areas of Collaboration

Water security and building decontamination are two significant areas of coordination and collaboration for EPA and DHS.

Building Decontamination and Biological Research

The EPA's Safe Buildings program addresses three areas of importance to near-term improvements in building decontamination. These include the materials compatibility of the current leading candidates for decontamination with the various materials present in a building; the appropriate sampling techniques and protocols for sampling the variety of porous and non-porous surfaces encountered in a building to assess any residual contamination; and methods for reducing the amount of contaminated waste.

DHS has a number of complementary activities in this area. DHS, in collaboration with the EPA, Centers for Disease Control, the National Institute for Occupational Safety and Health, and the San Francisco International Airport, is conducting an integrated systems program to develop pre-approved plans and decontamination agents for restoration of airports as a first step in extending these capabilities to a broad range of facilities. In support of this, DHS has commissioned the National Academy of Sciences to conduct a study titled "How Clean is Safe?" This study will aid in understanding and establishing appropriate clean-up levels for decontamination of public facilities affected by exposure to harmful biological agents. DHS is also sponsoring a number of studies on improved gas phase decontamination technologies and the systems to deliver them.

An important vehicle in coordinating these and other activities is the Building Protection Working Group, which meets on a monthly basis. This working group is co-chaired by DHS and EPA and includes the Defense Advanced Research Projects Agency, the Department of Defense, the National Institute of Standards and Technology, the Centers for Disease Control and Prevention, the National Institute for Occupational Safety and Health, the United States Postal Service, and the Government Accounting Office.

Building Decontamination and Radiological/Nuclear Research

DHS is also working to coordinate and resolve issues concerning radiological decontamination. One area of focus addresses DHS/Federal Government requirements for radiological and nuclear decontamination research, development, test and evaluation needs. We are also coordinating with EPA in an effort to define standards for achieving "clean enough" status of target areas and water supplies following a nuclear or radiological attack. DHS is working with EPA to ensure that these standards get defined in a timely manner and to an extent that will be physically achievable while minimizing economic impact.

Other Federal Government Work and Collaborations

In the area of medical treatments to contaminated people, DHS is coordinating with Health and Human Services to ensure that the necessary radiological medical diagnostic tools and treatments are efficaciously developed.

In addition, DHS is collaborating with the Defense Advanced Research Projects Agency (DARPA) on the first phase of an integrated radiological decontamination program. The program will address radionuclide capture decontamination, wide area detection, verification and modeling.

Other Federal Government Work Outside of DHS

DHS is also aware of and following the progress of several other efforts within the Federal Government. The Technical Support Working Group (TSWG) is supporting research on radionuclide fixing technologies. The Department of Energy has significant experience in radiological site clean up of its contaminated weapons facilities, and the Department of Defense has programs focused on decontamination of military assets.

Water Security

EPA is currently performing research on identification of drinking water contaminants, analytical methods, monitoring systems, contingency planning, and infrastructure interdependencies to protect wastewater collection, treatment and infrastructure but has not focused previous efforts on new technologies for large-scale urban radiological incidents. EPA is also initiating a Preliminary Scoping and Assessment Study to better define problems related to water quality likely to be encountered in response to large-scale urban radiological contamination incidents.

EPA's strong R&D program on water security encompasses threat assessments and prioritization, modeling the flow of water with potential contaminants through complicated water distribution systems, and field testing and refining these models in "real-world" systems and collaborations with the U.S. Army's Edgewood Chemical and Biological Defense Center. The Center performs tests with actual biological agents in a special constructed water distribution loop at that facility.

To complement these activities on the biological front, DHS is conducting an end-to-end systems study of a high-threat water contamination scenario to characterize all aspects of the problem—from agent introduction, through detection and response, to decontamination and restoration. DHS is also beginning an integrated systems demonstration to explore and test concepts for near-term monitoring architectures.

In addition to these targeted "water security" activities, DHS has a major program in bio-warning (BioWatch) and in developing the associated detection systems and the underlying biosignatures and assays that are key to the highly sensitive detection of biological agents with the very low false alarm rates that are required for an effective biological monitoring system. Many of the system concepts and approaches, as well as the specific technologies, should find direct applicability both in near- and longer-term water monitoring systems.

As with the building protection activities, an active working group (the Water Distribution Systems Research Consortium) brings together researchers from the various departments and agencies with the appropriate user communities and national organizations.

Gaps and Future Directions

Because of a sense of national urgency, the activities I've addressed here have focused on optimizing currently available technology for improved near-term solutions. They do not address the longer-term needs inherent in an affordable and timely integrated biodefense and the responsibilities actually called out in the HSPD–10. For example, the building decontamination systems under development will still be too costly and slow for large-scale clean-ups, although they are a significant improvement over those used for Brentwood. Furthermore, the underlying experimental data base for setting clean-up standards and performing risk assessments is extremely sparse. Little is known about the dose-levels at which individuals get sick or about the persistence of an agent once it is released into indoor and

outdoor environments or our water distribution systems. Yet these are critical to executing the responsibilities called out in HSPDs–7, –9, and –10.

Conclusion

In closing, I'd like to say that the Department looks forward to continuing to support EPA in its role as lead agency in the areas of building decontamination and water security. We view this collaborative work as necessary and vital to safeguarding the health and safety of the American public and an important part of our mission to prevent, protect against, respond to and recover from to acts of terror against the Nation.

Mr. Chairman, Members of the Subcommittee, this concludes my remarks. I will be happy to take your questions now.

Chairman EHLERS. Thank you. Dr. Kolb. Can you turn on your microphone, please?

STATEMENT OF DR. CHARLES E. KOLB, JR., PRESIDENT AND CEO, AERODYNE RESEARCH, INC.

Dr. KOLB. This afternoon, I am representing the National Research Council's committee to review the EPA's Safe Buildings research and development effort. Our committee performed its work from March through October of 2003, and we have published a report, which you have available, presenting our findings and recommendations.

The first thing our committee did was to confirm that the EPA had recognized and structured their research program around the four logical components of an effective safe building R&D program. These components are detection of the chemical or biological agent that is used in an attack, containment of that agent, either during an attack or subsequent to an attack, during cleanup activities, decontamination of the affected areas of the building, and finally, disposal of cleanup materials and any residue from the building that was contaminated too badly to be left in place.

We feel that a program based on these four components is very well-founded, and would be able to address the charter given the EPA very well. Given the short three-year term of the program that Congress has put in place, and the relatively modest level of funding available over those three years, we did strongly recommend that the Agency focus its R&D program on specific areas that would be amenable to progress in that kind of time scale, and also which drew on the Committee's traditional technology strengths.

In particular, we urged that most of the efforts of the program be focused on decontamination and disposal activities, and that work on detection of agents be aimed only at those areas which supported the decontamination and disposal activities, and also that work on containment be restricted to those activities that would help contain the agent during decontamination and disposal activities.

We felt that detection and containment activities that were aimed at modifying an attack while it took place, identifying an attack in real time and modifying it while it took place were of such longer term—or were much longer term challenge, and could not be effectively addressed within the time scale of the current program.

We did recommend that the Agency plan for a longer term program, and in fact, identified in our report a number of research

issues and areas which we felt should be addressed on longer than a three-year time scale.

Finally, we did urge that the EPA reach out to activities within other federal agencies. At the time, our committee was chartered. We were well aware of important activities in DARPA and the Department of Energy which were quite pertinent, and we assumed that as DHS got organized, very important activities would occur there as well, and so we did recommend that the Agency spend more effort and resources on their coordination with other agencies.

I think that is a fair summary of our report, and I would be happy to answer more directed questions.

[The prepared statement of Dr. Kolb, Jr. follows:]

PREPARED STATEMENT OF CHARLES E. KOLB, JR.

