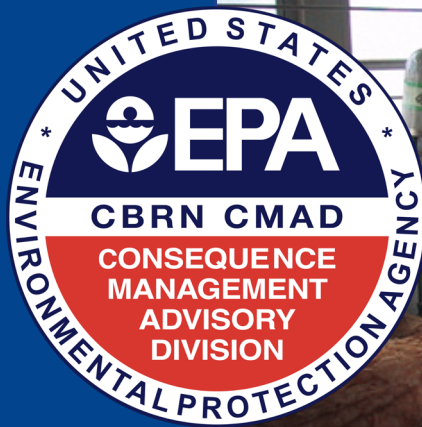




**CBRN**  
**Consequence**  
**Management**  
**Advisory**  
**Division**



**2014 Annual Report**





## Letter from the Director

As fiscal year 2014 (FY14) comes to a close, it is my pleasure to once again provide the highlights of our division's activities. One detail you may have noticed on the cover was our slight name change. In the spring, our parent office, the Office of Emergency Management (OEM), implemented its reorganization to better address current functions and expectations. One of the resulting changes was that the CBRN Consequence Management Advisory Team (CBRN CMAT) became a Division (CBRN CMAD). While OEM reorganized, we took the opportunity to analyze our own mission and determined that it would benefit us to reorganize our staff to improve our functionality and capabilities. As a result, the changes were implemented which created the Field Operations Branch, the Operational Planning Team, and the Associate Director position. Since we function holistically as a team, we will continue to use CMAT and CMAD interchangeably and the next version of the NCP will include CMAD as a Special Team, yet reference us as CMAT.

Mike Nalipinski, will serve as the CMAD Associate Director, and he will assist me with: strategic planning; outreach and communications; and will lead special projects for the Division. The Field Operations Branch (FOB) will be led by Paul Kudarauskas, who will manage the personnel assigned to FOB as well as critical deployable assets, namely Portable High-Throughput Integrated Laboratory (PHILIS) and Airborne Spectral Photometric Environmental Collection Technology (ASPECT). As FOB Branch Chief, Paul will also be responsible for: procurement and maintenance of deployable equipment; development and implementation of specialized training for On-Scene Coordinators; and evaluation of new technologies and response tools. Elise Jakabhazy will serve as the Team Leader for the CBRN Operational Planning Team (COPT) and she will be accountable for: the operational planning and support of CBRN technical issues; leadership and participation in national workgroups focused on advancing CBRN preparedness; collaboration with the National Homeland Security Research Center (NHSRC); and will lead future operational field studies.

Though our organization has experienced many changes in its relatively short tenure, I believe the changes illustrate the necessity for organizations to evolve and adapt to meet new challenges. It is for these reasons that we believe CBRN CMAD will better serve, support and advise our partners now and into the future. We hope that you find this to be true and if there is anything we can do to support or partner with you, please do not hesitate to contact me or one of the members of our management team!

Sincerely,  
Erica Canzler

# TABLE OF CONTENTS

## Letter from the Director

i

## Chemical

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CMAD Trains & Prepares with Region 10 for Chemical Weapons Response	1
PHILIS Helps Region 2 Superfund Site Save Time & Money	1
Novel Analytical Methods Enhance EPA's Capacity and Capability for CWA Response	2
PHILIS Continues to Maintain Accreditation	3
PHILIS at CBRNe Convergence Conference	3
PHILIS in Lab Exercise with Regions 1 & 2 New England CST for CWA Response	4
Full-Scale Exercise Tests Emergency Response Use of Web-based Electronic Data Review (WebEDR)	4
Integrated Detection and Decontamination Demonstration (IDDD) Exercise	5

## Biological

---

NYC Bio Response Plan	6
Study Determines Methyl Bromide is Effective and Can Be Used Safely for Anthrax Remediation	7
CMAD Remote Support in Region 4 Subway Exercise	8
Ricin Environmental Response Training Course Developed	9
Technical Support for Ricin Response Provided to Oklahoma City-County Health Department	9
Functional Exercise Compels Communication on Lab Capacity Issues for Anthrax Response	10
Underground Transportation Restoration Project	10

## Radiological

---

Rad Decon Application Under Development	11
RTFL Boot Camp & Refresher Courses	11
Radiation Response Tactical Guide Development	11
"Assessment of Self-Help Methods to Reduce Potential Exposure to Radiological Contamination after a Large-scale Radiological Release" Published	12

## ASPECT

---

National Park Service Requests Survey Assistance for Grand Canyon	13
Region 9 Support- 2014 Tournament of Roses Parade, 2014 Rose Bowl Game and 2014 BCS National Championship	14
Boston Marathon Aerial Support	14
64th Weapons of Mass Destruction Civil Support Team (CST) of New Mexico Exercise	15
CORE Summer Intern	15

## Collaboration & Coordination

---

CMAD Trains and Exercises in Region 9 Annual Training and Visits USCG Pacific Strike (PAC) Team	16
2013 International Decontamination Research and Development Conference	16
Transatlantic Collaborative Biological Resiliency Demonstration (TaCBRD) Tools Tested	17
Sample Prioritization Guidance for Labs	17
PARTNER: CMAD and NHSRC Working Together for Better Response Readiness	18
Who Needs HGTV when you can have the CMAD Webinar Series?	19
CMAD Organizational Chart	19

Acronyms	20
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# Chemical

## CMAD Trains & Prepares with Region 10 for Chemical Weapons Response

In May 2014, CMAD staff provided chemical warfare agent (CWA)-specific training to the Region 10 On Scene Coordinators (OSCs), Response Support Corps (RSC) members, Regional laboratory (lab) personnel, and EPA contractors. The training focused on some chemical-specific details that were used during the region's subsequent three days of Incident Management Team (IMT) / Level B training, including the transportation of a CWA simulant to the Regional All-Hazards Receipt Facility (AHRF) for analysis.



