

HOMELAND SECURITY SUBCOMMITTEE

**Face-to-Face Meeting Summary
Marriott Kingsgate Conference Hotel
Cincinnati, Ohio
May 28–30, 2008**

WEDNESDAY, MAY 28, 2008

Closed Session

Board of Scientific Counselors (BOSC) Homeland Security Subcommittee

The Homeland Security Subcommittee met in an approved closed session to review classified information on threat agents and scenarios as context for the U.S. Environmental Protection Agency (EPA) Office of Research and Development (ORD) National Homeland Security Research Center's (NHSRC) research.

Welcoming Remarks

Dr. Gary Saylor, University of Tennessee, Subcommittee Chair

Dr. Gary Saylor, Chair of the Homeland Security Subcommittee, welcomed Subcommittee members and other participants and explained that the face-to-face meeting was governed by the Federal Advisory Committee Act (FACA). The purpose of the meeting is to review technical information regarding the Homeland Security Research Program so that the Subcommittee may complete its review of the Program. EPA staff members are present to provide clarification on technical matters, and they are not to provide new information unless it is requested. EPA staff should communicate with Subcommittee members via the Subcommittee Chair or Designated Federal Officer (DFO). Subcommittee members should not approach EPA staff; if additional information is needed, the Chair will make the request via the DFO. Dr. Saylor asked the Subcommittee members to introduce themselves and provide background information on their relevant experience.

Administrative Procedures

Mr. Greg Susanke, EPA/ORD, Subcommittee DFO

Mr. Greg Susanke, Subcommittee DFO, reviewed the FACA procedures that are required for all BOSC Subcommittee meetings. Although FACA meetings generally are open to the public, some require closed sessions for extenuating circumstances. The EPA Administrator approved a closed session for this meeting for discussion of information of a sensitive nature.

All background information provided to the Subcommittee is available to the public on the BOSC Web Site; members of the public also may request a CD-ROM of the materials. Notice of this meeting and the two prior conference calls on April 23, 2008, and May 7, 2008, were published in the *Federal Register*. There will be one to two additional conference calls scheduled for this Subcommittee as followup to this meeting. Once scheduled, the information for the call(s) will be published in the *Federal Register*.

The minutes of the meeting are being taken by a contractor. The minutes will be provided to all speakers to ensure accuracy. After the minutes have been certified by the Chair, they will be published on the

BOSC Web Site. Several members of the public are in attendance, but no requests for public comment have been received. There will be time for public comment on Day 2 of the meeting at 2:15 p.m.

Introduction to Long-Term Goals (LTGs)

Dr. Gregory Sayles, EPA/ORD, Associate Director, NHSRC

Dr. Gregory Sayles welcomed the participants to the meeting and thanked the Subcommittee members for their hard work. He highlighted some of the EPA staff present at the meeting, including ORD, NHSRC, and regional leadership. He introduced Mr. Lek Kadeli, Deputy Assistant Administrator for Management in ORD, who welcomed the participants on behalf of Dr. George Gray, Assistant Administrator for Research and Development. He thanked the BOSC for their helpful feedback on ORD's programs and explained that the role that NHSRC plays within ORD is critical and urgent. Following the events of September 11, 2001, there was an urgent need for the nation to prepare for threats. Mr. Robert Varney, Regional Administrator of Region 1, has been a leader in this area, and he understands what the country faces and the energy and level of commitment needed. NHSRC is unique within ORD and operates within a 3-year timeframe, much shorter than the average timeframe of other ORD programs. The Center has done an extraordinary job addressing the needs of the Agency in terms of its role in homeland security and also provides outstanding technical support to EPA's regions. In terms of timelines, ORD can learn from NHSRC's success in this area.

Dr. Sayles presented a diagram illustrating that the Agency's Homeland Security Research Program cuts across many of EPA's offices, including the Office of Water (OW) and the Office of Solid Waste and Emergency Response (OSWER). The Office of Homeland Security coordinates all homeland security efforts within EPA, allowing the Agency to carry out its homeland security mission. Program and regional offices carry out activities under the Homeland Security Presidential Directives (HSPDs) and the National Response Framework (NRF). NHSRC conducts research that informs the offices that implement homeland security activities.

Dr. Sayles explained that the materials given to the Subcommittee were developed to help the members address the charge questions. The materials provide perspectives on the research program, ranging from broad strategic visions of the Federal Government to program-specific information. This meeting will look inside the program at the work associated with each of the LTGs. Following an overview of the agenda, Dr. Sayles explained that the Subcommittee members had received new materials that afternoon and described some aspects of two of the documents, the Bibliometric Analysis of Peer-Reviewed Journal Articles and the Client Survey Result Summary.

Dr. James Romano, Jr., asked about the relationship of the two documents the Subcommittee members had received that detailed the Multi-Year Plan (MYP). Mr. Susanke answered that the document the Subcommittee members had received previously was a general overview of the MYP, whereas the document received at the meeting was the draft MYP.

Overview for LTG 1

Dr. Hiba Ernst, EPA/ORD/NHSRC

Dr. Hiba Ernst explained that two LTGs guide the Homeland Security Research Program. LTG 1 focuses on water and wastewater infrastructure security. EPA's mission is to protect public health and the environment, and after September 11, 2001, the focus on water security increased. ORD and OW collaborated with each other and met with stakeholders to identify research needs. This led to the development of the Water Security Research and Technical Support Action Plan in 2003, which was reviewed and endorsed by the National Academy of Sciences (NAS) in March 2004. Now that the Program has become permanent, this action plan is being replaced with an MYP, similar to the research planning approach used by other ORD laboratories and centers. There are several drivers for the Program, including the Bioterrorism Act of 2002, which amended a portion of the Safe Drinking Water Act

(SDWA). The Bioterrorism Act set forth requirements for water utilities and EPA; under this act, water utilities are required to perform vulnerability assessments, and EPA is required to provide research and tools to support utilities in addressing vulnerabilities and responding effectively to terrorist attacks. HSPDs also provide drivers for the Program. HSPD 7 designates EPA as the sector-specific lead for the protection of water and wastewater infrastructure. These drivers are used for research decisions and prioritization, but additional inputs also determine research priorities. These inputs include threat scenarios, OW needs, stakeholder input, resource availability, NHSRC technical input, and recommendations from advisory committees such as the BOSC, EPA’s Science Advisory Board (SAB), and the National Research Council (NRC).

OW, water utilities, and other clients use Program products and expertise to improve protection from and the response to terrorist attacks on the nation’s water and wastewater infrastructure. The Program strives to produce products with dual benefits that also help water utilities with their day-to-day activities. Although the Program addressed some wastewater needs early on, resource availability dictated a primary focus on drinking water research because of its higher public health risk. Community water systems are different, and there are no “one size fits all” approaches to address their needs. As of 2004, there were 52,838 community water systems serving 272 million people. The majority of these systems are small; most of the population is served by larger systems. The Program is supporting OW in improving vulnerability assessment tools and developing the Blast Vulnerability Assessment Tool, which evaluates the impact of explosives and identifies hazard zones. The Department of Homeland Security (DHS) requires that all risk management tools developed are compliant with Risk Analysis and Management for Critical Asset Protection (known as RAMCAP) so that all tools can be compared across a national framework.

As part of the Threat Ensemble Vulnerability Assessment (TEVA) suite of tools, the TEVA Consequence Assessment Tool estimates vulnerability and potential consequences of contamination events using hydraulic, exposure, dose-response, and disease transmission models to assess the public health impact of contamination incidents. The TEVA suite of tools spans the four main areas of the Program: protection, detection, containment, and mitigation.

Research in the detection area can be divided into two main components: support for contamination warning systems (CWS) for the timely detection of contamination events (part of the Water Security Initiative [WSi] program) and confirmation of events through sampling and analyses. EPA has been charged with the development of a robust, comprehensive, and fully coordinated surveillance and monitoring system. The CWS includes the following components: online water quality monitoring, sampling and analysis, public health surveillance, enhanced security monitoring, and consumer complaint surveillance. The Program conducts the research to support most of these components. The CWS provides dual benefits for water utilities and a reduction in health and economic consequences from a contamination incident.