Good morning Mr. Chairman and Members of the Committee. My name is Charles Kolb. I am President of Aerodyne Research, Inc. in Billerica, Massachusetts, and served as a member of the Committee on Safe Buildings of the National Research Council. The Research Council is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology. I am here today to discuss the findings of a Research Council review of the Environmental Protection Agency (EPA) Safe Buildings Program Research Implementation Plan. This review was requested and sponsored by EPA. It was carried out by a committee of twelve experts who gave their time *pro bono* for the review. The committee members had expertise in areas including toxicology, chemistry, mechanical engineering, building technology, indoor air quality, microbiology, toxic chemical and biological agent detection, and aerosol distribution microphysics and dynamics. The committee began its work in March of 2003 and delivered its report to EPA in October 2003. My comments are based on the results of that report.

The committee was asked to review the EPA's Research Implementation Plan for its Safe Buildings Program. The plan presented to the committee attempted to address the three issues of (1) protecting building occupants during a terrorist attack that contaminates the indoor air with chemical or biological agents, (2) safe, efficient, and cost-effective decontamination of buildings that have been contaminated with chemical or biological agents, including disposal of contaminated materials, and (3) conveying information about decontamination to relevant stakeholders. The committee was asked to review the research plan and comment on whether it accurately identified the research issues, and appropriately prioritized and sequenced projects to address those research needs.

The committee was confronted very quickly with the reality that given the budget and three-year time frame proposed for this program, the EPA had proposed a rather ambitious program. In the committee's judgment, the research plan as it was presented to them at the time was unlikely to achieve all of its goals, and the committee therefore determined to focus its recommendations on those that could help EPA prioritize within the four major program areas it had identified. Those four program areas—detection, containment, decontamination, and disposal—did encompass the major areas of research required to protect and decontaminate structures. However, the committee concluded that given the limits on time and resources, and given EPA's core skills, the areas of detection and containment should be scaled back and made subordinate to the areas of decontamination and disposal. I will elaborate by discussing each of the four areas in turn.

Decontamination is an area in which EPA has considerable expertise from its experience with Superfund sites, brownfield projects, and with other programs to mitigate contamination by toxic industrial and agricultural chemicals. The committee saw EPA's primary role in safe buildings as that of providing the ability to complete restore domestic facilities rapidly and safely after an attack. In the short timeframe of the current program, the committee thought that EPA should focus on developing standardized test protocols for determining the effectiveness and performance of decontamination technologies and on applying those protocols to evaluate available and developing decontamination systems. Although the Department of Defense has test protocols in place for its decontamination procedures, these are not appropriate for use in civilian facilities where long-term occupancy with no adverse chronic health effects is the goal. The committee recommended that EPA use its existing

Environmental Technology Verification (ETV) program to test and evaluate the performance of proposed decontamination systems.

For disposal of materials post-decontamination, such as clean-up materials, contaminated solvents, and building materials that could not be fully decontaminated, the EPA program focuses on thermal incineration and landfills. However, thermal treatments may not be viable approaches in some states where air quality regulations or local stakeholder concerns prevent incineration of waste. EPA needs to analyze the layers of federal, state, and local regulations to understand where and in what circumstances incineration might be considered. The committee thought EPA should concentrate its current efforts in solid waste disposal on developing criteria that if met would permit the large volume of post-decontamination waste likely to be generated to be disposed of in municipal landfills. The key question is whether the material can be decontaminated or stabilized sufficiently to meet the criteria for acceptance as municipal waste rather than being treated as toxic waste. The EPA also needs to determine whether current hazardous waste disposal methods are adequate for handling any liquid wastes generated in the decontamination process.

The area of detection is of course crucial to confirming the extent of contamination, and confirming the success of decontamination. Logically, detection spans two distinct regimes: 1) continuous, real-time, automated instrumentation designed to sound alarms and/or trigger containment systems when a building is attacked, and 2) post attack agent detection systems designed to assess the degree of contamination and the success of clean-up efforts. The committee identified many other agencies and private firms that are involved in sophisticated detector and detection system development aimed at the first regime and felt that the small investment EPA could make in this area and its limited expertise with continuous, real-time detection instrumentation was not likely to have significant impact. In the limited timeframe and resources accorded to the current program, EPA has little possibility of making a significant contribution in "detect-to-warn" systems. The committee thought that EPA efforts in detection under the current program should be fully directed towards detection technology and standards useful for decontamination and disposal activities—that is, to post-event activity. EPA is highly suited to develop the standards for detection technology needed in decontamination and disposal efforts, to lead the development of test protocols and test-beds for these detectors, and to sponsor realistic testing for that decontamination/disposal detection equipment.

Finally, the plan presented to the committee included projects aimed at containing agents introduced into a building in order to mitigate the harmful effects to building occupants. However, the vast number of chemical and biological agents, each with its own toxicity signature, and the essentially unbounded number of building types, creates a challenge to providing meaningful advice regarding containment during attack. Development of practical containment strategies that are broadly applicable to buildings or to classes of buildings requires a major research endeavor that is beyond the scope of the current program. However, there are real needs associated with containment of identified agents during post-event decontamination and disposal that should be addressed by the EPA's program.

In its report the committee stressed time and again the need to focus the current program on goals that were realizable within its short three-year timeframe. However, the committee also recognized considerable longer-term research needs in all four of these program areas. In addition to carrying out a program of prioritized short-term research, the committee recommended that EPA include in its current effort a planning function for longer-term research. Longer-term research needed includes research:

- To better characterize the extent of an attack, including better standards for cleanup levels, better sampling methodology, and better understanding of the transport, robustness, and viability of chemical and biological agents across the full range of public structures,
- To develop methods for decontamination of sensitive equipment and priceless objects, and hard-to-reach places such as the interior of ductwork and the area above ceiling tiles,
- To evaluate of the toxicology of decontaminating agents, and any toxic by-products that might be formed during the decontamination process, and
- To better understand and improve the tools for modeling building airflows, contaminant dispersal patterns, and other information needed to develop practical real-time containment strategies.

In summary, the committee found that EPA had correctly identified the research areas that need to be addressed to enable better building protection, decontamination and recommissioning post-event. But the research implementation plan pre-

sented to the committee in 2003 was overly ambitious given the timeline and resources available to the program. The committee recommended that the EPA scale back its efforts within the program to those elements that could produce meaningful results within that timeframe, enhance collaboration and coordination with other federal efforts to maximize the results of the program, and produce a longer-term research plan that might be implemented if funding were made available.

Thank you for the opportunity to present these findings to you today.

BIOGRAPHY FOR CHARLES E. KOLB, JR.

EDUCATION

Ph.D. in Physical Chemistry, Princeton University, 1971
M.A. in Physical Chemistry, Princeton University, 1968
S.B. in Chemistry, Massachusetts Institute of Technology, 1967

EXPERIENCE

Dr. Kolb is the President and Chief Executive Officer of Aerodyne Research, Inc.; he joined Aerodyne as a Senior Research Scientist in 1971. At Aerodyne, his personal areas of research have included atmospheric and environmental chemistry, combustion chemistry, chemical lasers, materials chemistry, and the chemical physics of rocket and aircraft exhaust plumes. He is the author or co-author of over 160 archival publications in these fields.

Dr. Kolb has been a member of numerous government and National Academy of Sciences/National Research Council committees dealing with atmospheric and environmental chemistry issues and was recognized as a National Associate of the National Academies in 2003. He received the 1997 Award for Creative Advances in Environmental Science and Technology from the American Chemical Society. He has been elected a fellow of the American Physical Society, the Optical Society of America, the American Geophysical Union, and the American Association for the Advancement of Science; and has served as the atmospheric sciences editor of the journal, *Geophysics Research Letters* (1995–1999).

Chairman EHLERS. Thank you very much. Dr. Baecher. Would you turn on your microphone, please?

STATEMENT OF DR. GREGORY B. BAECHER, PROFESSOR AND CHAIRMAN, DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING, UNIVERSITY OF MARYLAND

Dr. BAECHER. Good afternoon, Mr. Chairman and Members of the Subcommittee. Thank you for this opportunity to be here to discuss our nation's water security.