Level B Training

Section and the other as the Scientific Support Coordinator (SSC) assigned to the Incident Command (IC).

Technical recommendations were vetted through the IMT structure resulting in CMAD staff preparing: characterization and clearance sampling plans; decontamination plans; and, evaluation criteria for the laboratory results.

During the field portion of the exercise, CMAD staff participated as subject matter experts (SMEs) in the IMT - one assigned as a Technical Specialist in the Environmental Unit (EU) of the Planning

## PHILIS Helps Region 2 Superfund Site Save Time & Money

The Portable High-throughput Integrated Laboratory Identification System (PHILIS) unit in Edison, NJ is currently providing rapid headspace analysis to help characterize wastes from over 2000 drums at the Superior Barrel & Drum site, in Elk Township, NJ to support a Region 2 OSC. Rapid headspace analysis via PHILIS' Gas Chromatography/Mass Selective Detector (GC/MSD) system allows the Region 2 Removal Branch to more quickly and effectively segregate and bulk wastes for disposal, while also saving significant analytical costs as compared to traditional outside laboratory analysis as well as shipping costs and time. PHILIS is combining both speed and accuracy in this analysis, while reducing overall costs to Region 2 for waste characterization and disposal.

***“The training/exercise was very useful to us on many fronts. First and foremost, we realize having the [CMAD] CWA expertise available in the IMT is critical to the success of a response.”***

Region 10 Management  
*(stated during Hot Wash after the training event)*



Sampling at Superior Barrel & Drum site



All Hazards Receipt Facility



Superior Barrel & Drum site

## Novel Analytical Methods Enhance EPA's Capacity and Capability for CWA Response

The PHILIS units and staff continue to develop novel analytical methods to enhance the EPA's capacity and capability for response to CWA and other chemical incidents, using a variety of analytical instrumentation including:

- liquid chromatography-tandem mass spectrometry (LC MS/MS);
- gas chromatography with mass selective detector (GC/MSD); and
- gas chromatography/time-of-flight mass spectrometry (GC/TOF-MS).

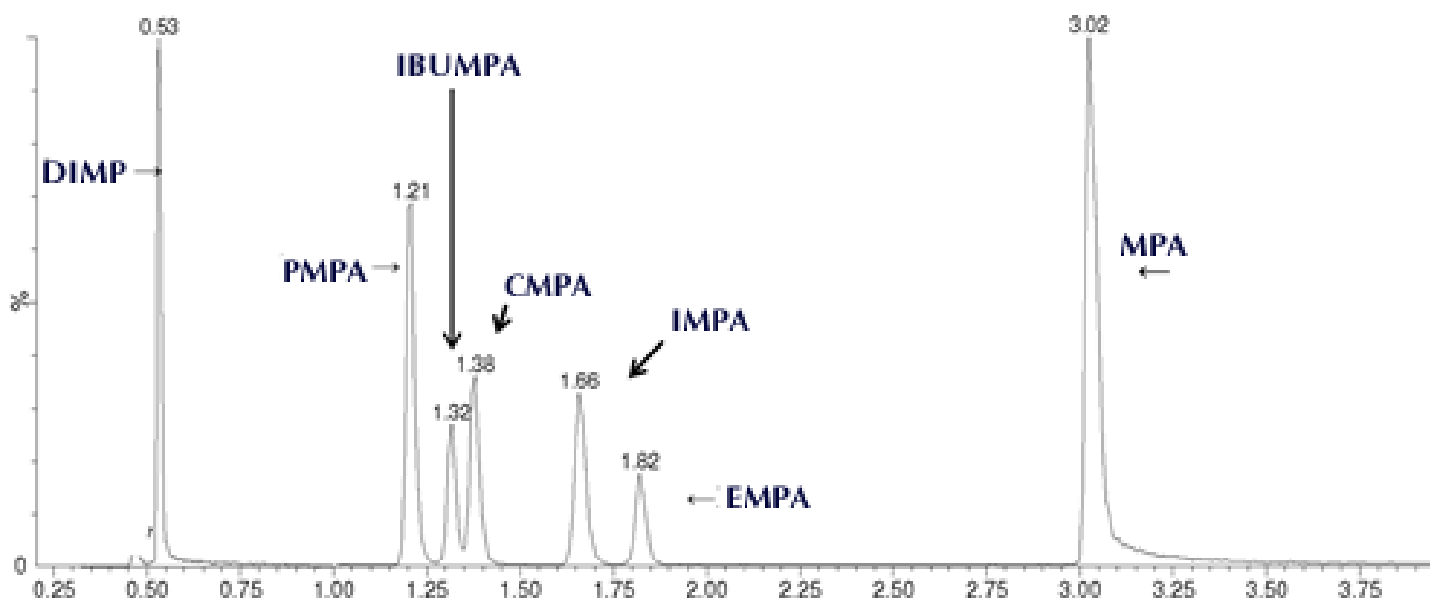
All methods developed by PHILIS for the analysis of CWAs will be shared with EPA's Environmental Response Laboratory Network (ERLN) and eventually included into the EPA's Standard Analytical Methods for Environmental Restoration Following Homeland Security Events (also known as the "SAM" compendium of methods). These LC MS/MS and GC/MSD methods and others will be shared with the CWA Sampling Analysis Plan (SAP) work group as a prototype of rapid methods for selected CWAs.

**Yearly, both EPA PHILIS units must demonstrate competency, as required by EPA's Science and Technology Policy Council, specifically the POLICY TO ASSURE COMPETENCY OF ORGANIZATIONS GENERATING ENVIRONMENTAL MEASUREMENT DATA UNDER AGENCY-FUNDED ACQUISITIONS:**

**Agency Policy Directive Number FEM-2011-01**

A rapid LC MS/MS method for organophosphate pesticides in waters was developed to support standard EPA Superfund investigations and cleanups. Proficiency in these LC MS/MS methods was followed by the development of a rapid LC MS/MS method for the breakdown products of nerve agents. When released in the environment, many nerve agents break down to numerous phosphoric acids. Being able to track breakdown products will help determine the extent of the contaminant plume in the event of a terrorist attack with nerve agents.