There have been several positive outcomes of detection research. OW used the Program’s sensor evaluation research information in the WSi design and operation, and some of these sensors currently are deployed at the Greater Cincinnati Water Works CWS pilot project. The Program also evaluates the manufacturers’ reported performance of commercially available technologies so that water utilities can make informed decisions; this testing is occurring for decontamination technologies as well.

In support of detection, TEVA-SPOT (Sensor Placement Optimization Tool) was developed to aid water utilities in sensor placement to improve contaminant detection as part of CWS. TEVA tools currently are used in the Cincinnati CWS pilot project and may be used in the two additional pilot projects in New York City and San Francisco. In collaboration with the American Water Works Association (AWWA), TEVA tools are being evaluated at nine additional utilities, and feedback is used for tool enhancement. Based on this research, the Program was a finalist for the prestigious operations research Franz Edelman Award.

To support the public health surveillance component of the CWS, coordination and communication between utilities and local health departments allow for using syndromic surveillance to improve detection of contamination events. Public health surveillance data can be linked to water quality data to improve CWS. The Program will continue to support the lessons learned from the deployment of these tools at the pilot CWSs, refine TEVA tools based on feedback from pilot cities and partners, expand the public health surveillance water module, and explore detection of low-density biological suspensions and online detection of radiological contaminants.

Per HSPD 9, EPA must develop an Environmental Response Laboratory Network (ERLN). The Program has provided support for the development of the technical underpinnings for ERLN, including sampling and analysis and support for OSWER and OW. The Program developed standardized analytical methods (SAMs) for environmental restoration following homeland security events, which have been incorporated into several regional response plans. The Program will continue to support the ERLN and update the SAMs annually and as new methods are developed. The Program also works to improve analytical methods to identify low levels of microbial contaminants in extremely large volumes of water and will continue these method developments and improvements, moving one ultrafiltration device, The Water Concentrator™, into commercialization.

In terms of containment and mitigation research, the Program continues to support OW in developing technical documents for water utilities (e.g., Response Protocol Tool Box and a distribution system reference guide for utilities that includes lessons learned). The TEVA suite of tools also includes a Flushing and Containment Tool that will help utilities makes informed decisions on how to contain and mitigate a contamination event. Health-based Provisional Advisory Levels (PALs)—threshold exposure levels for industrial chemicals and warfare agents—have been developed for 40 priority agents; these PALs inform health-based water use restrictions and return-to-service decisions.

The Center’s treatment and decontamination research includes the development of protocols and methodologies to decontaminate infrastructure and treat water that has been contaminated by chemical, biological, or radiological (CBR) contaminants. The Program already has initiated research and plans to increase its efforts in this area. Studies to evaluate efficacies of decontamination protocols; understand atypical contaminants and their fate, transport, and persistence in the environment; assess appropriate cleanup levels; and treat the contaminated water are some of the key areas for the research. NHSRC is working with OW to prioritize this research. Additional research areas that the Center is pursuing include social and behavioral sciences, particularly message mapping, and technical assistance and support to the water industry, stakeholders, and other federal organizations.

The Center collaborates with many other organizations on water security, some examples include EPA’s program and regional offices, AWWA and its research foundation, the Department of Energy’s (DOE) national laboratories, the U. S. Army’s Edgewood Chemical Biological Center, the U.S. Food and Drug Administration (FDA) Forensic Chemistry Center, the U. S. Air Force Research Laboratory, the Metropolitan Water District of Southern California, the U. S. Geological Survey, the Centers for Disease Control and Prevention, the U.S. Army Corps of Engineers, the National Sanitation Foundation, and the University of Cincinnati. The Center leverages outside expertise to supplement its own.

Poster Session for LTG 1 Research

This poster session was held in the Mount Auburn Conference Room at the Marriott Kingsgate Conference Hotel. The Subcommittee reviewed 16 posters in this session. Dr. Sayler asked all Subcommittee members to review each poster with the members of the workgroup devoted to LTG 1 (Drs. Sayler, Romano, and Ormsbee, and Mr. Leo Labaj) responsible for leading the discussion of the posters. During the 115-minute poster session, each Subcommittee member also had the opportunity to ask questions about the research or clarify specific points with the presenter(s). A book of poster reproductions was provided to Subcommittee members before the meeting.

LTG 1 Poster Discussion Session

BOSC Homeland Security Subcommittee

The Subcommittee members agreed that the poster presenters were enthusiastic and did a good job of presenting their research. Dr. Anil Nerode approved of the social science components, which he prefers to call social engineering. After a contamination event, affected people must be considered as well as the environment. In addition to local responders, those responsible for taking care of evacuated people and their homes also must be considered; this will help foster trust so that people will respond more positively to evacuation orders. He expressed his concern that intelligent organic or inorganic chemists will be able to examine the work in progress and could potentially develop methods of attack to target gaps in preparedness.

Dr. Daniel Walsh commented that it is important to examine the group dynamic and psychology that emerges in a situation that involves a large multijurisdictional effort with crime scene investigators, environmental responders, and local and federal governments, especially in events requiring a long-term response. Sometimes the outcomes can be unfavorable and unpredictable in these situations. An effort should be made to examine these instances, especially the social science aspects, and determine areas of failure so that future responses can be improved. There is value in examining the social dynamic that unfolds in complex events.

Dr. Romano noted that there is extensive literature on terrorist events and natural disasters, including medical and neuropsychological information, but less well-known is literature on the local nature of advance warning systems and the local population to which they are matched. These advanced warning systems fall under risk communication, which is EPA's bailiwick. EPA therefore has an opportunity to explore this area. Dr. Sayler commented that this issue crosscuts LTGs 1 and 2.

Dr. Walsh named examples of good work being performed at NHSRC that were highlighted during the poster session and recognized that these areas should continue to be explored. There is a great need, however, for developing increased capacity for disposal, and it is time to fulfill this need. He also encouraged the Center to expand its outreach and increase feedback from its clients and end users to ensure that products meet the needs of clients and decision-makers. There is value in developing a clearinghouse of information that can be used in events; EPA should compile, summarize, and make this information available in a user-friendly manner. Because so many incidents are managed locally, this information should be communicated to local responders.

Dr. Sayler gave Dr. Sayles the opportunity to respond to the comments thus far; Dr. Sayles had no response to specific comments but appreciated the input.

Dr. Walsh commented that in the water sector there is a process of distribution, sensing, detection, sampling, and analysis, which can be burdensome to arrive at meaningful outcomes; there must be attention to other means. The ultimate sensor array would be at the point of use; the current sensors are limited in timeliness and sensitivity. Adding medical information can be useful in some manner, but it arrives too late. A sensor at the point of use would provide immediate detection as an agent enters the domestic or commercial setting. Current response times inhibit the ability to prevent consequences, and solving this issue should be a priority. Ms. Ellen Raber did not think that a real-time sensor, in terms of cost, was possible within the next 10 years. EPA is extending its research to other potential decontamination methods (e.g., ultraviolet radiation, ozonation). Point-of-source treatment should be developed in tandem with sensors. She was impressed that all of the poster presenters considered the needs of end users and stakeholders and were concerned that the products were being used by the appropriate people and organizations.

Dr. Sayler requested comments from Mr. Jonathan Herrmann (EPA/Director of NHSRC). Mr. Herrmann responded that the Center performs research to inform EPA program and regional offices,

AWWA, and other clients. NHSRC can respond to some of the Subcommittee members' comments and recommendations, but others will need to be addressed by the program and/or regional offices.

Dr. Ormsbee agreed that increased investment should be placed in the social behavior model relative to sensors because there still is much noise in the system that may prevent detection; therefore, sensitivity analysis is needed. Although it may be too costly, response at the tap-level versus distribution systems is desirable. In examining modeling tools, errors are possible in three levels: the hydraulic model, the water quality model, or the interface between the optimization component and the decision parameters. Problems in the first two will accumulate and create problems in selecting parameters. There is the possibility of transferring technology to commercial vendors that can market the technology to utilities, but this provides an opportunity for terrorists to gain and use the information to determine what is not being monitored. In terms of sensor placement and flushing technology, he is skeptical whether the data collected to calibrate the models will be able to obtain a sensitive prediction given the inherent errors in the data.