I am representing the National Research Council Panel On Water Systems Security Research. That panel conducted its review of the April 2003 Draft Plan from EPA, and my comments refer to that version of the plan.

You will notice we have heard this afternoon from Dr. Gilman that there has been considerable work since the time of this review, and that work is ongoing. At the Committee's request, my remarks this afternoon address two things. First, our key findings and recommendations, as presented in the report, and second, where there are sufficient—whether there is sufficient collaboration among EPA and other interests to ensure that the research agenda is focused.

But first, turning attention to our key findings, given the urgency under which EPA is working, the panel commends the Agency for the speed and the diligence of its efforts. The Action Plan contains and long and well-conceived list of needs, which if met would provide significant information to help water managers across the country respond to threats and to attacks.

However, the research projects in themselves will not result in improved protection for our nation's water systems. EPA needs to prepare plans to integrate research results into guidance, and to

recognize the need for funded implementation plans for water utilities across the Nation.

The panel was cognizant of EPA's need to act quickly, and supports EPA's focus on building a practical program of research and support, emphasizing continual improvement to our capacity for response and recovery. The EPA's strategy to emphasize immediately usable and first approximation results, the panel thought was a sound one.

Nevertheless, certain technology advances can only be accomplished through long-term research. One example is the interaction of different infrastructure sectors, as we were so painfully aware of in the national capital region in the recent hurricane damage.

The plan should highlight such long-term research needs so that a collaboration of agencies can work to ensure that substantive mission-oriented research questions in water security are not overlooked.

Finally, the Action Plan is silent on the financial resources required to complete research and to implement countermeasures. The value of water security needs to be communicated to affected parties, because increased rate structures or reallocations will be needed to create the financial resources necessary to implement countermeasures.

The EPA should quantify benefits as well as costs of the proposed research, and especially identify business-enabling dual use benefits of security enhancements, which will provide net economic benefits to the Nation.

Turning attention to the second question regarding collaboration among EPA, DHS, and other interests. Three points. In an emergency, it will be too late to discover that a critical activity that was thought to have been under the control of another agency has been overlooked. Although the Action Plan recognizes the importance of coordination among relevant agencies, presumptions are made about the activities and capacities of other agencies that need to be verified.

For example, the presumption that if water contamination causes a notifiable disease, that disease will be picked up by existing health surveillance systems, implicitly assumes the timely reporting to local health authorities and to the Centers for Disease Control that may not be routinely occurring.

Second, the special circumstances of a purposeful attack will require that the roles and responsibilities of various relevant parties, including law enforcement, be worked out ahead of time. The use of field and table-top exercises as described in the plan is strongly encouraged to help utilities and federal, state, and local agencies develop coordination.

Third, developing an effective communication strategy that meets stakeholders' needs while addressing security concerns should be a high Agency priority. Consideration should be made as to how water security information databases will be accessed, who will be granted access, who will control and update the databases, and how the databases will be integrated with legacy systems.

By way of conclusion, the drinking water research needs and projects identified within the Action Plan, and the panel's view, are

lengthy and detailed, but if met, would provide added knowledge to help water managers respond to threats and attacks.

Thank you again for the opportunity to discuss the safety of the Nation's waters. Drinking water is critical to the public health, to our nation's security, and to our economy, and I would be happy to answer any questions you may have.

[The prepared statement of Dr. Baecher follows:]

PREPARED STATEMENT OF GREGORY B. BAECHER

Good afternoon, Chairman Ehlers and Members of the Committee. Thank you for the invitation to discuss the security of our nation's water systems. I am Gregory B. Baecher, Professor of Civil and Environmental Engineering at the University of Maryland, and a member of the National Research Council Panel on Water System Security Research. The National Research Council (NRC) is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology. The Panel on Water System Security Research was organized by the National Research Council's Water Science and Technology Board in response to an Environmental Protection Agency request to review EPA Homeland Security efforts in the areas of water systems and safe buildings.

The consequences of a terrorist attack on the Nation's water supply to public health, national security, and the Nation's economic services could be significant. Terrorist incidents of the recent past have heightened concerns regarding the vulnerabilities of public water systems to deliberate attack. The Environmental Protection Agency (EPA) bears lead responsibilities for protecting water systems from terrorist threats, and the agency is working in partnership with Federal, State, and local government agencies, water and wastewater utilities, and professional associations to ensure safe water supplies.

To support its water security responsibilities, the EPA developed the *Water Security Research and Technical Support Action Plan (Action Plan),* released in 2003, which identifies critical security issues for drinking water and wastewater, outlines research and technical support needs within these issues, and presents a prioritized list of research and technical support projects to address these needs. The *Action Plan* is being used by EPA to establish funding priorities for water security research and technical support efforts over a three-year period.

The National Research Council's Panel on Water System Security Research conducted a review of the *Action Plan* from May through September of 2003. The report resulting from our studies provides an assessment according to the following questions: (1) has the *Action Plan* completely and accurately identified important issues and needs for water security; and if not, what issues and needs should be added; (2) are the needs appropriately sequenced; (3) are the projects recommended for funding in the *Action Plan* appropriate to meet our water security needs, are they correctly prioritized and sequenced, and is their timing realistic; and (4) overall, what changes of content or structure in the Action Plan are recommended to improve the presentation to convey more clearly the water security research and technical support program that is described? It should be noted that the panel was reviewing a work in progress and also that we functioned on a very fast timetable. The panel focused its review on an April 2003 draft of the *Action Plan,* although the program was continuously maturing during the review period, and many developments have undoubtedly occurred since the review was completed.

At your committee's request, my comments focus on:

- Key findings and recommendations of the National Academies' report, *A Review of the EPA Water Security Research and Technical Support Plan (Parts 1 & 2);* and
- Collaboration among EPA, the Department of Homeland Security (DHS), and other interests, to ensure that EPA is properly focusing its research agenda; and what steps EPA and DHS should take to improve this collaboration?

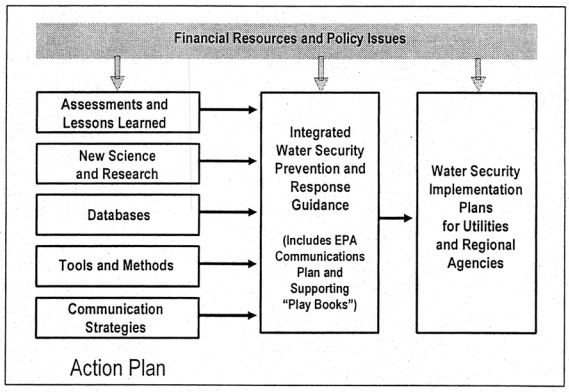
KEY FINDINGS AND RECOMMENDATIONS

Given the urgency and limited time within which EPA has been working on water security, our panel commended EPA for the speed and diligence of its efforts. Nevertheless, given time and resource constraints on the water security program, the panel recognized that EPA needed to prioritize its efforts to meet urgent needs, while simultaneously preserving a longer-term research and technical support strat-

egy for water security and remaining mindful of the agency's other essential tasks that contribute to public health and security. In order to assist the EPA in prioritizing its water security efforts, the panel recommended that the EPA focus on building a *practical* program of water security research and technical support, emphasizing a continuing improvement in response and recovery capacity, while identifying cost-effective countermeasures based on an understanding of the nature and likelihood of potential threats.

The *Action Plan* contains an extensive list of drinking water and wastewater research and technical support needs and associated projects that cover many critical water security issues. However, the projects will not, in themselves, result in improved protection of the Nation's drinking water and wastewater systems. Improved protection will result only when the information and knowledge gained from the projects are integrated into funded water security plans that are implemented by collaborations among private and public organizations.

The figure below suggests a framework for how individual research and technical support projects contained in the *Action Plan* could contribute to improved water security. Specifically, the *Action Plan* encompasses data collection and assessments; database creation; new scientific research, tools and methods development; and communication strategies. In order to assist utilities and regional agencies in utilizing this information, our panel suggested that a comprehensive guidance document be developed that would direct a utility through available prevention strategies, information resources, communication planning, and response and recovery actions.