A rapid headspace analysis for Volatile Organic Compounds (VOCs) and possibly G-series nerve agents was developed for the GC/MSD systems to provide fast reliable screening data to the OSC, for timely decision making purposes. Rapid screening can triage samples for further analysis by PHILIS and other ERLN labs using National Environmental Laboratory Accreditation Program (NELAP) or SAM methods.



Example Chromatograph



## PHILIS Continues to Maintain Accreditation

PHILIS initially demonstrated Agency required competency in 2011 by receiving accreditation in the NELAP and has continued to maintain this accreditation ever since. In preparation for annual NELAP accreditation, both PHILIS units undergo internal audit and proficiency testing (PT) exercises. These are conducted by the EPA Quality



Interior of PHILIS Mobile Unit

Assurance and Technical Support (QATS) contract and are designed to “stress” the PHILIS Quality System so that deficiencies can be corrected before the NELAP audits. On January 9-10, 2014, the Edison PHILIS unit underwent a NELAP sponsored audit which was conducted by a representative from the New Jersey Department of Environmental Protection (a NELAP-authorized accrediting agency). The Castle Rock PHILIS unit underwent a similar NELAP sponsored audit on January 14-15, 2014, except that this audit was conducted by a third party representing The Florida Department of Health Bureau of Laboratories (also a NELAP authorized accrediting agency).

Both the Edison and Castle Rock PHILIS units passed these audits and maintain their accreditation through June 2016.

## PHILIS at CBRNe Convergence Conference

CMAD has provided staff and field deployable assets (PHILIS) to support EPA’s regional and inter-agency exercises for strengthening the nation’s response to CWA attacks. In the fall of 2013 CMAD deployed the PHILIS mobile laboratories to the 6th Annual Chemical, Biological, Radiological, Nuclear, and high yield Explosives (CBRNe) Convergence World Conference and Exhibition in San Diego, CA. CMAD showcased EPA’s mobile capacity and capability for the analysis of CWA-contaminated environmental samples, with detection limits below risk-based clearance levels. The conference was well attended by

CBRNe experts from around the world, from both government and private industry sectors.



CMAD Display at CBRNe World Conference



PHILIS Mobile Unit at CBRNe World Conference



# Chemical

## PHILIS in Lab Exercise with Regions 1 & 2 New England CST for CWA Response

In April 2014, CMAD deployed the Edison PHILIS units to EPA Region 1 to participate in a joint exercise with Region 1's fixed "brick & mortar" New England Research Laboratory at Chelmsford, MA as well as several of the New England area National Guard Weapons of Mass Destruction (WMD) Civil Support Teams' (CSTs) mobile screening laboratories. Soil, water and wipe samples were spiked with CWA-stimulants and submitted to the mobile and fixed labs to evaluate the individual labs and compare results.

Concurrent to the laboratory exercise, several EPA Region 1 and 2 OSCs, the CSTs, and EPA contractors conducted a Level A screening and sampling exercise using CWA-stimulants at the Boston Massachusetts Bay Transportation Authority (MBTA) Training Center. Standard Operating Procedures (SOPs) for the safe collection, transport, handling, triage and analysis of samples potentially contaminated with CWA were exercised.



Boston MBTA Training Center

During the exercise, the interoperability between EPA Region 1 OSCs' and the CSTs' Level A response efforts were evaluated, including SOPs and protocols. The Region 1 laboratory capability and capacity for CWA analysis, in conjunction with PHILIS and the CST's mobile laboratory assets were also evaluated. An after-action report (AAR) detailing both the highlights of the successful interoperability as well as some improvements to the Region 1's CWA sampling, triage and analysis SOPs and procedures will be forthcoming. The AAR will also highlight the steps needed to establish better data sharing and reporting protocols among the fixed and mobile laboratory assets in the event of a CWA incident.



PHILIS Mobile Unit

## Full-Scale Exercise Tests Emergency Response Use of Web-based Electronic Data Review (WebEDR)

From June 16- 20, 2014, Environmental Response Laboratory Network (ERLN) representatives provided Web-based Electronic Data Review (WebEDR) support to laboratories participating in the EPA Office of Water's Water Laboratory Alliance (WLA) Full Scale Exercise (FSE). The 2014 FSE participants included representatives from EPA Region 1, water utilities, and ERLN member and non-member laboratories. The purpose of the 2014 FSE was to simulate emergency response activities and improve preparedness relating to threats against drinking water systems.

ERLN representatives supported EPA's Office of Emergency Management (OEM) with data management during the exercise. Participating laboratories performed actual sample analyses. After the laboratories completed their sample analysis they then submitted their completed Electronic Data Deliverables (EDDs) via the WebEDR tool using the "Protocol for Measurement of Extractable Semivolatile Organic Compounds (SVOCs) Using Gas Chromatography/Mass Spectrometry (GC/MS)". This FSE exercised the process of sample collection all the way through analysis and web-based results reporting. The ERLN Representatives indicated that the 2014 FSE was useful for identifying gaps and specific details regarding the data management process that require attention in order to effectively use the system during future response activities.