Mr. Labaj stated that before a vulnerability assessment is performed, a threat assessment must be completed and potential basis threats designed. EPA is focusing on the most difficult aspect of this and focusing in the right direction, but he would like to know when projects are considered completed (i.e., when is done "done"?). There is a gap regarding chlorine; utilities are not moving away from the use of chlorine, although a chlorine release is extremely dangerous and devastating in many regards.

Dr. Joseph Bozzelli agreed with Dr. Walsh that evaluation of methods for more rapid-time sampling should be considered, including evaluation of the current methods available, literature as methods evolve, and what can be engineered for improvements in time and accuracy. He noted that detecting pathogens provides increased challenges as compared to chemical contaminants. He also agreed with Ms. Raber regarding decontamination efforts. If it is allowed, he requested that more information about specific results and products be included with the poster presentations.

Dr. Walsh commented that there appears to be increased emphasis on prevention and detection versus consequences; emphasis on consequences also should be increased. He asked whether there were plans to shift the focus from the front end to the back end of the spectrum. Dr. Sayles responded that the Program currently is evolving in this direction, and workgroups are working with OW to determine treatment research needs.

Dr. Walsh commented that it would be valuable to engage the public to increase prevention efforts. Outreach and education tools could be used to engage the public, thereby preventing events from occurring or minimizing the consequences of those that do. Federal agencies should trust the public to accurately understand risks and participate in prevention efforts.

Perspectives From Office of Water

David Travers, EPA/OW, Director, Water Security Division (WSD)

Mr. David Travers presented a diagram to illustrate the hierarchy of OW, including the Office of Ground Water and Drinking Water (OGWDW), which is responsible for setting standards under the SDWA. Within OGWDW, WSD has a broad array of research projects in prevention, detection, recovery, and response, including overarching projects in collaboration with ORD. ORD provides invaluable assistance to OW via its research and expertise and enables OW to focus on promoting a safe and resilient water sector and responding to an array of congressional and other mandates. ORD has a fundamental role in design, implementation, and evaluation of key security programs including CWSs, laboratory response and capabilities, and decontamination. The WSi is an important priority for WSD, and the Water Laboratory Alliance is an important component of the WSi; these two areas account for two-thirds of the Division's budget. ORD has been instrumental in these efforts.

The purpose of CWS design is to capture the broadest possible array of contaminants. The CWS design includes water quality monitoring, consumer complaint surveillance, sampling and analysis, enhanced security monitoring, and public health syndromic surveillance. The design incorporates utility and public health data management/integration and event detection, ultimately leading to the goal of timely detection and appropriate response. The current CWS design will be revised following data collection from pilot projects, and BOSC input is welcomed as well. Determining the locations to place sensor stations is a challenge, but ORD has been a leader in creating models that allow utilities to build optimal water quality monitoring networks. ORD has conducted studies that have established relationships between certain types of contaminants and certain types of sensors that allow for the selection of optimal types of water quality equipment, which has been critical in designing water quality monitoring stations.

Approximately 90 percent of select and nonselect agents lack validated methods for drinking water. Consequently, ORD is helping examine whether existing validated methods have the potential to detect high-priority contaminants. ORD research has provided expert review of analytical methods and development of several critical assays. In terms of syndromic surveillance, ORD has been critical in identifying types of syndromic data to detect different classes of contaminants and coordinating water utilities and key partners, resulting in established data streams from fire departments, health departments, and poison control centers that enhance the ability of the CWS to detect a contamination event. ORD also assisted with the consequence management phase of the CWS by researching the distance that contaminants can travel in certain amounts of time. A matrix was created to guide utilities in developing a sampling program, understanding the extent of contamination, and informing certain response actions. ORD organized message mapping workshops, helped develop the *Greater Cincinnati Water Works Crisis Communication Plan* that defines responsibilities of the public information officer during all phases of an event, and led the development of the site characterization plan. Additionally, ORD played an important role in the evaluation of the CWS.

In terms of consequence analysis, ORD provided technical expertise in developing scenarios and running TEVA for the contaminant scenarios; without this assistance, OW could not have developed two of the four scenarios. These scenarios are particularly important given EPA's mandate as the sector-specific lead for water and its responsibility to understand vulnerability to various types of threats. ORD also participated in a public workgroup to help identify and prioritize decontamination needs for the sector and provided critical information on current research activities and future research needs. In response to an earlier comment from the Subcommittee, Mr. Travers explained that OW, not NHSRC, is responsible for some of the issues that the Subcommittee members had mentioned, including response. OW has a number of response activities underway, including first responder training and response plan guidance.

Dr. Walsh commented that it will not be possible to have the level of effort seen during the Cincinnati pilot project in all projects and asked what a reasonable roll-out plan is at a national level. Mr. Travers stated that the outreach seen in Cincinnati may be necessary for implementation of similar projects across the nation. One lesson learned was that a CWS cannot be implemented without the consequence management component. Relationships between water utilities and public health departments must be enhanced before these types of projects are implemented. EPA is evaluating the operation of each individual component of the pilot project and its ability to detect contamination. Sustainability also will be critical, including cost effectiveness.

Perspectives From Water Utilities

Alan Roberson, AWWA

AWWA has more than 60,000 members that represent the full spectrum of the water community. More than 4,700 utilities that supply water to more than 180 million people are members of the association. The Water Sector Coordinating Council works with EPA and DHS to develop sector-specific plans, which forecast 10–20 years into the future. AWWA has worked with EPA and DHS on a number of activities, including educating members via Web casts about CWSs, publishing white papers on CWSs, and

developing water and wastewater emergency response networks (i.e., the Water/Wastewater Agency Response Network, known as WARN).

The water sector includes drinking water and wastewater utilities, and approximately one-half of all utilities perform both drinking and wastewater functions. Approximately 80 percent of the 54,000 community water systems are public. Approximately 30,000 systems are small services that serve less than 500 people and generally operate on a budget of less than \$150,000 per year, which may not allow for a full-time operator or additional equipment. Those systems that serve less than 100 people generally operate on \$30,000 per year. Large systems that serve greater than 100,000 people generally are well funded but have challenges such as politics and security. Water utilities are unique in that they are required to perform vulnerability assessments and update their emergency response plan as a result of the Bioterrorism Act of 2002; however, no additional funding was provided to fulfill this extra requirement.

It is a challenge to understand the relative threat of physical security versus that posed by contaminants. Protection of the system (including response and recovery) in the event of a terrorist incident or natural disaster also is a challenge. The research results of the NHSRC are relevant and used by many different utilities, and most large utilities are using at least one of the five data streams: monitoring, enhanced sampling, physical security, customer complaints, and public health surveillance. TEVA, reports, and other Center products are high quality. Additionally, NHSRC has provided scientific leadership in this area, which helps utilities because they can rely on ORD research and spend their resources elsewhere. ORD's communication and coordination with utilities and AWWA has been positive and successful. EPA-sponsored workshops regarding TEVA generally are filled to capacity, and there is great interest among utilities for EPA products. The Franz Edelman Award nomination is a major accomplishment and the result of the coordinated efforts of EPA, AWWA, and Sandia National Laboratories.

Dr. Romano asked what projects AWWA's research foundation has been able to undertake as a result of EPA's research. Mr. Roberson replied that the Risk Assessment Methodologies for Water Utilities (RAM-W) tool was a result of dedicated AWWA research, and another project focuses on managing customer complaint data; these projects are a result of EPA performing other research on which AWWA did not need to focus. Improved leverage has been a positive result.

Dr. Walsh commented that larger, older cities are potential targets and asked about the hydraulics systems in these cities. Mr. Roberson responded that these systems are improving, and there is a wide range of cities with dynamic water quality monitoring despite the fact that some still have static systems. The majority of cities are moving to dynamic water quality models. The challenge is in calibration. Dr. Walsh asked whether tracer studies could be used to perform calibration. Mr. Roberson responded that nonthreatening tracers could be used, but this would require an increased amount of analytical work. EPA has been a leader in developing water quality models, providing research that is the foundation for commercial modeling.