Example framework for depicting the contributions of the Water Security Research and Technical Support Action Plan to the broader needs for protecting the nation's water systems (including drinking water and wastewater).

The *Action Plan* recognizes that information is essential to effective response and recovery programs, but there should be emphasis on making this information immediately useful. If an event were to happen tomorrow, water systems, local and state health departments, and emergency response agencies would have to respond on the basis of whatever information was available. The ability to respond and recover will be a process of successive approximations that will improve as information and methods improve. The *Action Plan* should be implemented with this iterative process in mind.

The panel was concerned by the management responsibilities arising from the *Action Plan.* Project managers will need to be continually aware of related activities inside and outside EPA to minimize duplication of effort and to allow updating of protocols as new data are generated. If projects suffer from frequent change of leadership, coordination will be impaired, harming essential integrating functions. The panel suggested that EPA implement a management plan that includes adequate resources and stable leadership to coordinate the many projects. This plan should include a schedule for reviewing the progress of the overall water security effort and for periodically reassessing priorities.

The *Action Plan* is silent on the financial resources required to complete the proposed research and technical support projects and to implement the countermeasures needed to improve water security. The panel concluded that the EPA

should attempt to quantify benefits and costs resulting from the proposed research and technical support projects, and further study should be directed to better acknowledging business-enabling, dual-use benefits of security enhancements. More emphasis is needed on communicating the value of water and increased water system security with the public, rate regulators, and local elected and appointed officials, because increased revenues through user-rate increases or reallocations of resources will be needed to create the necessary financial resources to implement such countermeasures.

The panel recognized the need to act quickly to address issues of water security. The EPA strategy in the *Action Plan* to emphasize immediate usability and first approximations is a sound one, but certain research or technological advances may be accomplished only through long-term research investments. The panel recommended that the *Action Plan* clarify which of its research activities are short-term, applied efforts and highlight long-term research needs, so that a collaboration of agencies could work to ensure that substantive, mission-oriented research questions in water security are not overlooked.

COLLABORATION AMONG EPA, DHS, AND OTHER INTERESTS

The *Action Plan* concentrates, understandably, on matters that the EPA has traditionally handled and for which it has expertise. While there have been problems of both overlap and gaps in the activities of the EPA and other federal agencies under ordinary circumstances, the lack of urgency in most cases has allowed these issues to be addressed over time. In the midst of an emergency, however, time may not allow for the discovery that a critical activity, which was thought to be under the control of another agency, had been overlooked due to poor coordination. Although the *Action Plan* recognizes the importance of coordination among relevant agencies, there are assumptions made throughout the *Action Plan* about the activities and capabilities of other agencies that may not be correct or may be over stated.

The rapidity and high stakes of potential terrorist attacks on water supplies suggest that the EPA should pay particular attention to improving interagency coordination and to determining the roles, capabilities, and training of other agencies with regard to water security. The special circumstances of a purposeful attack will require that the roles and responsibilities of various relevant parties (including law enforcement, FBI, and environmental and public health authorities) be worked out in detail ahead of time. The use of field and table-top simulation exercises is necessary to help utilities and federal, State and local agencies develop improved coordination and response and recovery strategies. All personnel who would respond to a water system attack should be involved, including water and wastewater utilities, police, public health workers, and emergency medical personnel.

The events contemplated by the *Action Plan* take place in the context of a potential crime. Roles and responsibilities of cognizant parties, including law enforcement, must be established ahead of time. The anthrax episodes of 2001 brought this into sharp relief. Legal issues related to criminal investigations, such as chain of custody, preservation of evidence, and control of information need to be considered in advance; the need for information dissemination to the public, to environmental response teams, and to health authorities will create opposing demands at critical times.

Developing an effective communication strategy that meets the needs of the broad range of stakeholders, including response organizations, water organizations and utilities, public health agencies, and the media, while addressing security concerns, should be among the highest priorities for the EPA. Criteria for classifying and distributing sensitive information should be developed that recognize the need for all water utilities, local and state agencies, researchers and consultants to have access to water security information. Consideration needs to be taken of how the water security information databases will be accessed, who will be granted access, who will control and update databases, and how new databases will be integrated with current systems. The EPA should thoroughly examine the consequences of various levels of information security and fund formal studies on the risks and benefits of widely transmitting water security data (including involvement of a wider research community). The dangers of keeping information too closely guarded may, in fact, be greater than those of informing an ill-intentioned person.

ACTION PLAN PROJECTS AND IMPLEMENTATION

The drinking water research needs and projects identified in the *Action Plan* are lengthy and detailed, and, if pursued, would provide significant information, tools, and methods to help water managers respond to threats or attacks. Less information is presented in the *Action Plan* regarding threats to the Nation's wastewater infrastructure, making it difficult to assess the adequacy of the proposed research.

In its review of the *Action Plan,* the panel proposed revisions to the 35 water security needs and suggested two additional needs. The panel also evaluated the focus, priority, and timing of 123 projects, and suggested 18 new projects.

The *Action Plan* discusses how to conduct the research through collaborations with other organizations but at the time of the review did not include plans for funding this research or integrating the results into effective preparedness and response plans for the Nation's utilities. The panel concluded that an implementation plan was needed that would clearly articulate the roles and responsibilities of other organizations and federal agencies in respect to implementation of this research and technical support plan. Not all water security research and technical support guidance will be the responsibility of the EPA, but in order to develop effective collaborations, clear allocations of responsibilities are needed. In order to facilitate fast and effective implementation of this research plan, the panel recommended that the *Action Plan* include a thorough and up-to-date assessment of water security research activities that are underway in other agencies or organizations (e.g., the Department of Defense and universities) as well as a summary of related ongoing EPA efforts, beyond those outlined in the *Action Plan.*

Plans should also be included for communicating research findings and distributing the tools resulting from the *Action Plan* projects to stakeholders in a timely manner. For example, risk communication is a critical component in an overall crisis management strategy. The EPA needs to consider how to incorporate the current state of the knowledge in risk communication into its guidance to water utilities and organizations.

Again, thank you for the opportunity to discuss the safety of our nation's water systems. Drinking water is critical to public health and the Nation's security and economy. The EPA activities that were the subject of our studies are critical to the Nation's safety and should continue, considering the recommendations of our panel. I will be happy to answer questions you may have.

Biography for Gregory B. Baecher

Gregory B. Baecher is Professor of Civil and Environmental Engineering at the University of Maryland, College Park. He is a member of the National Research Council's Water Science and Technology Board and a member of the Board's former Panel on Water System Security Research. He was formerly Professor of Civil Engineering at the Massachusetts Institute of Technology, and an senior executive in the private sector. He received a BSCE from the University of California at Berkeley, and M.Sc. and Ph.D. from MIT. His area of teaching and research is project management and risk analysis, principally in application to the Nation's water resources infrastructure. He is the author of two recent textbooks on risk assessment of dams and on geotechnical reliability, and is the editor of a forthcoming NATO advanced scientific institute proceedings on the protection of civil infrastructure from acts of terrorism. He has served on several NRC committees on water resources planning, risk analysis, and homeland security.

Disclosure Statement

PROJECT TITLE:

EPA Homeland Security Efforts: Water Security Research and Technical Support

SPONSOR:

Environmental Protection Agency

SPONSOR AWARD NO:

68–C–03–037, Work Assignment #0–2

TOTAL POTENTIAL AWARD:

$181,000

AMOUNT OBLIGATED:

$181,000

Discussion

Chairman Ehlers. Thank you very much. I appreciate the testimony, and we will now begin with the questions, and I will open with my questions.

FY 2005 BUILDING DECONTAMINATION RESEARCH FUNDING AND JURISDICTION

Just trying to clarify some of the issues on who does what. This is for Dr. Gilman and Dr. Albright. Given that the President's budget proposes to eliminate EPA's building decontamination research for Fiscal Year '05, which of your agencies will be responsible for building decontamination research in '05? I will start with Dr. Gilman.