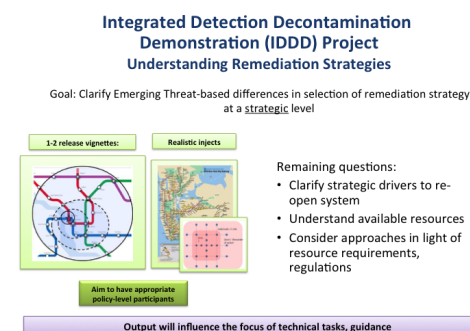
## Integrated Detection and Decontamination Demonstration (IDDD) Exercise

CMAD was the EPA lead in supporting the Department of Homeland Security (DHS) sponsored Integrated Detection and Decontamination Demonstration (IDDD) project, which culminated in a “live demo” of the remediation technologies during the fall of 2013. The live demo took place at the Bowery Station, an active New York City Metropolitan Transit Authority (NYC MTA) subway station. EPA participants included the National Homeland Security Research Center (NHSRC), the Environment Response Team (ERT), and representatives from Regions 1, 2 and 3. Other federal and state agencies participated, including the: Center for Disease Control (CDC), Department of Defense (DoD), National Guard CSTs, NYC MTA, and NYC Department of Health and Mental Hygiene (NYC DOHMH). The IDDD focused on an emerging chemical threat agent that could have the potential to be released in an underground transportation hub such as a subway system. The IDDD final technical reports are currently undergoing review by EPA and the other IDDD participants.

On November 20-21, 2013, CMAD also participated in a second field component of the IDDD project at an abandoned subway station in NYC. The Massachusetts Institute of Technology (MIT) Lincoln Laboratories, a DHS contractor, led the two-day exercise involving

the release of a VX-simulant persistent nerve agent into the NYC MTA subway system. The demonstration was the culmination of a 5-year project with DHS to address: issues of appropriate personal protective equipment (PPE); decontamination (decon) efficacy; analytical methodology; dispersion patterns of an agent throughout an active subway system (both stations and tunnels); persistence of the agent adhering to and penetrating into the various subway building material substrates; and sampling strategies in

concrete and tile materials making up the interiors of the NYC MTA. As predicted, the simulant penetrated into the concrete walkways and tunnel walls, but the observation that chemical agents can penetrate into materials often assumed to be considered as non-porous, such as the tile, was unexpected. The demonstration identified penetration of the agent into micro cracks in the tile. Knowing the depth of penetration through a material, coupled with the knowledge of the toxicity and persistence of a CWA, demonstrates the challenges required for developing decontamination options.



### IDDD Demonstration Project

the subway system. The demonstration was conducted in an abandoned, isolated, subway station in lower Manhattan. The demonstration involved the release of a fluorescent VX-simulant into the station and subsequent observations of the dispersion patterns of the simulant throughout the station and adjacent tunnels. A focus of the demonstration was the penetration study, conducted by MIT, of the agent as it made contact with the

A Table Top Exercise (TTX) was conducted on the second day of IDDD where participants discussed response activities (i.e., tactics, resources, available assets, etc.) to a potential release of the agent-of-concern in a major subway system. EPA was represented by two CMAD chemists, and OSCs from Regions 1, 2 and 3. Other participants included DHS, FBI, CSTs, New York City law enforcement and Mass Transit Authority, MIT, Sandia and Pacific Northwest National Labs (PNNL). The classified TTX included sampling plans, laboratory capacity shortfalls, information dissemination issues, and gap analysis. A final report encompassing the 5 year project is scheduled for release by DHS in 2014.



# Biological

## NYC Bio Response Plan

CMAD, at the request of the NYC Department of Health and Mental Hygiene (DOHMH), is currently leading a group comprised of representatives from several EPA offices, including: OEM; NHSRC; Office of Resource Conservation and Recovery (ORCR); ERT, Office of Chemical Safety and Pollution Prevention (OCSPP); Office of Water (OW); and OSCs from Regions 2, 3, and a Removal Manager from Region 5 to develop a response and recovery plan for NYC. The plan will provide guidance for the remediation, clearance and re-occupancy of private and public properties in the event of an intentional release of *Bacillus anthracis* (*B. anthracis* or *Ba*). The plan includes general guidance for government/regulatory entities and stakeholders; technical guidance including decontamination strategies and tactical procedures (supported by tools), sampling strategies and plans, clearance criteria and procedures; roles and responsibilities; and guidance for establishing technical working groups and clearance committees. The EPA group is working with representatives from various NYC agencies, and representatives from the state of New York to develop the plan. Two of the long term goals of the effort are to develop a planning template for developing bio-response plans for other major urban areas and to develop planning checklists for general

CBRN response in subway systems.

Some of the overarching response strategies (e.g., system closure, characterization, decon, clearance and return to service) will have applicability to an all-hazards response.

NYC presents many challenges with buildings that are predominantly high-rise structures and the city also operates the largest subway system in the country. In a wide-area release of *B. anthracis*, these type of structures and facilities will be difficult to decontaminate. To try to develop a scalable approach to decontamination, a sub-group of the team performed an inspection of a 33-story high rise building to collect data and information to develop a plan for fumigating a high-rise building. The group went so far as to inventory the contents and materials in the building to better understand material compatibility and potential waste generation issues.



NYC Subway Common Area



NYC Subway Ventilation Fans

The development of this plan and discussing the many issues involved will help to facilitate an effective and coordinated response for a biological terrorism event.



NYC Bio-Response Planning



## Study Determines Methyl Bromide is Effective and Can Be Used Safely for Anthrax Remediation

In December 2013, an operational study was conducted by CMAD to evaluate the use of Methyl Bromide (MeBr) for fumigation of spore-forming bacteria in residential structure. CMAD partnered with the University of Florida (UF), NHSRC, and ERT. A majority of the current alternative technologies for remediating *B. anthracis* have a capacity, corrosion and/or collateral-damage issues frequently associated with remediating *Ba*. Even if the capacity of these technologies were increased, the collateral damage they cause would likely generate a significant volume of waste. In the case of sensitive or historic infrastructure, corrosive remediation techniques may not be



Tarped House

an option even if capacity were available. MeBr, on the other hand, does little to no damage to the structure or its contents during fumigation. Further, there is an existing pest-control industry that could be leveraged during an incident since they have the infrastructure and technical skills needed for MeBr application. MeBr reduces waste, time, and total cost of remediation and may be the optimal choice for sensitive or historically-significant infrastructure. Completing this operational study increases EPA's capacity to respond and recover; resulting in greater resiliency in response to a *Ba* or other biological incidents.