Dr. Sayler thanked the presenters for their time and efforts and recessed the meeting at 5:04 p.m.

THURSDAY, MAY 29, 2008

Subcommittee Working Session

BOSC Homeland Security Subcommittee

Dr. Sayler reconvened the meeting at 9:11 a.m. and reviewed the day's agenda. During the working session, the Subcommittee members discussed their impressions of the information presented the previous day and of the Program as a whole. The members used this time to clarify technical details and request additional information.

The consensus of the Subcommittee was that additional information was needed on investments as they related to decision-making and peer-review issues. Journal articles are available at the Web site, and although the bibliometric analysis has not been discussed in depth, several documents pertaining to the bibliometric analysis were provided to the Subcommittee. Dr. Sayler noted that the timeframe under which the NHSRC works is shorter compared to the timeframe for other peer-reviewed research. Dr. Bozzelli agreed but observed that it is important to publish in peer-reviewed publications to obtain appropriate feedback (e.g., learning what may be missing from the research), and journals are being published much more rapidly than in the past. He acknowledged that it takes as much time and effort to write a manuscript as it does to perform research, but publishing is important; the Program should seek to increase its number of peer-reviewed publications.

Dr. Romano requested additional information regarding commercialization of Program products and the ability of EPA to plow back commercial royalties into additional technology-based research. Dr. Sayles replied that some licensing is in progress, and a staff member has been assigned to the area of technology progress and transfer.

Mr. Labaj asked for details about the process of developing products from beginning to end. Dr. Sayles responded that NHSRC is relatively new, and the MYP details the evolution of projects, including those that are ending, as well as future plans. Dr. Sayler commented that the transparency of the process is important, and investment decision-making will be highlighted in the Subcommittee's report.

Ms. Raber asked how the Program ensures that information is received by end users. Dr. Sayles responded that the Program is aware of the urgency to provide the results of its research in a targeted manner as quickly as possible. The emphasis has been to provide the Program's clients with technical reports and models, although research results are released in peer-reviewed journal articles. Ms. Raber thought that peer-reviewed journal articles were important for the professional development of the researchers, and Dr. Ormsbee thought that peer review was important for the Program to receive objective feedback on its research. Dr. Romano again urged Program leadership to consider how the downstream products can revitalize the Program and provide resources for the front-end research. Dr. Walsh suggested that a recommendation be made for a more interactive peer-review process that provides insight and commentary on the work being performed by the Program. Dr. Sayler pointed out that the Program has been reviewed by the NAS and EPA's SAB. In addition to this BOSC review, in 2–3 years there will be a mid-cycle review so that the BOSC can review the progress that the Program made in response to this review. If the Subcommittee deems it appropriate, it can recommend that a BOSC Standing Subcommittee be formed to guide and advise the Center; it would be the Center Director's decision to implement this recommendation. Dr. Banks added that the FDA holds several annual workshops to receive input from academia, and the National Institute of Standards and Technology and DOE have internal peer-review committees. Dr. Sayles stated that, to date, NHSRC has requested that NAS review some of its research programs and the SAB to review its key, visible products. The Center also follows ORD's internal peer-review process and holds an annual conference to receive input from the international community regarding the Center's future plans for decontamination research.

Dr. Sayler commented that there did not appear to be a mechanistic process for the prioritization of research opportunities in place. Mr. Labaj agreed and asked that this be included in the Subcommittee's report. Dr. Walsh added that the Program must identify all needs and begin a process for prioritizing these needs. Mr. Labaj asked at what point in the process end user and/or client interaction is solicited. Dr. Sayles replied that because of the broad client base, this has been a challenge. The water research team has a long-standing relationship with its end users and clients, especially as a result of its interaction with OW, and communicates needs well. OSWER, however, is very diverse. The Center is in the process of developing an advisory group that includes representatives of all stakeholders to guide the process and ensure interaction between NHSRC and its clients/end users (i.e., the Taskforce on Research to Inform and Optimize CBR Response [TRIO]). TRIO also will ensure that the products developed by NHSRC are

the most useful possible. Dr. Walsh urged the advisory group to consider interim products as well as final products.

Ms. Raber asked how LTG 2 is formulated with regard to possible threat scenarios. Dr. Sayles answered that the Center performed internal threat analysis to help guide this work and the NAS reviewed and approved the analysis. This analysis set the initial direction of this work under LTG 2. Ms. Raber suggested that this be related more to outdoor building research in the future. Dr. Sayles replied that the Center is moving toward addressing a broader outdoor threat scenario, as detailed in the MYP. Ms. Raber acknowledged this but suggested that even more be done.

Dr. Walsh asked about crisis exception applications. Ms. Raber explained that these were exceptions made for products not yet fully approved by EPA's Office of Pesticide Products under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) that could be used in the case of a biological attack; provisional permits for these products can be made in emergency situations for site-specific use.

Dr. Romano commented that systems that include infectious disease surveillance data are designed to answer questions about treatment but are not designed to answer whether water is safe. Time-lag and sensitivity issues are challenges for sensors as well as health surveillance systems. He wondered whether there was a systems approach to incorporate infectious disease surveillance into answering the question of water safety. He also commented that behavioral science linkages between end users and applications could be investigated. He recommended that the systems analysis approach in place for physical security also could be used for behavioral science issues. Dr. Sayles replied that NHSRC is considering behavioral science areas as a result of NAS and SAB recommendations; the Center currently is identifying research needs that fit into NHSRC's mission and what research/products will be useful to clients.

Dr. Saylor asked Center leadership to be ready that afternoon to provide additional information regarding the Center's involvement with EPA's Science To Achieve Results (STAR) external grants program.

Dr. Walsh commented that an insider threat in the water sector is more of a law enforcement concern and asked what process is in place to ensure that gaps in cross-agency coordination are filled. Ms. Raber explained that generally water utilities address these issues locally. Dr. Romano asked whether EPA's ERLN research on analytical assays informs Department of Justice (DOJ) research on similar forensic assays. Ms. Raber explained that EPA works with DHS, which in turn works with DOJ. Dr. Walsh added that these lines of communication are good but must be expanded; he recommended that periodic internal reviews be completed to ensure that there are no gaps in this area; if gaps are identified, then they should be filled.

Overview of LTG 2

Dr. Shawn Ryan, EPA/ORD/NHSRC

Dr. Shawn Ryan reiterated that EPA's mission is to protect human health and the environment, and the Agency has the responsibility for the remediation of contaminated sites, including those contaminated via CBR agents, via legacy legislation. The events of the fall of 2001 resulted in the unprecedented clean-up of public facilities contaminated with agents traditionally classified as biological warfare agents, and ORD was involved directly with the successful remediation of the contaminated sites. EPA also has responsibility for overseeing compliance with FIFRA for use of antimicrobial agents, and ORD supports this regulatory authority. The Homeland Security Research Program was initiated to provide scientific support to the EPA response community and other program offices involved in the site remediation resulting from intentional releases of CBR agents. New methods and strategies needed to be developed onsite for immediate response.

Some of the drivers for EPA's remediation efforts are legacy legislation, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund); the Solid Waste

Disposal Act; and FIFRA. Other drivers include the National Oil and Hazardous Substances Pollution Contingency Plan; HSPDs, including HSPDs 9 and 10, which pertain to LTG 2; the NRF; and stakeholder feedback. LTG 2 is to provide the primary client (i.e., OSWER) with products and expertise to improve the capability to respond to terrorist attacks affecting buildings and the outdoor environment. LTG 2 research is prioritized in a similar manner as LTG 1 research; however, OSWER needs are the main driver. The Program is designed to meet LTG 2 by focusing on three areas: detection, containment, and remediation; remediation includes decontamination and disposal.