Dr. GILMAN. The Presidential Decision Directive that Dr. Albright was discussing in his testimony expects the EPA to be the leader in a cross-agency effort at coordinating and implementing a strategy on decontamination, so the EPA will have a role in that. The exact division of labor within that is a point of ongoing discussion between ourselves and all of the other participants in that coordinating effort. So, the assignment in the post '05 budget is yet to be determined, but we would expect in the process of the '06 budget discussion, the exact tasks that will be undertaken by the Department of Homeland Security and other agencies, as well as the EPA, will be laid out.

Chairman EHLERS. Let me clarify that. You are saying that for Fiscal Year '05, the EPA will continue to have the responsibility, in post '05, you are going to work out that division of responsibility during Fiscal Year——

Dr. GILMAN. We have an ongoing responsibility to overall leadership for decontamination, for the actual projects and programs that might fall under that as it relates to research, we still have to work between our agencies on who will take what role and in what circumstance.

The actual efforts aimed at decontamination, for example, the establishment of a national decontamination team by the EPA are anticipated to be taking place. The question is about research associated with decontamination in '05. That is, what we did not request funds for. That doesn't mean that there will be no research in decontamination. There will be some activities that continue on within the EPA. There are ongoing activities in the Department of Homeland Security, Department of Defense, and other agencies.

Where we go for '06 is really a part of the budget discussions that are underway right now.

Chairman EHLERS. And when do you expect that to be completed?

Dr. GILMAN. Probably shortly before we submit to the Congress.

Chairman EHLERS. Probably the day after you submit it, if you follow previous patterns. The question is how is the EPA going to be able to carry out these responsibilities in '05, because my understanding is there is nothing in the President's budget for you to do that work in '05?

Dr. GILMAN. We have been in the process of trying to prioritize our work, as I have said before. We have moved our decontamination items of highest priority to the fore. Those activities will be funded through the '04 budget that was provided by the Congress. There will probably be some work that carries over into '05 from that '04 level of activity. As you know, continued discussions between the other partners in homeland security and homeland secu-

rity decontamination research are underway in order to determine who will do what in the '05 timeframe.

Chairman EHLERS. Didn't the Administration remove the funding from the '05 budget?

Dr. GILMAN. For the Environmental Protection Agency, yes. Not for other agencies.

Chairman EHLERS. No, but you will still have the lead in '05.

Dr. GILMAN. For coordinating and for leading the strategic thinking in the arena, for decontamination overall, and within that, the research components.

Chairman EHLERS. Well, I am just trying to figure out where the money is going to come from, because, in addition to the EPA, I have NIST under the jurisdiction of this subcommittee, and they got caught in a situation like that this current Fiscal Year. They have just laid off 100 scientists, and they are still going to have huge problems.

The Help America Vote Act is not being implemented properly, because NIST did not get the funding, and I don't want the same thing to happen to EPA. I know the President's budget basically said you have enough money that you can roll over into that, but my understanding is that money is obligated, and you don't have the money.

So I am trying to clarify that. I am here to help you, in other words. I am not sure what you are able to say on this, but I just want to make sure you have enough to do your job.

Can you enlighten me on this? Are you sure you have the money in——

Dr. GILMAN. Let me see if I can separate the two.

In the arena of providing for decontamination in the event of an attack, providing support to private sector entities, EPA does have the lead for that. Our emergency response teams are training up for that, and a special decontamination team is being established in Cincinnati, Ohio.

In the arena of research, then, to support those activities, we will continue to provide leadership in that regard. We have ongoing activities from Fiscal Years '03 and '04. Some of those will carry over into '05. We have not requested funds for '05. Just for what takes place in Fiscal Year '06 as it relates to the budget for research in decontamination for EPA, Department of Homeland Security, and Department of Defense. This really is the subject of a coordinating exercise amongst all of our departments as we speak.

Chairman EHLERS. No, I understand. I'm not concerned at the moment about '06. It is the '05 that concerns me, and I am wondering where are you getting the money to pay for the responsibilities you have? I would hate to see those fall between the cracks.

You haven't yet defined those responsibilities, but you will definitely have a lot of them, because, as you say, you are not going to start the new system until '06. So where is the money going to come from?

Dr. GILMAN. Well, as I say, we have been through our agenda, for research, and put the money toward the highest priority items there. So we are focusing on our high priority items.

Chairman EHLERS. But are you leaving a lot of lower priority items out?

Dr. GILMAN. Those are the things that we will have to discuss with the Department of Homeland Security and other agencies, including the Center for Disease Control and the like, for who is going to do what portions of those for the future.

Chairman EHLERS. All right. My time has expired. We will come back to that in a moment, but let me first recognize the gentleman from Colorado, Mr. Udall.

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS (CRADAS) TIMEFRAMES

Mr. UDALL. Thank you, Mr. Chairman. Dr. Gilman, if I might, I would like to start with you and discuss CRADAs, Cooperative Research and Development Agreements.

There is a small company in Colorado named HACH, Homeland Securities—Security Technologies, and they have been working on a real-time monitoring technology for drinking water distribution systems. I understand they have completed one CRADA with EPA on testing the technology, but they have now been negotiating with EPA for—over the last year, in order to do a second phase of testing.

If I could ask you a trio of questions, why is it taking so long to negotiate the second CRADA, what is the current status of it, and then, what is the typical timeframe for negotiating and implementing cooperative research and development agreements at the EPA?

Dr. GILMAN. Why don't I start with the last first?

What is the typical timeframe? When I arrived at the EPA, one of the first ones to come across my desk had been pending in the Office of General Counsel for two years. Fortunately, that is the rare CRADA. Others move much more quickly than that. Let me combine the status and why so long on HACH.

It doesn't take so long when it is pretty simple and straightforward. As a research matter, the second CRADA, we signed the first formally with HACH just this morning. In the second CRADA, the company is interested in doing some work at a facility we just opened at Edgewood. It is really a new facility aimed at simulating water distribution systems in a controlled environment. We have multiple systems like that at our facilities in Ohio. By going to Edgewood, we could go to the ChemBio Center there and put in live agents, and test them in a safe setting, which is why we have set up a duplicate system there.

In the discussions with HACH, the question is whether or not the technology in the system is ready to go directly into testing at Edgewood, or whether or not it needs some testing at the facilities that don't necessarily work with live agents right at the outset. So, the question for our scientists (and this becomes a scientist to scientist discussion, not a General Counsel to attorney question) is what is the research agenda that we really are looking at, what are the steps we need to do to really validate that the technology does what it was designed to do?

Our scientists believe that we need some preliminary work without live agents before we go to Edgewood and do live agents. That is the point of discussion currently. It is not a question of what the lawyers say. My first indication was that that was the case. Now,

it is a more serious and substantial set of questions of exactly what is the correct research agenda to be pursuing and proving what is a very promising technology.

Mr. UDALL. Do you have any idea when the discussions would be concluded?

Dr. GILMAN. I would have hoped they'd be concluded as we speak. I would like to have signed two CRADAs this morning, not just one. So it is a very high priority for us. EPA takes over operation of the loop at Edgewood in the June timeframe for some of our work, and I am very hopeful that we can do what work is necessary to be done outside the Edgewood setting, and then get to work at the Edgewood setting very soon, this summer, at least.

DECONTAMINATION RESTORATION TURNAROUND TIME, STANDARDS, AND TECHNOLOGIES

Mr. UDALL. If I could, let me focus on Dr. Kolm and Dr. Gilman again. I listened with some interest about the idea that the proper metric for decontamination restoration might be something on the order of one month, preferably two weeks for a structure similar to the Hart Office Building. Is that turnaround time of two weeks attainable, and what are the impediments to achieving the NAS goal of two weeks?

