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technical BRIEF
INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

2018 EPA International Decontamination Research and Development Conference

INTRODUCTION

On May 8-10, 2018, the U.S. Environmental Protection Agency's (EPA's) Office of Research and Development's National Homeland Security Research Center (ORD/NHSRC) hosted the 10th U.S. EPA International Decontamination Research and Development Conference at the EPA facilities in Research Triangle Park, North Carolina. This conference is known as the largest and most recognized civilian-led conference on all issues related to cleanup following a chemical, biological, or radiological (CBR) incident. It continues to foster collaboration and strengthen research to develop strategies and technologies enabling the nation to withstand and to recover from future disasters, both natural and man-made, at a national and local level.

Figure 1. (Left) Ms. Juliette Kayyem speaks during the opening session; (Right, front) Dr. Paul Lemieux participates in the Technology Café.

For three days, more than 300 national and international participants representing federal, state, and local government agencies; academia; industry; and non-governmental organizations (NGOs) attended 68 oral presentations and networking events, a poster session showcasing 40 posters, and a technology café featuring 12 exhibitors (see **Figure 1**). The objective of this year's conference was fourfold:

1. Bring together federal, state, and local researchers; emergency responders; U.S. and other national governments; and private stakeholders who work in CBR remediation and recovery preparedness;
2. Facilitate the exchange of information on scientific endeavors, including basic and applied research, field demonstrations, guidance/software tool development, and field applications related to CBR remediation issues;
3. Demonstrate the connection between basic or fundamental decontamination research to applied research and effective field application of technologies;
4. Explore challenges faced by regions, states, tribes, and locals in response to natural or man-made incidents.

These objectives and the research presented therein supports EPA's mission to protect human health and the environment, and directly aligns with the agency's proposed 2018-2022 strategic plan in developing strategies and technologies for preventing contamination and responding to emergencies.

INVITATIONAL SPEAKERS

Five invitational speakers representing the federal government, private companies, and NGOs were invited to speak at the conference. Each speaker presented cutting-edge and provocative ideas that addressed the primary objectives of the conference.

Dr. Richard Yamada, Former Deputy Assistant Administrator, U.S. EPA ORD, explained ORD's mission to provide the science, technical support, technology, and tools to inform EPA's mission. He also outlined ORD's research programs, its key state partners, its state engagement, its interagency partnerships, its provision of technical assistance, and its roles in homeland security research.

Ms. Juliette Kayyem, Belfer Lecturer in International Security, Harvard University, shared her analogy of left of "boom" versus right of "boom" (i.e., pre- versus post-incident). Although counter-terrorism received renewed emphasis after the September 11, 2001 attacks, the focus of homeland security continued to capitalize on a single threat to the left of boom up until Hurricane Katrina. Homeland security efforts now include disaster prevention, preparedness, and mitigation (left of boom) as well as the response and recovery (right of boom).

Mr. Juan Reyes, Assistant Director, Fairfax County, Virginia, Department of Public Works and Environmental Services, provided an overview of Fairfax County, Virginia; a municipal-level view of public works in Fairfax County; and a description of their public works mission in emergency management (including mitigation, preparedness, response, and recovery). Mr. Reyes spoke to the efforts and services that a county must undertake to remain economically viable and resilient to the damaging effects of hazards.

Mr. Lance Brooks, Division Chief, Cooperative Biological Engagement Program (CBEP), Defense Threat Reduction Agency (DTRA), outlined the agency's mission and the CBEP. As an agency, DTRA focuses on the "pathway" (e.g., state actors) and violent extremist organizations. Mr. Brooks highlighted the Department of Defense (DoD) Cooperative Threat Reduction (CTR) program's goal to reverse weapons of mass destruction (WMD) programs ("dismantle and destroy") and prevent the acquisition and proliferation of WMD materials. Mr. Brooks explained the need for agencies to begin effectively bridging the gap between operational requirements and field implementation.

Ms. Amanda BenDor, Technical Program Manager, PATH (an international nonprofit organization), explained the role of the Global Health Security Partnership (GHSP) during the 2014 Ebola outbreak in Liberia. “GHSP is a collaboration of the Peace Corps, the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR), and Seed Global Health” (https://www.peacecorps.gov/, 2018). GHSP helps counties strengthen their health systems by expanding infectious disease surveillance, strengthening laboratory capacity, and developing effective information systems to prevent, detect, and respond to infectious diseases and other public health threats. GHSP was key in helping countries build systems and capacities to prevent and respond to outbreaks. Ms. BenDor discussed how PATH was able to apply GHSP lessons learned from the 2014 Ebola outbreak in Liberia to the 2017 Ebola outbreak in the Democratic Republic of the Congo. This sharing of information and discussion of lessons learned helped PATH to react more efficiently and effectively. Ms. BenDor’s presentation elaborated on the role that NGOs have at a national and international scale, and the need for government-NGO cooperation.

SCOPE AND APPLICABILITY

Since the initial conference was held in 2005 following the Amerithrax incident, the conference has grown to include national and international participants who come together on a regular basis to discuss a range of homeland security topics. Contributions from partners and international collaborators continue to grow with each conference and themes remain dynamic: as new topics arise, they are included in the agenda for discussion.