The detection research primarily is designed to support remediation efforts. The Program supports detection technology development and evaluations, All Hazards Receipt Facilities, and SAMs. Technology development includes research on the Trace Atmospheric Gas Analyzer and laser-induced breakdown spectroscopy (LIBS); LIBS is used to detect anthrax and ricin in an unknown background. The Program also evaluates commercially available applications. Future detection research will include SAM validation studies, CBR detector evaluations, development of real-time methods for detection of chemical and biological agents and decontamination by-products, and evaluation of sampling strategies and methods.

Containment research focuses on mitigation, including building and occupant protection and decision-making following an event. Future containment research includes development of a comprehensive building security and containment tool, assessment of the infiltration of CBR particles into commercial buildings, investigation of adhesion of particles to complex surfaces, improved understanding of surface deposition and methods to assess re-aerosolization, and development of PALs for various toxins and short-term and intermediate exposures.

Remediation research is divided into decontamination and disposal areas. The Program also examines agent fate and methods to measure efficacy for field use. Under decontamination research, decontamination method and efficacy test method development occurs, followed by technology efficacy evaluations, application studies, and, ultimately, demonstrations.

Dr. Romano asked whether EPA's assessment had found a shortage of testing methods and limited data on agent fate and whether the findings shaped research priorities. Dr. Ryan responded that this was the case, and as a result, research focuses on fate before technologies are examined. FIFRA also shapes research efficacy test methods that are used. Collaboration with stakeholders in the decontamination area has resulted in a yearly decontamination workshop with international participation.

Disposal research has focused on chemical and biological agent fate and transport in landfills, autoclaving procedures to inactivate anthrax spores on complex materials, portable gasifier development and testing, and development of a disposal decision-support tool. Many projects are planned for future disposal research, including full-scale field testing of decontamination and disposal methods and those involving social and behavioral sciences. Under LTG 2, the Center collaborates with the same organizations as it does for LTG 1; there is a mutual leveraging of resources with the partners listed.

Poster Session for LTG 2 Research

This poster session was held in the Mount Auburn Conference Room at the Marriott Kingsgate Conference Hotel. The Subcommittee reviewed 14 posters in this session. During the 105-minute poster session, each Subcommittee member also had the opportunity to ask questions about the research or clarify specific points with the presenter(s). A book of poster reproductions was provided to Subcommittee members before the meeting.

LTG 2 Poster Discussion Session

BOSC Homeland Security Subcommittee

Dr. Sayler opened the floor to discuss, comment, and critique the posters from the poster session and asked the workgroup (Drs. Banks, Bozzelli, and Walsh and Ms. Raber) focused on LTG 2 to lead the discussion.

Ms. Raber commented that she was impressed with the enthusiasm of the presenters and the quality of the technical information. The decontamination technologies are on track to be expanded to cover wide-area problems, but the technologies are not quite there yet. NHSRC is a good choice to take the next step. The risk-based approach regarding “How clean is clean?” is on track and important from a regulatory standpoint; should an event occur, this information is needed for cleanup. She was concerned with the lack of funds for the re-aerosolization research; the researchers are interested in pursuing this topic and its indoor and outdoor potential, but the work is on hold as a result of funding.

Dr. Bozzelli concurred that there was good work being performed, and the number of interactions with the community are positive and of good value. He noted that the detection and analysis of agents and biological samples is ongoing under both LTGs, and this research needs to continue to increase accuracy and decrease response time. The analysis for chemical agents is considered good. He recommended increased monitoring of the literature on sampling and analysis methods that may be applied to biological and other agents and subsequent feasibility evaluation of the newer methods for possible faster sampling and concentration techniques while retaining needed accuracy.

Dr. Bozzelli also noted that Dr. Paul Lemieux’s (EPA) thermal experiment results were surprising, as the anthrax spores and ricin embedded into construction materials take considerable amounts of time to reach temperatures and undergo destruction as a result of the relative high heat capacity and low thermal conductivity of the construction materials.

Dr. Walsh commented that the Center’s work in this area fits in with EPA’s historical role of remediation. In contrast to LTG 1 research, LTG 2 research has elements of public engagement. He re-emphasized that the Program needs to focus on the back end of the research, and he recommended periodic re-assessment of the short- and long-term priorities of the Program as a whole. Short-term products that have value can provide functionality while the long-term products are being developed. The emphasis on waste staging was appropriate as was preparing for the practical elements of a response that can be prepared in advance, such as developing permitting disposal capacity before an event. There is a need to examine the full web of impact and consider the ramifications of secondary and tertiary impacts of fate.

Dr. Banks was impressed with the technical expertise and the good contextual sense of awareness. Micro-level planning was unclear, however, and it is necessary to ensure that the planning can inform the execution during operation. A shelter-in-place plan should be robust; approximately 50–75 percent of the population will not follow evacuation plans. The Agency should avoid “stove-pipe” issues. A radiological attack may provide the tipping point into a different risk assessment scheme. Dr. Sayler asked Dr. Banks to provide more about the tipping point issue in the written report.

Mr. Labaj stated that many laboratories will not have the capabilities to identify unknown contaminants outside of the realm in which they normally operate, so samples must be sent to state or other laboratories for identification. As there are safety issues involved, it is necessary to develop guidelines regarding the transfer and/or shipment of potentially dangerous samples.

Dr. Romano commented that it was clear that the NHSRC researchers are the center of a vital hub of collaborators, and the researchers are directing the hub and bringing all of the information from the collaborators together. Leveraging is a strong point, and the Center has made positive choices in their partners. Contract monitoring training may be helpful with the collaborations. Social and behavioral

science research is incipient but can be very broad, so Dr. Romano recommends that the researchers develop the same front-end analytic approach that was used to develop the water threat assessments under LTG 1.

Dr. Ormsbee commented that the decontamination and disposal aspects of LTG 2 were well thought out and suggested that the behavioral science work be increased.

Dr. Walsh commented that there is a good deal of overlap between LTGs; however, LTG 2 research focuses on elements at the back end of consequence management, whereas LTG 1 research is focused on the front end. He recommended that researchers from the two LTGs collaborate and share their respective strengths, especially so that the back end of LTG 1 becomes better developed. Dr. Sayles explained that the building and outdoor aspects of LTG 2 necessitated a start at the back end, and OW's needs require LTG 1 research to be focused on the front end. The Program is transitioning to treatment and decontamination as the detection work matures. LTG 1 researchers are working with OW to develop a white paper to determine research needs in this area. As there are limited resources, LTGs 1 and 2 are informing each other to maximize resources.

Dr. Walsh commented that there is enormous preventive value in providing public outreach. Fact sheets and other materials should be developed so that the public can prepare for and respond to domestic events; establishing a connection with the public is a vital piece of this work. All homeland security water research leads to a single decision, a "Do Not Use" order to the public, and work must be pursued with this fact in mind. Dr. Sayles agreed that the Program should address making connections with the public within their research mission, and social and behavioral science research has been initiated. OW, however, is responsible for implementing outreach and developing those types of materials (e.g., fact sheets); NHSRC's research may be able to assist OW in this effort.

Perspectives From the Office of Emergency Management

Debbie Dietrich, EPA/OSWER, Director, Office of Emergency Management (OEM)

Ms. Debbie Dietrich stated that she was pleased to speak about how ORD helps OEM. EPA's Emergency Response Program (ERP) started in 1968 following development of the first National Contingency Plan. ERP responds quickly and decisively to releases of hazardous substances or discharges of oil and supports state and local efforts by providing a "safety net." Under the National Response System, ERP is the cornerstone of national preparation and response to hazardous material (HAZMAT) incidents, with 250 on-scene coordinators (OSCs, which are not first responders) who are supported by national and regional response teams. ERP responds to a wide range of emergency scenarios, including catastrophic natural disasters, terrorism incidents, and major national security events; the majority of responses are to HAZMAT or oil spills. ERP shares responsibilities with the U.S. Coast Guard and receives approximately 30,000 incident notifications per year. Of these 30,000 notifications, ERP responds to approximately 300 in a given year, with an additional 500 emergency responses resulting from EPA's responsibilities to monitor and provide technical assistance under CERCLA and the Clean Water Act. Responses include sampling and monitoring, decontamination, disposal, site screening, dust mitigation, and data management. The 250 OSCs are assigned throughout the 10 regional offices and maintain a good deal of authority to manage incidents with the help of contractors. ERP has extensive working and planning relationships with local, state, and federal responders as well as around-the-clock scientific and engineering support and state-of-the-art technology.