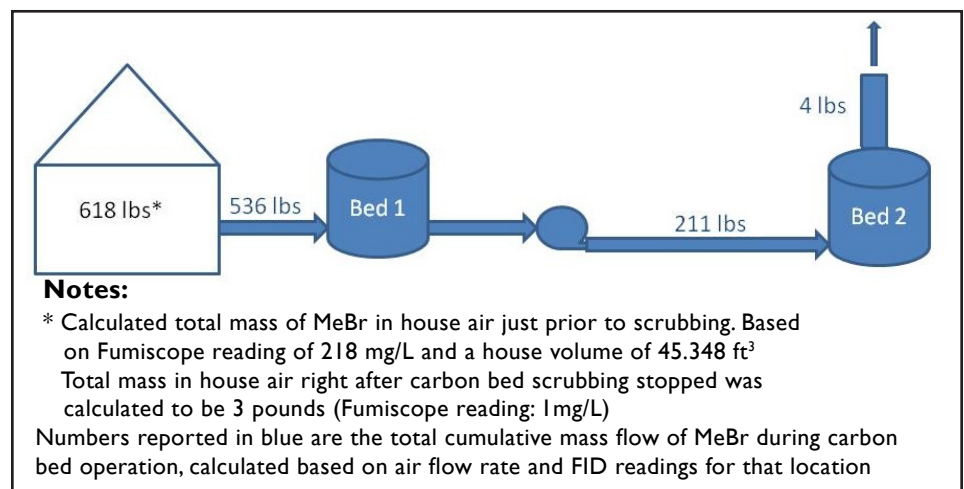
Coupons loaded with a *Ba* surrogate were selected for use in the study based on a series of NHSRC laboratory tests. Spores of *Bacillus anthracis* Sterne 34F2 (*Ba* Sterne), the vaccine strain, were utilized as surrogates for fully-virulent *Ba* spores. Two coupon material types, glass and wood, were chosen for preparation of customized biological indicators (BIs) since these materials are the most difficult for MeBr to inactivate the spores, as evidenced by NHSRC material testing studies. Multiple BIs were deployed throughout the entire house to qualitatively assess fumigant efficacy spatially, and then NHSRC RTP Microbiology laboratory analyzed all coupons.

Activated carbon scrubber vessels were connected to the home with inlet hoses and MeBr levels were measured within the carbon bed system. The total mass of MeBr that exited the house and entered the carbon bed system was calculated via integrating the area under the concentration versus time curve.



Preparing Coupon Retrieval

While gaseous MeBr was delivered into the house, concentration, temperature, and relative humidity were monitored inside and outside the structure. ERT assisted EPA by performing ambient air monitoring using photoionization monitors at stationary locations around the structure; while hand-held monitors with the same technology were used to leak test the tenting materials and to provide monitoring for locations not covered by the six stationary monitors. The monitors proved effective for MeBr monitoring and provided a successful health protection measure for the site workers and offsite persons.



Mass Balance of MeBr

# Biological

## Methyl Bromide, Continued...



Testing the Air Flow

The fumigation was carried out safely and successfully; test coupons inoculated with *Ba Sterne* placed throughout the structure were all found to be negative after the fumigation. The effective execution of the operational study, provided critical data for evaluating the efficacy of using MeBr fumigation as a readily available and cost effective alternative for remediating spore-forming bacteria found in a building. Completing this operational study increases the ability to respond and recover, resulting in EPA's greater resiliency and capacity for response to a *Ba* or other biological incidents.

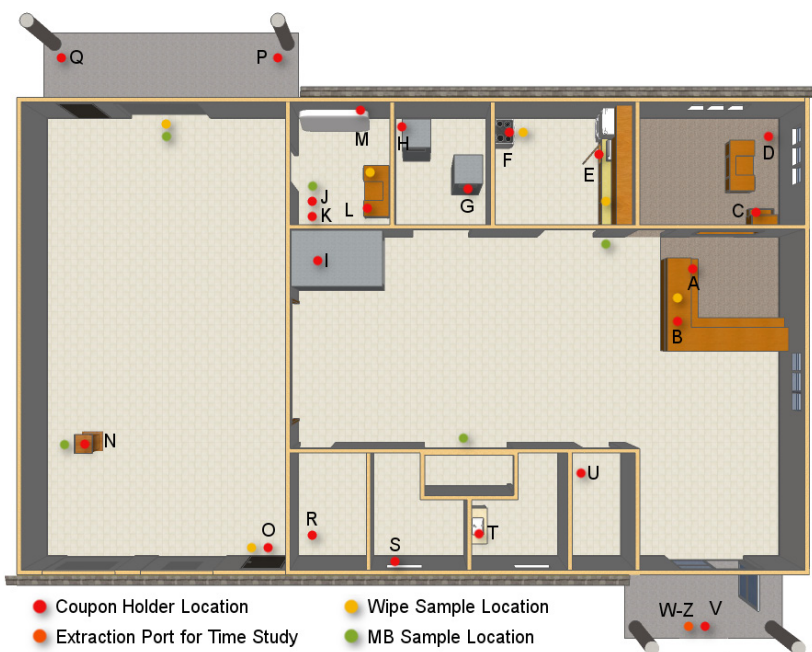
If you are interested in learning more about this study, the detailed final report will be available at [www.epa.gov](http://www.epa.gov) soon.