The purpose of the 2018 EPA International Decontamination Research and Development Conference was to conduct and communicate the fundamentals and applications of science, including how current work supports EPA’s mission in support of state, tribal, and local decision makers. The conference emphasizes the transdisciplinary and translational approach of EPA’s homeland security research, fostering collaboration across the federal government and working with the emergency officials to implement research at a federal, state, tribal, and local level.

TOPICS & STRUCTURE

At its core, the conference revolves around CBR detection and decontamination research. Additionally, each conference highlights recent disasters or research needs. The following general topics were featured at this year’s conference:

- New CBR detection and decontamination research data, or field activities and large-scale demonstrations, related to the detection and decontamination of biological (including agricultural threat agents and biotoxins), chemical, and radiological threat agents, in indoor areas (in facilities), in outdoor areas, or of outdoor materials (such as concrete);
- Cross-cutting topics related to restoration, including: clean-up levels/risk assessment, exposure assessment, sampling/analysis of threat agents, fate/transport/containment, material compatibility with decontamination processes, tool and guidance development, waste management of threat agent-contaminated materials, water/wastewater decontamination, and systems approach to response and regulatory issues;
- Initiatives highlighting local priorities, challenges, and science and technology developments related to response and recovery efforts.

New to this year's conference was the introduction of a special topics category. These topics addressed emerging issues as identified by the conference committee. This year's special topics were:

- Emerging threats: work addressing threats of recent interest to our customers and stakeholders (e.g., fentanyl, drug lab cleanup);
- Recent disaster response: examples of work supporting large-scale natural disaster response efforts;
- Research to response: best practices for bridging the gap between research-and-development and field operations;
- All-hazards remediation (non-CBR): remediation efforts related to a variety of disasters/incidents outside core homeland security responsibilities.

GENERAL AND BREAKOUT SESSIONS

This year's conference featured two general and six concurrent breakout sessions. Speakers were limited to 25 minutes with 5 minutes for questions. Session topics are described below.

General: Cross-Cutting Initiatives for Response and Recovery

Cross-cutting topics related to restoration, including organization efforts to support regions, local initiatives, and homeland security: Presenters highlighted emergency response, management and disposal of waste, and resiliency.

Concurrent: Regional, State, and Local Initiatives

Local priorities, challenges, and science and technology developments related to response and recovery efforts from intentional or accidental environmental incidents: Presenters emphasized emerging threats' toxicity, exposure, risk, and decontamination.

Concurrent: Water Infrastructure Protection and Decontamination

Obstacles and solutions associated with protecting and decontaminating water infrastructure: Presenters highlighted water sector preparedness, water-based bacterial spore fate and transport, water distribution system tools to support decontamination efforts, and contaminant persistence in drinking water pipes and premise plumbing.

General: Chemical, Biological, and Radiological Research Efforts

Cooperative efforts within homeland security, including preparedness and response partnerships with the U.S. Coast Guard and the DoD: This session also hosted discussions related to NGO perspectives from the international Ebola/health emergency response activities.

Concurrent: Biological Agent Decontamination

Application of decontamination methods in response to biological agents: Presenters focused on underground-transport restoration, decontamination with hot air or low-concentration hydrogen peroxide, virucidal heat treatment, and the use of electrostatic sprayers for decontamination.

Concurrent: Biological Agent Sampling and Analysis Methods

Biological sampling and analysis methods, highlighting science tools, characterization and extent mapping of biological incidents, and strategies for a bioaerosol air sampling network.

Concurrent: Biological Agent Research

Research and decontamination strategies for biological agents: Presenters emphasized viral persistence, preserving contaminant viability in environmental samples, and polymerase chain reaction (PCR) methods for biological agent detection.

Concurrent: Chemical Agent Research

Methods for chemical agent research and decontamination strategies: Presenters focused on chemical hot air decontamination, decontamination options for sensitive equipment-related materials contaminated with persistent chemical warfare agents, best practices to minimize laboratory resources for waste characterization, and decontamination using vaporous hydrogen peroxide.

Concurrent: Radiological Agent Research

Radiological research and decontamination strategies as well as research pertaining to response and remediation following large-scale incidents: Presenters highlighted radionuclides of concern, innovative detection methods, transport of radionuclides in affected areas, and decontamination technologies.

Concurrent: Technology and Software Supporting Disaster Response

Technology and software tools to assist disaster response: Presenters emphasized spatial context through indoor maps, all-hazard software tools for waste management planning and estimating resource demands associated with waste transport, and a multi-hazard research Web-based tool for searching, applying, and sharing scientific information.

CONCLUSION

EPA's International Decontamination Research and Development Conference continues to serve as a valuable educational, networking, and planning resource for scientists and operational experts. This event serves as a crucial communication and feedback mechanism for experts to develop and implement technologies necessary to support the left- and right of the boom. Since its inception in 2005, the conference has continued be a source of knowledge and insight into the homeland security paradigm. Due to its growing popularity, the conference has exceeded the capacity of its long-time venue, EPA's Research Triangle Park facility. Conference organizers are using this opportunity to think of creative alternatives for the 2019 conference location and how to continue to attract a diverse group of attendees.

MORE INFORMATION

- For more information about EPA's Homeland Security Research Program, visit the Web site at https://www.epa.gov/homeland-security-research.
- To view publicly released abstracts, presentations, and questions and answers, visit the post-conference Web site at https://www.epa.gov/homeland-security-research/epa-international-decontamination-research-and-development-conference

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DISCLAIMER

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