Dr. GILMAN. The first thing to take into consideration is the nature of the agent in question, whether it is a chemical agent or a biological agent, and then obviously within each of those categories, what is necessary in order to do the decontamination. On the biological side, we are currently working with anthrax, the toughest agent to be dealt with on the biological side.

Mr. UDALL. Is that the toughest agent that we could identify?

Dr. GILMAN. That is our surrogate, for the moment.

Mr. UDALL. Okay.

Dr. GILMAN The toughest. So we have started there. Our presumption is if we can clean for anthrax, we can clean for most anything on the biological side. That is something that, in the longer run, we want to expand beyond anthrax and become more agent-specific in our work. But for the moment, as a surrogate, that is where we are.

For the most cost-effective and the most timely, we want to do some of those other agents, ultimately, because if you clean to the standards of anthrax for an agent that doesn't need that, there may be agents through which natural attenuation is the best approach. Isolate the building, leave it alone for a period of time, and you can re-enter. So, to run the various trade-offs between cost-effectiveness and timeliness, there is more work to be done—but it is on an agent by agent specific basis.

Mr. UDALL. Dr. Kolb, did you have anything on that?

Dr. KOLB. Yes, sir. One of the things our committee did identify as a very high priority was that the EPA program, and decontamination program, spent a lot of effort identifying standards for cleanup. It is very important to be able to answer the question how clean is safe, and it is difficult to clean a building and recertify its occupancy if you don't have well set standards. The ability to thoroughly test to make sure that the decontaminate agents have indeed met those standards.

We feel that the EPA has a very, very important role to play to set those standards for a full range of threat chemical and biological agents, and to develop test protocols to test decontamination materials and detection schemes, so that it will be straightforward in the event of another attack to determine whether or not the building has, indeed, been cleaned up adequately and has met the standards that were preset for that cleanup.

Chairman EHLERS. The gentleman's time has expired. Dr. Burgess.

Mr. BURGESS. Thank you, Dr. Ehlers. Thank you for convening this hearing. I apologize for being late. Dr. Gilman, in your written testimony, under technical support and technology verification, you talk about over 40 technologies that have been evaluated. Now, as a practical matter, are those things that have been evaluated and found to be successful? What number from that group have we found actually do have commercial utility in cleaning up a noxious agent or a toxin?

Dr. GILMAN. Let me describe the nature of the program. It is not a program aimed at giving an EPA seal of approval. It really is a verification program. We run the different technologies against a standardized protocol, and determine their performance, and then provide that information to the users of the technology. For example, our very first effort was in the area of looking at hand-held cyanide detectors for water utilities that were very interested in a portable capability of measuring cyanide.

The program ran a standard set of protocols, the performance of the different instruments was laid out there, and that now has been pushed out through a formalized communication process through our Office of Water at the EPA to the agencies in question. In the arena of actual decontamination equipment, we are really just at the front end of doing that technology verification effort.

The work at Edgewood that I was talking about in the water side is paralleled by some efforts that we are collaborating with the Edgewood Chemical Biological Center on, looking at building decontamination technology, and it is, again, the same. Hopefully, we will get to the point where we have the same kinds of results, where we have verified the performance of different approaches, and then we allow the performers to select the technology that is most appropriate for their needs.

Mr. BURGESS. Late last year, I did a field hearing on nanotechnology, right after the President signed his nanotechnology bill. I did a field hearing at the University of North Texas in Denton, and some of the scientists there talked about the use of nanotechnology for decontamination, and using buckyballs to surround toxins or noxious elements. Is that something that is being looked at as well?

Dr. GILMAN. We have actually been running a grants program for several years now in the nanotechnology arena, and the original focus was on the use of nanotechnology for remedial action, which you know, is a step along in the process of what we are talking about here, decontamination. We have also been funding efforts looking at it by way of detection, for example, and in some instances, a combination of both detection and decontamination.

So there are some very real possibilities there.

Chairman EHLERS. Thank you. The gentleman's time has expired, and we will begin a second round of questioning, and first, I wanted to get back to you, Dr. Gilman. Still trying to clarify the budget issues, and as I said, my concern is I want to make sure you have the money to do your job. Is it true, and I have been told that you are already scaling back some of your planned Fiscal Year '04 research funding, because the money to complete the research would not be available in Fiscal Year '05. Is that correct, and if so, can you give me some examples?

Dr. GILMAN. As I mentioned, our effort to prioritize the various items on our research agenda, has been underway. We have moved some items to the front of the list. We have taken others off the list. So there are some projects that are off the list. I would be happy to provide you a detailed listing of those things for the record.

I mentioned in my testimony that we had done an analysis of safe havens in homes. Examples include the notion of using plastic and duct tape and, as an aside, when that work is published, after it has been peer-reviewed, I think you will be surprised at the efficacy of that approach. But we had also contemplated evaluating that approach in non-residential settings. That is the kind of thing that we have put to a lower priority, and will not be pursuing because of our prioritization, and generally speaking, a number of things that we have proven out at the bench level, if you will, or in simulation, that we might have done some field testing to further validate, or things that have fallen to the lower priority.

FIELD VALIDATION OF INDOOR AIR EXPOSURE MODELS

Chairman EHLERS. Well, I have a partial list here of things that I have learned about. First, is it true that EPA has canceled plans in Fiscal Year '04 to begin field validating. This may be the one you just referred to, an indoor air exposure model to estimate human exposure to chemical and biological contaminants from an attack, because the funding will not be available to complete the work in the fifth year. Is that one of those?

Dr. GILMAN. That is the model that we have been using in our simulations to try and prioritize research, yes.

Chairman EHLERS. And so you are canceling plans to begin the field validation.

Dr. GILMAN. For the field validation, yes.

Chairman EHLERS. And are you confident enough that the model is correct so you don't have to field validate it?

Dr. GILMAN. Ultimately, we were hoping to do that field validation by way of creating a fairly simple user tool for building owners and operators. This might be a web-based tool. It might be a downloadable tool. Something for them to use in interpreting the guidance that we are going to be providing them on building operation and building contamination and decontamination. Without that field validation, we probably won't make that effort to make it a tool, but there may be other opportunities for us with other agencies to do that kind of work.

Chairman EHLERS. All right. Also, is it true that you have canceled plans to begin looking at threat assessments and exposure

simulations for events other than the highest consequence event, because funding will not be available.

Dr. GILMAN. Well, we have turned our focus to the potentially highest consequence event, as a matter of prioritizing our research needs. So, you know, in effect, how far down you go down the list of your priority needs based on threat assessment is indeed dictated by resources, but where you make those cutoffs is not just a resource question. We have been trying, through doing our simulations, to make some judgment as to the likelihood and the potential consequence. Low consequence items, items that are of high likelihood, fall to a lower level of concern for us.

Chairman EHLERS. Well, the third one. Is it true that the EPA is going to end the technology verification program during Fiscal Year 2004 for building air filters that detect chemicals in the air, because again, you won't have enough money to finish it next year?

Dr. GILMAN. We will complete the verification on 10 filters that we are currently looking at, and have no plans for further work in that area.

Chairman EHLERS. Well, that highlights my concerns, because you have certain areas of lead responsibility, and I understand the need to prioritize. I have also been involved in research, and I have been, in one case, an administrator, and had to make those decisions, too. But it just seems inordinately poor practice to basically cut off something before it should be cut off, forcing you to prioritize even work that is being done this year, because you won't have the money next year.

Dr. GILMAN. And as I said, Mr. Chairman, we are in discussions with the Department of Homeland Security and other agencies, so that if we come across something that falls in the category of high priority, near-term priority, we have the ability to work with them to see if we can take care of that problem.

Chairman EHLERS. Well, everyone knows we have given Homeland Security enough to do all the research this nation is going to need for the next few years, but at the same time, you know, the expertise in the EPA, you have begun the work. It just doesn't seem appropriate for me to cut that off at this point, at least not to the extent it has been cut off.

My time has expired. We will recognize the gentleman from Colorado again, if he has anything else to ask.