Daily Safety Meeting for the Study



Activated Carbon Scrubber



Test Facility and Location of BIs



Inlet Port



Exhaust Port

## CMAD Remote Support in Region 4 Subway Exercise

On June 24th CMAD staff and NHSRC provided support to Region 4 during their exercise in which a simulated release of *Ba* was dispersed into MARTA, the Atlanta subway system. CMAD and NHSRC collaborated to represent the Technical Working Group (TWG) and Environmental Clearance Committee (ECC) for the Region 4 exercise. Recommendations for characterization

sampling, decontamination recommendations for the tunnels and subway cars and clearance criteria were offered to the Region for their consideration. The result of this exercise concluded that CMAD's technical advice could effectively be provided to responders via integration into the ICS structure within the TWG or as a SSC.



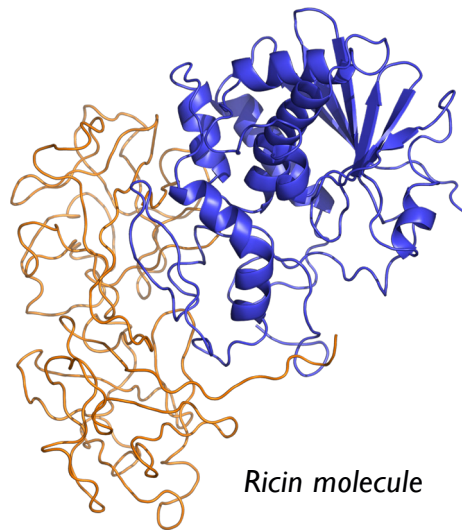
## Ricin Environmental Response Training Course Developed

In late 2013 and 2014, two separate incidents of potential domestic terrorism involving ricin took place in the National Capital Region. During coordination efforts with the various federal and local agencies, businesses, and responders it became apparent that there was no clearly defined environmental response and analysis protocols to address ricin incidents. The gaps identified included: how to conduct environmental sampling for ricin; the proper means of analysis of the ricin samples; the effect of bleach on the analysis of clearance samples; and determining if the analysis was for screening or for confirmation of active ricin.

To address these issues, CMAD and EPA Region 3 OSCs performed a one-day ricin training exercise in Washington, DC, and a one-day training exercise at Ft. Meade, Maryland. A number of federal and local agencies attended, including the Federal Bureau of Investigation (FBI), Central Intelligence Agency (CIA), Capitol Hill Police, US Coast Guard (USCG), and members of Maryland's CST.

Training presentations focused on: statutory and regulatory authorities, presented by EPA Capital Region OSC; environmental sampling techniques for characterizations and clearance sampling for ricin, including a hands-on demonstration with surface media, presented by CMAD; current sampling and sampling plan assistance and analytical capabilities, presented by Edgewood Chemical and Biological Center (ECBC); analytical options, presented by NHSRC; and laboratory capabilities within the federal and state agencies, presented by CMAD.

CMAD members and the Capital Region OSC have also presented a two-hour summary of this training exercise to the EPA Region 3 OSCs in Philadelphia.



## Technical Support for Ricin Response Provided to Oklahoma City-County Health Department

In May 2014, CMAD provided initial guidance to the Oklahoma City-County Health Department (OCCHD) on strategies for characterizing and decontaminating a residence contaminated with ricin (the initial detection of ricin was identified by the FBI and was still under their jurisdiction, but once FBI concluded their investigation in July, EPA Region 6 was requested to provide additional support to OCCHD in conducting response activities). CMAD provided technical assistance to identify the analytical options and develop a decontamination work plan. CMAD anticipates that we will provide Region 6 OSCs with additional support during FY15 during the decontamination and clearance activities.



*Ricin Beans*



# Biological

## Functional Exercise Compels Communication on Lab Capacity Issues for Anthrax Response

On April 26, 2014 FEMA hosted a TTX and functional exercise (FE) of the Integrated Consortium of Laboratory Networks (ICLN). The ICLN, managed by DHS, is a “coordinated and operational system of federal laboratory networks that can provide timely, high quality, and interpretable results for early detection and consequence management of acts of terrorism and other events requiring an integrated laboratory response” (ICLN MOA, June 2005). The exercise scenario focused on laboratory response to a wide-area contamination incident involving Ba over the city of Baltimore, MD. Knowing that sample analysis will be a huge bottleneck during the response, a facilitated discussion forced the players to discuss communications and response actions that would be taken, including when, and how a backup in the sample analysis queue would affect response decisions.

The TTX portion of the exercise included participants from federal (CDC, DHS, and EPA) and Maryland state agencies, and the City of Baltimore. While the TTX portion of the exercise focused on a face-to-face facilitated discussion and coordination effort, the FE involved ICLN members working “behind the scenes” managing the influx of virtual samples, coordinating their analyses across all of the laboratory networks, and communicating situational awareness among ICLN members through use of the ICLN Information Technology (IT) portal.

The purpose was to simulate what would happen during a real life incident where the impacted jurisdiction and Incident Command elements would be tasked with formulating informed actions related to the laboratory response, with the follow-on collaboration and communication of the ICLN members working to respond and accommodate the field decisions.

Overall, the TTX and FE met their objectives. The TTX proved to be a great venue for the different response entities to meet and form a relationship before an incident were to occur in real life. Response issues and limitations were discussed from each entity’s perspective, and it was helpful to understand and see the big picture, rather than each entity working in a vacuum. The FE, utilizing the ICLN portal, allowed ICLN members to become familiar with navigating and communicating within the portal in a response situation. It also challenged the ICLN members to assess capacity issues and seek surge analytical solutions.



Wrapping rolling stock

## Underground Transportation Restoration Project

The Underground Transportation Restoration (UTR) project is a program sponsored by DHS that will address the remediation of large underground transportation hubs, such as subway stations, in the aftermath of a bio-agent(s) release. CMAD and NHSRC are leading the multi-agency group that will plan and execute the Operational Technology Demonstration (OTD). Which will focus on the decontamination of subway tunnels, platforms, and rolling stock. The project is just getting initiated and is expected to span several years. CMAD and NHSRC are also leading several other groups that support this project, including the sampling and analysis, decontamination, and guidance development group, while EPA’s Office of Resource Conservation and Recovery is leading a waste management group. This DHS-funded effort enables EPA to leverage outside funding resources while working toward results that will help to prepare the Agency for biological incidents.