Two teams have been established within OEM, the Environmental Response Team, which serves OSCs with expert advice in new situations, and the National Decontamination Team (NDT), which was established after the anthrax incidents on Capital Hill to fill a national gap in the areas of decontamination and disposal for weapons of mass destruction. NDT is located in Cincinnati and collaborates with ORD; its mission is to provide OSCs with scientific and technical advice about weapons of mass destruction.

The NRF is the overall federal framework that guides how state and local governments will work together following an event. Under the NRF’s Emergency Support Function Annex 10, EPA is responsible for oil and HAZMAT cleanup. Most of the work has followed natural disasters, and the authority that EPA maintains under CERCLA is broad. EPA responded to the World Trade Center, Pentagon, and western Pennsylvania sites following the September 11, 2001, attacks as well as to the Capitol Hill anthrax attacks. There are many post-9/11 challenges as terrorism has added a new dimension to response requirements and more “exotic” contaminants are being introduced.

OEM coordinates with ORD via TRIO, a unique, collaborative effort between NHSRC, NDT, and the regions to bring together the research and response communities. The goal is to share information, develop priorities, and improve the operational utility of research. Progress has been made on the prioritization of research needs, but work remains to be done to better focus priorities and improve understanding. Despite the huge cultural divide between OSCs and researchers, this has been a positive effort to bring these two groups together. OSCs want complete science, but they will accept available science to make decisions. Positive outcomes of this collaboration are communication and high-quality science in which competency and integrity clearly are core values. NHSRC’s external collaboration is effective in contributing to federal science and expertise, and research/responder “product teams” show promise. The collaboration has led to several successful projects, including development of PALs and SAMs. A few challenges remain: nonmatching priorities, research timeframes that do not meet responder expectations, limited operational usefulness of products to date, too few final products, and clarity of roles and responsibilities. The limited operational usefulness of products is a result of the collaboration not beginning until 2 years following the establishment of the NHSRC, but OSCs now are providing input, so this should improve. Future efforts between OEM and NHSRC will include improvement of coordination and communication at all levels, agreement on and establishment of time frames for priority response community needs, establishment of more research/responder product teams with progress “check-ins,” development of better working relationships, and continuation of TRIO.

Mr. Labaj asked whether EPA responded to the Miami anthrax outbreak. Ms. Dietrich replied that EPA was not the lead agency but did have staff in Miami.

Dr. Sayler asked for details about the product teams that were mentioned in the presentation. Dr. Curtis Snook (EPA) responded that researchers are trying to set up a dialogue so that researchers can meet the needs of the emergency responder community. Key people are being identified for the various topics. One product team will focus on detection of chemical warfare agents. For example, EPA currently is not operational for the VX nerve agent because the Agency’s equipment cannot detect low levels, and EPA responders, therefore, cannot reliably identify when they are operating in a hazardous environment.

Dr. Romano asked how EPA reacts to vendors who claim to have solutions. Dr. Snook replied that there are mechanisms in place to perform evaluations of commercial applications.

Perspectives From EPA Regions

Ira Leighton, EPA/Region 1, Deputy Regional Administrator

Mr. Ira Leighton explained that the regions would not be as successful without services provided by NHSRC and OEM. The regions are unique in that they have a long-standing relationship with key practitioners (i.e., public health, police, and fire) and stakeholders. The role played by the regions is to leverage capabilities and build effective connections. Currently, Region 1 is concluding a 2-year lead on homeland security issues. Having one region provide the lead and coordinate with and represent all of the other regions allows NHSRC and OEM to approach one source of information. The ultimate interest of the regions is to be able to apply the best available science while making operational and environmental decisions, and the key to future success in this area is to develop a community of practice for front-line responders at the local, state, regional, and federal levels.

The Regional Annual Status Report, provided to the Subcommittee members in their meeting binders, describes regional capabilities. Three drivers affect the regional perspective: (1) the scope of preparedness, which has moved well beyond emergency response; (2) EPA often being asked to perform beyond its stated role as a result of its highly technical, field-ready force; and (3) the importance of exercising with state and local partners on the issue of consequence management, sampling, and analysis (i.e., actions must continue beyond cleanup).

One example of how Region 1 is developing a community of practice is via its hurricane preparedness activities. Because a major hurricane affecting the states in Region 1 had been predicted, Region 1 convened state and federal partners who had been impacted by Hurricane Katrina. The community of practice was advanced by the knowledge of the responders and the lessons learned. The New England Regional Laboratory will be the first EPA laboratory to pursue the ability to analyze environmental samples of chemical warfare agents. To further build the community of practice, chemists from state laboratories are being invited to examine and understand what is being learned.

There are four key components to developing a community of practice: (1) building strong connections between principal investigators and front-line responders; (2) ensuring that NHSRC research has the right focus; (3) providing NHSRC with adequate and necessary funding, especially for technology transfer; and (4) using current threat exercises (beginning-to-end science capabilities).

Public Comment Period

Mr. Greg Susanke, EPA/ORD, Subcommittee DFO

Mr. Susanke called for public comment at 2:15 p.m. No comments were offered.

Perspectives From EPA Regions (continued)

Ira Leighton, EPA/Region 1, Deputy Regional Administrator

Following the public comment period, Mr. Leighton provided examples of how Region 1 is building the community of practice in each of the key component areas. His hope for this forum is that the BOSC will help NHSRC, OEM, and the regions identify how to approach the community of practice idea in a manner in which the science is advanced so that federal, regional, state, and local practitioners are advancing collective needs. He is proud of EPA personnel, including NHSRC researchers, because they are dedicated and up to the challenge of meeting EPA's mission.

Dr. Banks asked how the community of practice played out for the Blackstone, Massachusetts, water contamination incident and requested details on the timeline. Mr. Leighton responded that collaboration was a key component of the response; a protocol and agreed standards already were in place so that responders knew how to proceed. Ms. Elise Jakobhazy (EPA/Region 1 OSC) explained that she was the OSC who took the initial call regarding the incident and stated that the information arrived at EPA approximately 6 hours after the potential contamination was discovered.

Dr. Walsh commented that the linkage of research with the front lines is essential, and it is disappointing that some ORD research priorities do not always match the front-line perspective. One of the highest priorities is to breach this gap, so he recommended that a liaison be put in place in NHSRC to advocate front-line and regional needs. Additionally, state and local forces should be engaged so communication reaches the front lines.

Subcommittee Working Session

BOSC Homeland Security Subcommittee

EPA staff clarified outstanding issues from the morning's working session.

In response to the question regarding programmatic investment decisions, including prioritization and decision-making responsibilities, Mr. Herrmann explained that the Center establishes its research agenda using the best scientific judgment and: (1) stakeholder reviews, (2) peer reviews, and (3) research needs. Stakeholder meetings with OSWER, OW, and TRIO are held to identify stakeholder needs. Research is developed to meet these needs, and the resulting research agenda is peer reviewed. Additionally, activities have been increasingly influenced by government requirements (e.g., outdoor decontamination of anthrax). Initially, NHSRC decided on a broad approach because of the uncertainty of needs following a terrorist attack, and a balanced portfolio was developed. Division leaders provide input based on their expertise.

Mr. Labaj asked whether it was very competitive for divisions to receive funding and who arbitrates the decisions. Mr. Herrmann explained that he arbitrated financial decisions and the process is very competitive.

Dr. Saylor asked how the paradigm is influenced by input from the executive side. Mr. Herrmann responded that NHSRC retires certain research as new research is initiated; this is a reasonable approach to administering a research program.

Dr. Saylor commented about the risk of becoming stagnant in certain areas because funding and resources limit forward progress. Mr. Herrmann quoted Voltaire's sentiment, "Don't let the perfect be the enemy of the good." NHSRC shares research information before it is perfected, explaining this caveat, and people use the research to the best of their abilities. It is better to spend \$1 million to go from 0–50 percent knowledge than to go from 60–70 percent. Dr. Peter Jutro (EPA) added that some research projects deemed to be too successful are discontinued because this success indicates that the programs are not taking risks. Failures show that research programs are pushing the envelope. He explained that Mr. Herrmann performs sensitivity analysis to move research forward. It is possible to negotiate some of the government requirements if it can be proven that a dramatic shift in investment and focus is not in the nation's best interest.