THREATS TO WASTEWATER INFRASTRUCTURE

Mr. UDALL. Yes, thank you, Mr. Chairman. I might like to use my additional five minutes. I did want to associate myself with Dr. Ehlers' remarks about our commitment to continuing to make sure the funding is available, and the long-term investment.

I know both Vern and I are very committed to the twofer concept when it comes to homeland security, where we are making these investments in research and development that also pay off in better public health, safer buildings, whether or not we are attacked again, and of course, that is our goal, to not be attacked again. But particularly in these two areas, it seems like we have had enough experience now that we are put on notice.

With that, Dr. Baecher, if I could direct a question to you, and maybe Dr. Gilman has a comment as well. You note the lack of in-

formation in the Action Plan regarding threats to the Nation's wastewater infrastructure.

Could you elaborate on the potential harmful effects of attacks to the wastewater systems, and how you would prioritize this research need, and then, if I could add another comment. In looking over some correspondence between the—HACH and the EPA, there is this mention of backflow attacks on drinking water distribution. I am reminded that I have a back pressure valve on my sprinkler system in my home, which is to prevent water backing up into the house. Is this a similar kind of dynamic that is being alluded to here with a backflow attack? I have heard a lot of talk concerning my local water system. If somebody goes to the reservoir and pours some chemical, or an agent in the water, it will be diluted pretty quickly, and then it has to run through the systems that are in place to deliver safe water to homes and to businesses.

Is this a way to get around that problem that an attacker would face?

Dr. BAECHER. Perhaps I should start with that question first.

Mr. UDALL. Yes.

Dr. BAECHER. If I may. If you look at the water system, we have water collection areas and reservoirs, which hold that water, and then it is transferred over relatively long distances to a treatment plant, where it is sometimes filtered, sometimes not, and chlorinated and otherwise made suitable for potable water. Then it is put into a distribution system, a pipe network, and distributed to retail users, to people in their homes and to businesses and that sort of thing.

If you introduce contaminants at the supply point in the reservoirs, there is quite a lot of dilution. That is not to say that there are no opportunities, but there is quite a lot of dilution, and that water is also subsequently treated, perhaps filtered, perhaps chlorinated.

If you go downstream of the treatment plant, though, into the pipe network, in most urban areas, any fire hydrant, any faucet, can be back-pressured to introduce contaminants back into the water downstream of the treatment. Now, there still are residuals; chlorine and other chemicals in the water to protect it, but nonetheless, you could, on a local basis, within a small, perhaps multiblock area, have significant impact by back-pressuring contaminants at that point, downstream of the filtering and chemical treatment.

And I believe that is what you are referring to. There are protective devices that are on the scale that need to be used, which would not be inexpensive, but there are back-pressure devices that can be used to prohibit people from doing that. They typically are not installed in, for example, fire hydrants.

Mr. UDALL. Would it take some specialized equipment to actually perpetrate that kind of an attack?

Dr. BAECHER. It would not, sir.

Mr. UDALL. It would not.

Dr. BAECHER. No, just—as long as you can get the pressure sufficiently higher than the pressure in the distribution system, you can basically pump water upstream, if you will.

Mr. UDALL. And you could do that in the dark of the night?

Dr. BAECHER. Well, you could rent a house on Capitol Hill.

Mr. UDALL. Do you have any good news here?

Dr. BAECHER. The spatial distribution of the impact would be limited, of course——

Mr. UDALL. Yes.

Dr. BAECHER. That is some good news.

Mr. UDALL. So you wouldn't even have to be doing it in the public domain.

Dr. BAECHER. It would not.

Mr. UDALL It could be undertaken in the privacy of your own rented home.

Dr. BAECHER. That is right, but I mean, the number of people that would be affected by that sort of attack is relatively limited.

Mr. UDALL. Yes.

Dr. BAECHER. Because the materials have to move through the distribution network. They won't move that far, and depending on where you attack the distribution system, there may not be that much downstream of it.

ENVIRONMENTAL PROTECTION AGENCY'S ROLE IN DETECTION AND CONTAINMENT

Mr. UDALL. If I might, in my remaining bit of time I have. If I could move back to the building side, we talked about the EPA's role being detection and containment. I am sorry, being—decontamination disposal. Those are more the reactive measures that we have to take. The proactive are the detection and containment piece, and I worry about who might pick that up, Dr. Gilman, if the EPA focuses on this other area, and then, are you in the process of working with the experts on the front end challenge?

Dr. GILMAN. The detection part has been as the NRC recommended to us, our lower priority. It is an area where the Department of Defense and a number of others—the Department of Energy and the Department of Homeland Security, are very focused, so we have been deferring to them on detection. Our motto at our Center is we beg, borrow, and steal whatever technology is there. We look to them for the front end development, and then worry about its application in the buildings or water systems.

Containing is in the buildings arena. The filtration work and the like is something we have been focused on. It is also something that the Department of Homeland Security and especially the Department of Defense having been working on, because they have been looking to their own facilities. We have a very good collaboration with DOD in that regard.

Mr. UDALL. Excellent. Again, I want to thank the panel, and it has been very informative. Thank you.

Chairman EHLERS. The gentleman's time has expired. And you asked for the good news. About the only good news I heard is that if they did it in this area, we would finally have some low cost housing near the Capitol.

This macabre sense of humor.

Mr. UDALL. Would it maybe eliminate the lead, or dissolve it all at the same time? Maybe there is a twofer there.

Chairman EHLERS. Yes.

Mr. UDALL. Mr. Chairman.

Chairman EHLERS. Dr. Albright, I jested about the amount of money DHS has, but I just wanted to ask you what is your view of what EPA is supposed to be doing, and how it is supposed to be paying for it, and are you willing to and do you have the money to pick up the slack in '05 if necessary?

Dr. ALBRIGHT. Well, again, the presidential directives make very clear what EPA's role is in this area. They are the lead and the coordinating body for this sort of work. We have, in Financial Year 2004 and Financial Year 2005, I would say well in excess of $20 million just in this particular area, in terms of building decontamination techniques and tools, and that does not go into the areas of detection, for example, which is a whole area that we have significant activities in. Not the least of which are aimed at detection of attacks on major public facilities. So, I think the answer is absolutely. We work very closely with EPA. I mentioned in my statement the extant working groups, or at least some of the existing working groups, that are aimed at coordinating that kind of work. Again, EPA has the lead in that, and we respond to that lead. Actually, all our interaction with EPA, well precedes the presidential directives. The presidential directives just basically enshrined in policy what had been happening for some time.

Chairman EHLERS. To answer my question directly, you mean you are willing to pick up the slack if necessary?

Dr. ALBRIGHT. I am not exactly sure how much slack there actually is. Rather than looking at the EPA program, I think if you looked at the national program in detection and decontamination techniques, not just what is going on in the Department of Homeland Security. There is significant work being done at DARPA. And by the way, we are co-funding some efforts at DARPA within the Department of Homeland Security. You look at work that is being done elsewhere within DOD and within the Department of Energy, and I think you will find there is a very formidable program in this area.

CRITICAL RESEARCH AREAS ON BUILDINGS DECONTAMINATION AND WATER SYSTEMS

Chairman EHLERS. And on that point, I would like to ask Dr. Baecher and Dr. Kolb a question. Excuse me. Are there any critical research questions on buildings decontamination or building decontamination research, or water systems security, that have not yet been included in the Agency's research plans, the EPA's research plans?

Dr. KOLB. Well, with the caveat that our committee finished its work last October, we really haven't reviewed anything that the Agency has done, or put in place since then. I did mention that in our report, we outlined a number of areas where we thought a longer term, longer than the three-year program currently underway, could and in fact should be funded and pursued.

In my written testimony, I listed several of these. Just very quickly, one is to better characterize the extent of an attack, including better standards for cleanup levels, better sampling methodology, better understanding of the transport robustness and viability of chemical and biological agents across the full range of public structures.