Fully wrapped subway car

## Rad Decon Application Under Development

DHS and EPA have joined together on a project to support first responder decision-making after a large-scale radiological incident. The final task, led by CMAD, involves developing a decontamination software tool/application, or “Rad Decon App.” CMAD has developed partnerships with the United Kingdom’s (UK) Public Health England, the National Library of Medicine (NLM), DoD and the Georgia Tech Research Institute (GTRI) to support the application development. NLM has developed and currently supports several software applications including Wireless Information System for Emergency Responders (WISER), an on-line information source

for emergency responders and GTRI has developed and maintains DoD’s Chemical Companion, a decision support tool for first responders.

Since it was agreed that stakeholder involvement was critically important for the project, this task focused on getting advance input on the utility and content of the application and to ensure its usefulness to the end-user/first responders. CMAD planned and conducted three stakeholder-engagement meetings, with each locale representing one of each typical small, mid-size or large city (Burlington, VT, Charlotte, NC and Los Angeles, CA). This proved very worthwhile, as over

60 local, state and federal attendees offered excellent feedback and endorsed the idea of the “Rad Decon App” that could support response decision-making. Stakeholders also supported organizing the application along a step-by-step alternative evaluation process similar to the UK’s Radiation Recovery Handbook and they expressed interest that the app be accessible through existing on-line response tools, such as WISER and Chemical Companion. CMAD is incorporating their input into the development plans for the “Rad Decon App”.



## RTFL Boot Camp & Refresher Courses

CMAD developed and disseminated its 5th Radiation Taskforce Leader (RTFL) Initial Training course, or “boot camp” in Edison, NJ over two weeks in March. The 14 first-time participants received instruction on a variety of health physics topics, including radiation safety concepts; protective actions; use of various instruments and procedures; selecting and wearing appropriate PPE; operating in a contaminated environment; and running a level-C worker decon line.

The course provided approximately equal shares of lecture time and activity/exercises. The two weeks of training culminated in a full-day four-station field exercise which required participants to perform most of the activities learned in the course which was taught by members of CMAD, ERT, the Radiological Emergency Response Team (RERT) and Regions 1 and 5. In addition to the initial training participants, the class was joined by 12 RTFLs from previous course offer-

ings, who came to receive refresher training for three days during the second week and participate in the field exercise.

This boot camp was the first RTFL initial training course offered in the last five years. We have retained many previously trained RTFL members and have remained near our target of 40 participating RTFLs. At the conclusion of boot camp in March, the number of trained RTFLs is 55. As such, we have a small but capable cadre of EPA staff who have volunteered to augment the Agency’s response capabilities should a large-scale response involving radioactive material be needed. Although CMAD is the lead for the RTFL training, the RTFL Program is managed by OEM’s Preparedness & Response Operations Division (PROD) and if you are an EPA staff member interested in becoming a RTFL, please discuss with your manager and then contact Brian Schlieger at 202-564-3128.

## Radiation Response Tactical Guide Development

CMAD is leading a project to develop a tactical guide for radiation responses, in parallel with guides for biological and chemical responses. These guides are targeted toward OSC use and involve OSCs during their development whenever possible. The Rad Tactical Guide (RTG) is currently in development, with a draft “Volume 1 – Emergency Phase Actions” to be final by the end of the calendar year. Volumes 2 (Interim actions) and 3 (Recovery Phase) will begin development once Volume 1 is finalized.

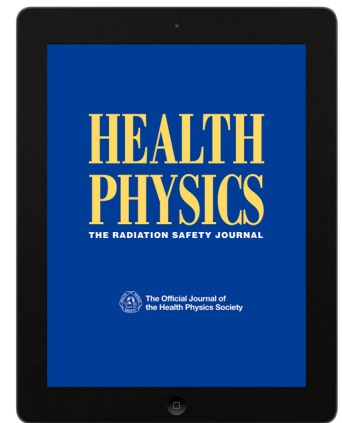
# Radiological

## “Assessment of Self-Help Methods to Reduce Potential Exposure to Radiological Contamination after a Large-scale Radiological Release” Published

The following is the abstract of an article authored by several EPA scientists and Health Physicist published in Health Physics - September 2014 - Volume 107 - Issue 3: Assessment of Self-Help Methods to Reduce Potential Exposure to Radiological Contamination after a Large-scale Radiological Release Snyder, Emily; Drake, John; Cardarelli, John; Hall, Kathy; Szabo, Jeff; Demmer, Rick; Lindberg, Michael; Riggs, Karen; James, Ryan

### ABSTRACT

After the release of radioactive materials from a large radiological dispersal device (e.g., dirty bomb), improvised nuclear detonation, or nuclear power plant accident, up to hundreds of square miles may be contaminated. A portion of this area will be evacuated; however, people living in the portion that is not evacuated yet is still contaminated with low-levels of radioactive contamination will be asking for ways they can reduce their exposure. Whether cleaning activities can significantly reduce exposure is not fully understood. In this effort, the ability of cleaning activities to remove cesium ( $^{137}\text{Cs}$ ) was studied. The removal efficacy of cleaning with a commercial product, Simple Green®, was compared to cleaning with water for hard surfaces typically seen in residences. The removal efficacy of laundering fabric material surfaces was also determined for a range of conditions (e.g., fabric material type, wash temperature). During these studies, assessments of the implications of these activities (e.g., cross-contamination, resulting waste streams) were also completed. Simple Green® and water were effective for removing  $^{137}\text{Cs}$  from plastic laminate and vinyl flooring (93.4–96.8%) but were not effective for removing  $^{137}\text{Cs}$  from painted wallboard and wood (7.3–68.1%). It was also determined that there was no significant difference between the two cleaners on all of the surfaces, except plastic laminate, for which Simple Green® was slightly more effective. Laundering was effective for removing  $^{137}\text{Cs}$  contamination from polyester and cotton swatches and cotton comforters (up to 96.8% in the single swatch testing).