Dr. Romano asked whether there was a process in place to rejuvenate the front end of the research program by commercialization or technology transfer that provides additional funds. Mr. Herrmann responded that one of the first decisions that the Center made was in regard to the amount that it should participate in the Federal Technology Transfer Act; the ultimate decision was that because EPA plays a government service role, the timely release of information was the most important aspect, and the Center would not concern itself with licensing and royalties. As some research has been developed, NHSRC does have some patents and intellectual property in place, and the Center is working with AWWA to develop vendor technology to support utilities. NHSRC is considering return on investment, but the ultimate goal is providing information in a timely manner. In terms of rejuvenation, Mr. Kim Fox (EPA) explained that for the TEVA software, EPA collaborated with AWWA to involve a suite of commercial vendors that work with the software, and the licensing states that if they modify the software in any way, they must inform EPA, who then can benefit from the modifications as well.

Dr. Saylor asked whether using AWWA to communicate to the water community was advantageous because of EPA's regulatory role. Mr. Herrmann agreed that it was because there has been tension over the years between the water industry and EPA. As the research that NHSRC performs is a matter of national significance and not related to regulation, EPA and AWWA were able to work together to solve the most pressing problems, and this has paid tremendous dividends across the board.

Dr. Saylor asked whether STAR funds had been used for NHSRC research. Mr. Herrmann responded that STAR funds had not been used for NHSRC research, but NHSRC, in cooperation with DHS, is internally funding one external grant for the Center for Advancing Microbial Risk Assessment (CAMRA) at Michigan State University. NHSRC and DHS each committed \$5 million to CAMRA over 5 years. Dr. Saylor commented that STAR funding could fill manpower gaps and asked whether the grants program

was being considered to fund social and behavioral science research in the future. Mr. Herrmann replied that DHS is funding grants at the University of Southern California and Johns Hopkins University that have social science components, but this could be an area to investigate in the future in terms of risk assessment.

Dr. Bozzelli asked what research is needed to advance the area of analytical sampling of chemical agents. Mr. Oba Vincent (EPA) responded that there is a whole suite of aspects to sampling and analysis. One concern is field detection, and EPA is trying to develop field capabilities for the U.S. Army that also meet EPA standards. One approach that NHSRC is taking is adding chemical warfare agents to existing EPA methods and then verifying and validating that these agents can be detected by current EPA methods. In this manner, new methods are not being introduced; EPA is expanding existing methods. Dr. Romano added that the dichotomy between laboratory and field is decreasing.

Dr. Walsh commented that the utilities will play a large role in decision-making that has direct effects on the environment and human health and asked whether EPA had communicated with utilities on this point. Mr. Fox replied that each local water authority makes decisions regarding human health, and public health departments generally make the announcement; EPA does not have this authority. EPA can provide guidance, technology, and tools that help utilities make these decisions. EPA has primacy for water only in the State of Wyoming and the District of Columbia.

Dr. Ormsbee asked how the APMs under each LTG reflect the balance relative to resource allocations. Dr. Sayles responded that it is not a good idea to speculate how funding will be allocated in future years; the APMs are based on an anticipation of what can be done given the current allocation with the knowledge that this amount can change each year.

In response to Dr. Romano's question about intramural versus extramural funding proportions, Dr. Sayles explained that this information could not be shared in a public forum.

Ms. Raber asked how funding was prioritized for research activities planned during the next 5 years. Dr. Sayles replied that all of the research activities detailed in the MYP have been prioritized and are planned. New areas illustrate the evolution of the Program as other areas are discontinued as they mature.

Dr. Sayler thanked EPA staff for the information and recessed the meeting at 3:15 p.m.

FRIDAY, MAY 30, 2008

Closed Session

BOSC Homeland Security Subcommittee

The Subcommittee members agreed that no additional clarification was needed regarding SECRET information, and this session was cancelled.

Subcommittee Working Session

BOSC Homeland Security Subcommittee

Dr. Sayler reconvened the meeting at 11:10 a.m. and explained that Subcommittee members had additional questions regarding NHSRC response to previous NRC and SAB reviews. Mr. Fox responded that the Center had been working on message mapping and subsequent training, and the reviews brought up concerns about the message that was being conveyed. In response, NHSRC sponsored a follow-up workshop to determine whether the public was hearing the correct message. The Center received funding from the White House to develop specific sets of technology to detect specific agents, but NHSRC researchers thought that investment should be placed in general classes versus specific agents, and the

reviewers agreed. The reviews encouraged more modeling for determining contaminant fate and transport and where to place sensors, which NHSRC is implementing. Previous reviews suggested pursuing more social and behavioral science research. Although this area is a weak fit for ORD scientists, the Center did coordinate with DHS to determine what work is being done in this area and hired a postdoctoral fellow to pursue this research.

Dr. Ormsbee commented that viability of more sophisticated models depends on sufficient sensitivity analysis being performed before a field trial. He asked whether TEVA parameters had been manipulated to determine how a Monte Carlo analysis is affected over a range of possible scenarios to determine what impact this has on decisions. Mr. Fox replied that some of this type of analysis had been performed but not to this extent. Dr. Banks added that a simple Monte Carlo analysis would not be sufficient, but there are methods to accomplish this; NHSRC should consult a statistician.

Dr. Sayler noted that previous reviews had suggested that NHSRC establish better mechanisms for peer review of materials with a secure classification and asked whether personnel with increased security clearances were in place to review this type of material. Dr. Jutro responded that there are not such personnel in place because most of the material that EPA classifies is initial, original investigations that could provide a “how-to” guide for terrorists or indicate weaknesses; the classified material is not product research of the type that needs to be peer reviewed. Other EPA reports are classified because classified information from other agencies (i.e., not research information) are included. Very few EPA research reports are classified documents, and agencies constantly review each others’ work. Mr. Herrmann added that only three NHSRC research documents and one joint document with OW had been classified during the previous 6 years, and the Subcommittee members learned about each of the three documents during the closed session on Wednesday. It is the EPA Administrator’s responsibility to ensure that appropriate documents are classified. Every document is reviewed for security purposes, but EPA does not want to classify documents unless it is absolutely necessary.

Following the discussion with EPA staff, Subcommittee members summarized their sections of the report, commented on the sections completed by other Subcommittee members, collaborated with their workgroups on the language and structure of their assigned sections of the report, reached consensus on areas of disagreement, and exchanged information to assist overall preparation of the Subcommittee’s report. Subcommittee members will send their written assessments to Dr. Sayler. The members agreed to schedule a conference call to discuss their report on July 11, 2008, in the early afternoon.

Dr. Sayles took the opportunity to thank the Subcommittee members for their effort and hard work. He recognized that the members did an amazing job assimilating the vast amount of information that they were given in preparation for this review. The Subcommittee’s findings will be used explicitly to set the path forward for the Program; the Program will deliberately respond to each item. He thanked Dr. Sayler for chairing the Subcommittee and Mr. Susanke in his capacity as DFO. Dr. Sayler added his thanks to Mr. Susanke for coordinating the efforts of the Subcommittee and EPA staff.

Subcommittee Report Out of Preliminary Findings

Dr. Gary Sayler, University of Tennessee, Subcommittee Chair

Dr. Sayler welcomed teleconference participants to the meeting and explained that all of the materials for the BOSC review would be provided to the public. This is a preliminary report out and could be modified as the members begin to draft the written report.

The Subcommittee was impressed with the spirit and enthusiasm of EPA staff and management. The general quality of the research is good, and some outputs, such as SAM, have great utility and can be harmonized across states and regions. Scientific and research leadership is evident and suggests great promise for future contributions. The Program is meeting client needs, but it is not yet clear that outcomes are manifest. Efforts to interface with the end user community and the public are excellent, but continued

improvements to meet end user needs are needed and anticipated. It is difficult at this point in time to truly evaluate efficiency, particularly in investments in modeling, in terms of new products versus historical products. To address next generation needs and requirements, consideration needs to be given to a longer term research program, which may include STAR activity and outside research collaborators. There is an apparent need for operational input throughout the life cycle of the research projects.