Another is to develop methods for decontamination of very sensitive equipment and priceless objects, and hard to reach places, such as the interior of duct work and the areas above ceiling tiles in buildings.

Also, to evaluate the toxicology of decontaminating agents and any toxic byproducts that might be formed during decontamination process. Obviously, we don't want the cure to be worse than the disease.

And finally, to better understand and improve the tools for modeling building airflows, contaminant dispersal patterns and other information needed to develop practical, real-time containment strategies, which is, in our view, quite a long-term research project, particularly given the very large variety of buildings that we may want to try to actively protect, as Mr. Udall indicated.

Chairman EHLERS. Mr. Baecher.

Dr. BAECHER. I think on the—speaking for the water panel, the panel was impressed by how comprehensive the EPA's Action Plan was in water security. We made a very large number of recommendations on individual research items, which are detailed in the plan. There is some 100 plus such recommendations.

To echo what we just heard about building research, though, I think the panel did identify the need for some focus on longer term research needs and opportunities. The Action Plan from EPA necessarily focused on a very short-term three-year window, and we understand that that was the mission in the context of the plan, but in our report, we also talk about longer term opportunities.

Some of those opportunities (perhaps many of them are not) are opportunities that will span across agencies. The EPA, while being the lead agency for water security, is not necessarily the lead agency in things such as communicable diseases and others, and so there needs to be, in the panel's view, some coordination among agencies in looking at the longer term needs.

One of those that the panel did identify, which falls under the general rubric that we just heard about a few moments ago, of dual use, or of looking at inadequacies of things like operations and maintenance of the water system, which has long been declining in the country, and the opportunity that is presented by improving that maintenance for water security.

Chairman EHLERS. Thank you very much. I was just checking with Mr. Udall that he has no further questions, so I will keep going for a few more, and then we will release the prisoners.

The question for Dr. Gilman or—Gilman and Dr. Albright. Who has lead responsibility on your agencies or other federal agencies for research relating to chemical, biological, or nuclear contamination in large, public spaces, such as the National Mall here in Washington, or any large assemblage that might occur?

Are there any other research issues for which lead responsibility remains unclear? I will let you each comment on that?

Dr. GILMAN. Well, I think it is fair to say that the Department of Homeland Security has stepped out in the large spaces arena. We have been more focused on interior spaces, buildings and the like. I think there is an expectation on the Department that the EPA become more involved in that.

Certainly, our emergency response teams and our decontamination team need to be focused in that arena, so that is a point of ongoing collaboration between our two organizations. I would like to return to a number of the things that were highlighted for future looks.

Chairman EHLERS. Let me just get Dr. Albright on the record on the question first.

Dr. ALBRIGHT. Yes, I would agree with that statement. I think our focus has tended to be on the very large scale classes of attacks. We, again, rely on EPA very strongly, in terms of taking a leadership role in terms of standards and policy in this area, but certainly, we have spent considerable effort looking at some of the research issues associated with large scale cleanup, not just from biological attacks, where again, there is a policy decision that has already been made, but also, very importantly, on radiological attacks. We just concluded a significant effort with EPA and other agencies on thinking about how we would think about how clean is clean? What are the policy issues associated with that?

And then on the research and development kinds of activities you need to do, think about cleaning up, for example, large strips of asphalt, and the exteriors of buildings, and that sort of thing.

Chairman EHLERS. Yes. And obviously, in radiologic situations, you would have the DOE involved as well.

Dr. ALBRIGHT. DOE certainly has done a significant amount of work in that area, generally associated with cleanup of their own sites. But in terms of cleaning up cities, you know, marble exteriors and that sort of thing, there has actually been remarkably little work done to date, and so that is some slack we have been picking up.

Chairman EHLERS. Okay. Dr. Gilman.

Dr. GILMAN. Yes, and speaking of that one question of standards for cleanup, we do have a very good news story in terms of the radiological side, where the Department of Homeland Security, the Department of Energy, the Nuclear Regulatory Commission, and the EPA have jointly put together some guidance in that regard. I have been asked by my own Agency to coordinate across our programs on the chemical and biological side, in anticipation of doing a similar cross-agency effort to try to arrive at some guidance for both immediate response and longer term decontamination and return to original or modified use for different areas.

It is an area that the two panels at the NRC said needed to be addressed. It is an area that we are engaged in addressing. Some of the other things mentioned as areas for further look, the question of the toxicity of decontamination. That is, in large part, an existing mission of the Environmental Protection Agency in providing authorization to utilize fumigants in the case of decontamination. We are working with the Office of Pesticides, which has the principal responsibility to prior approve a number of fumigants and make sure that we understand the health consequence of the fumigants as well. That is an example of the kinds of things that we have been trying to do in response to the recommendations of the NRC panels.

PRESIDENT'S BUDGET REQUEST FOR DECONTAMINATION

Chairman EHLERS. Thank you. I just want to re-emphasize the line of questioning I followed on some of these things is based on my experience of agencies for no good reason being deprived of money. As I gave the example of NIST earlier, and as best we can find out, it was just a few Senate staffers, maybe House staffers in a back room. The appropriations process making a decision that decimated the agency. And in this particular case, I think someone possibly in OMB or somewhere else has cut off money that you need, just because they misunderstood what money you had available this year to carry over.

I just don't want you to get in that box, because I think it will be detrimental to the Agency. Just to get just a few more things on the record. How much does the EPA intend to spend on building decontamination R&D in Fiscal Year '05? Do you have that, Dr. Gilman?

Dr. GILMAN. The request and—the appropriation for '04 is about $12.8 million. Excuse me, it is about $8.6 million. We have obligated close to half of that in '04 so far. Some of that money that hasn't been obligated may get obligated in the '05 timeframe. Some of the work is actually contracted for or established in the '04 timeframe, may carry over, but we aren't talking about truly significant amounts of money carrying over into the '05 timeframe. The '03 money that was the largest pot of money that was not fully obligated at the time we submitted the budget, has now largely been obligated except for a few hundred thousand dollars.

Chairman EHLERS. Can you send us a letter giving us the precise amounts of those?

Dr. GILMAN. Certainly.

Chairman EHLERS. For both '04 and '03. And does this money appear in the budget request, then? The President's budget request.

Dr. GILMAN. The discussion of prior year activities, but there is no request for '05 dollars, if that is the question you are asking.

Chairman EHLERS. Okay. And with the budget request, are you sure you will be able to continue in Fiscal Year '05 any of the activities you have in '04?

Dr. GILMAN. To the extent that we don't complete them, and they have been on our priority list, and we are planning on carrying them out. We will carry that work over into '05.

Chairman EHLERS. And I guess we would also like to know which ones, if you can tell us that.

Dr. GILMAN. Okay.

Chairman EHLERS. In writing if you can't do it here.

Dr. GILMAN. All right. Okay.

Chairman EHLERS. All right. As I said before, I am from the Federal Government, and I am here to help you. We will be pursuing this in more detail as we do our work and as we enter into the Appropriations Office.

I certainly want to thank everyone for their testimony, particularly our guests who have worked so hard on the panels. And these panels are a very important part of the functioning of the Federal Government. There is not a lot of scientific expertise in the Congress, or even in parts of the Administration, and so we really ap-

preciate your willingness to work on these panels and help your country that way.

I still remained concerned that we haven't heard fully why the EPA building program was cut. There is obviously some work that will not be done because of the cut, and I look forward to receiving the EPA's revised long-term R&D plan.

I also will expect to work with the Administration and the Appropriation Committee to ensure that this important work is not stopped in its tracks, that we continue with the really important work, and provide not just the funding but the capability as well, so that can be done.

Having said that, if there is no objection, the record will remain open for additional statements from the Members, and for answers to any follow-up questions the Subcommittee may ask of the panelists, which would happen by letter from Members of this committee.

Without objection, so ordered, and with that, the hearing is now adjourned.

[Whereupon, at 4:05 p.m., the Subcommittee was adjourned.]