The Subcommittee used the stated charge questions to assess the Program in terms of each LTG. In regard to the charge question dealing with relevancy, LTG1 is consistent with EPA's Strategic Plan and the Homeland Security Research Program MYP. NHSRC is responsive to EPA program office and regional homeland security research needs under LTG 1; however, the Program could improve collaboration with outside stakeholders, small- to medium-size enterprises, and advisory boards. Because of the inherent number and variability of the parameters in TEVA, investment in sensitivity analysis research should be performed to quantify the accuracy of model predictions before release. The Subcommittee found, with regard to the relevance of LTG 2, that the objectives and scope as defined in the MYP are consistent and clear. The Program focus is generally responsive, but there are some areas in which improvement is needed. More communication and interaction with end users would be useful to ensure relevance and accelerate implementation for stakeholder needs. Although it is too early to assess public benefits, this area of the Program appears to be on track. Overall, the Program is in line with the nation's homeland security needs.

In terms of structure, the Program design has clearly identified priorities, and LTG 1 contributes to the logical framework. Periodic reassessment within the framework of a systems approach is both appropriate and timely, and dual-use applications are evident. In regard to LTG 2, the science used to achieve this LTG is appropriate in most areas of the research, but researchers should be constantly evaluating scientific literature for new methods. A systems approach in conjunction with a risk analysis/threat assessment should be considered in determining research objectives, and efforts need to be considered for supplying existing or interim technologies that could be given to end users sooner. All of the LTG 2 plans appear to benefit multiple needs.

In regard to the charge question addressing quality, products under LTG 1 appear to meet expectations, and the Program is generating good research projects. There is room for improvement in the peer-review and evaluation process; the Subcommittee will provide more details about this aspect in its written report. Under LTG 2, work is conscientiously performed, researchers are enthusiastic, and a good quality assurance/quality control program appears to be in operation. The research appears well thought out with good attention to detail.

In terms of scientific leadership, LTG 1 researchers clearly exercise a leadership role in the field of water security, as many EPA staff are actively engaged and have leadership roles in inter-agency programs. EPA should expand its leadership role in providing guidance for the planning, design, and implementation of new, more sustainable, and resilient water and wastewater systems for the 21st century. Under LTG 2, researchers are strongly involved in federal research collaborations and active in many committees and working groups, providing positive value. The researchers, however, need to be more proactive in setting national level priorities.

Under the coordination and communication charge question, the Subcommittee found that, in terms of LTG, scientists and managers are engaged effectively in program management, and the Program is actively engaged with clients, stakeholders, and end users. There is a continuing need to improve external communication down to the municipality. Under LTG 2, many of the researchers are involved in excellent collaborations and using, leveraging, and supplementing ongoing efforts and expertise at other agencies, although university interactions appear to be limited.

The Subcommittee evaluated performance and efficiency and found that it was difficult to judge the effectiveness of the limited number of products that have been produced thus far under LTG 1. Within

LTG 2, more detailed information is needed from a broader set of end users and decision-makers (e.g., survey), but interactions with regional offices and other government agencies are judged to be strong.

After reminding attendees that the following recommendations were preliminary and could be modified when the Subcommittee drafted the written report, Dr. Sayler outlined the preliminary recommendations for LTG 1. Under the area of protection, the Subcommittee recommended that the Program: (1) update the RAM-W equation; (2) review the need for a Blast Vulnerability Assessment Tool; (3) develop an interim strategy to better inform water utilities of the value and use of existing distribution system models, such as the EPANET software, to address issues associated with routine water quality concerns, advanced homeland security planning, and contamination assessment and response activities; and (4) initiate research on more sustainable and resilient water and wastewater systems for the 21st century. In the area of detection, the Subcommittee recommended that the Program: (1) develop a nation-wide laboratory network, (2) perform detailed sensitivity analysis of TEVA, (3) place more focus on assessment/analysis of alarm, (4) improve the timeline from detection to public notification, (5) establish a national policy and framework for shipping samples, and (6) expand behavioral science research. In terms of containment, the Subcommittee recommended automatic shut down methodologies on alarm. Under remediation, the Subcommittee recommended that the Program develop a cost-benefit analysis methodology to assist in prioritization for mass contamination events.

Within LTG 2, the Subcommittee recommended that the Program: (1) provide more communication and early distribution of draft products for the user community; (2) consider a systems approach to better identifying the key issues and establishing research objectives; (3) demonstrate evaluation of scientific literature for possible application of new technologies; (4) consider pursuing the release of interim deliverables in all research programs; (5) perform research on the social and behavioral dynamics of recommended command procedures for complex, catastrophic incidents as a means to improve success in future events; and (6) consider a life cycle approach in managing research projects.

Dr. Bozzelli added that it may be useful for EPA to note any limitations on interim technology and tools that are released. Dr. Ormsbee noted that it is important for utilities to provide feedback in these situations to ensure that the model dynamics provide correct results. Ms. Raber added that the broad LTG 2 recommendations will be expanded, and more details will be provided in the written report.

Dr. Sayles, Mr. Fox, and Dr. Nancy Adams (EPA) thanked the Subcommittee for their recommendations and expressed their eagerness to view the details provided in the written report.

Dr. Sayler thanked everyone for their participation and adjourned the meeting at 1:52 p.m.

Action Items

- ✧ Subcommittee members will send their written assessments to Dr. Sayler; Dr. Banks' assessment will include more notes about the "tipping point" issue.
- ✧ Dr. Sayler will draft the report from the Subcommittee members' assessments and send it to the Subcommittee members.
- ✧ Mr. Susanke will arrange a conference call in the early afternoon of July 11, 2008.

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**HOMELAND SECURITY PROGRAM REVIEW
SUBCOMMITTEE FACE-TO-FACE MEETING
May 28–30, 2008**

Marriott Kingsgate Conference Hotel
151 Goodman Street
Cincinnati, Ohio

AGENDA

Wednesday, May 28, 2008

CLOSED session:

9:00 a.m. – 12:00 p.m. **Presentation of Classified Information on Threat Agents and Scenarios
as Context for the Center's Research**

12:00 – 1:00 p.m. Lunch

Begin PUBLIC session:

1:00 – 1:15 p.m. Introduction by Chair (10) and DFO Administrative Remarks (5)

1:15 – 1:30 p.m. Overview of Long Term Goal (LTG) 1—Water

1:30 – 3:30 p.m. Poster Session for LTG 1 Research

3:30 – 3:45 p.m. Break

3:45 – 4:15 p.m. LTG 1 Poster Discussion Session

4:15 – 5:00 p.m. Perspectives From Program Clients on LTG 1 Research

Thursday, May 29, 2008

Continue PUBLIC session:

9:00 – 10:00 a.m. Subcommittee Working Session

10:00 – 10:15 a.m. Overview of LTG 2—Buildings and Outdoor Areas

10:15 a.m. – 12:00 p.m. Poster Session for LTG 2 Research

12:00 – 12:30 p.m. LTG 2 Poster Discussion Session

Agenda for May 28-30, 2008 Homeland Security Subcommittee Meeting

- 12:30 – 1:30 p.m. Lunch
- 1:30 – 2:15 p.m. Perspectives From Program Clients on LTG 2 Research
- 2:15 – 2:30 p.m. Public Comment Period
- 2:30 – 3:30 p.m. Subcommittee Working Session
- 3:30 – 5:00 p.m. Workgroup Working Sessions

Friday, May 30, 2008

CLOSED session:

8:00 – 9:00 a.m. Opportunity To Clarify SECRET Information

In PUBLIC session:

- 9:00 – 11:00 a.m. Workgroup Working Session
- 11:00 a.m. – 1:30 p.m. Subcommittee Working Session
- 1:30 – 2:00 p.m. Subcommittee Report Out of Preliminary Findings

Adjourn