A copy of the full journal article is available at: [http://journals.lww.com/health-physics/Abstract/2014/09000/Assessment\\_of\\_Self\\_Help\\_Methods\\_to\\_Reduce.5.aspx](http://journals.lww.com/health-physics/Abstract/2014/09000/Assessment_of_Self_Help_Methods_to_Reduce.5.aspx)



RTFL Training Exercise



## National Park Service Requests Survey Assistance for Grand Canyon

In June 2014, CMAD's Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Program worked with the National Park Service (NPS) to investigate possible uranium mine drainage into the Grand Canyon in Grand Canyon Village, AZ. The Orphan Mine was mined for uranium ore in the 1950's and 1960's. NPS is interested in addressing any potential impacts to the public and environment from these potential discharges.

Previous ground surveys had allowed the NPS to characterize the contamination on the top of the canyon that was used to prepare mining material for shipment. However, the mine discharged through the side of the canyon wall some 1,000 feet below the canyon rim and questions remained about potential cross-contamination on the side of the canyon wall from transporting mine material to the top of the canyon. Thus, the main area of concern is the side of a canyon wall, inside a crescent shaped (concave) feature of the canyon. In order to accommodate for the geography of the survey area, the survey was broken up into both vertical and horizontal efforts.

ASPECT sensors were mounted in an NPS helicopter to survey several areas that may have been affected by mining operations. The most challenging areas were the vertical surfaces along the vast Canyon wall. A special detector configuration was designed allowing the detectors to face sideways out of the helicopter door. The vertically mounted detector configuration allowed the six outer crystals to act as a shield for the two inner crystals, thus reducing extraneous signals outside the areas of concern.

The Abyss area of the Canyon wall was first surveyed using this setup, as it was less treacherous flying and served as a proof of concept and background area. The most challenging part of the survey, the Canyon wall around the Orphan Mine, was also conducted with the detectors in this configuration. This was the most significant area of the survey as it was difficult to reach either on foot or by aircraft and was the primary reason behind the interagency collaboration for the survey.

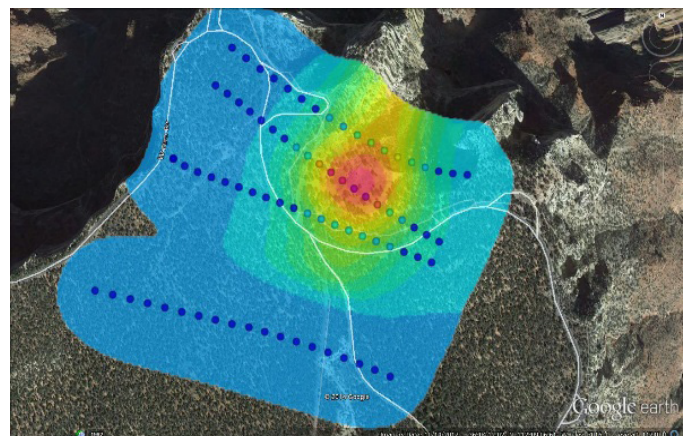


ASPECT Grand Canyon Survey

Two additional areas were surveyed with the detector packs mounted in the standard horizontal configuration on board the NPS helicopter. These surveys were used to confirm previous survey results and to determine any contamination immediately down gradient from the affected areas. Video was taken as part of the vertical survey and synchronized with data to allow for better geospatial awareness of the results. By characterizing the mine area, NPS has better knowledge of the area and hazards, allowing for a more effective response.



ASPECT Team Members



ASPECT Data Plot

# ASPECT

## Region 9 Support- 2014 Tournament of Roses Parade, 2014 Rose Bowl Game and 2014 BCS National Championship

Per the request of the City of Pasadena, CA, the ASPECT Team deployed to the west coast to support activities associated with the 2014 Tournament of Roses Parade (Parade), Rose Bowl Game, and Bowl Championship Series (BCS) National Championship Game ("BCS Game"), located in Pasadena, CA. The deployment was from December 29, 2013 - January 7, 2014.



On December 31, ASPECT flew two flights collecting background radiological, chemical and photographic data in the areas of the Rose Bowl stadium, the parade route and parade staging areas. On January 1, 2014, ASPECT flew a radiological mission before the start of the parade and Rose Bowl game and a chemical mission before and during the parade and the Rose Bowl game. On January 6, 2014, ASPECT flew a radiological mission before the start of the BCS Game and a chemical mission before and during the BCS Game.

The ASPECT aircraft flew at an altitude of 750 feet above ground level (AGL) for the radiological surveys and at an altitude of 2,800 AGL for the chemi-

cal and photographic collection surveys. To reduce response time in the event of an emergency, the plane loitered at 2800 feet near the parade route and stadium during all events.

During the events, ASPECT personnel worked with the City of Pasadena, Los Angeles County Police and Sheriff, the FBI, and DHS Office of Infrastructure Protection (IP). As information from the aircraft was received and quality assured, ASPECT personnel disseminated the information to the City of Pasadena HAZMAT Director. The interactions provided opportunities for ASPECT personnel discussed capabilities and the role and mission of DHS IP Protective Security Advisors (PSA). The DHS IP PSA representatives invited the ASPECT Program to discuss the system and showcase the technology and capabilities to the entire office (TBD). They also requested we begin the process of a Memorandum of Understanding (MOU) for future work with their office.

Working successfully with the response teams during the events proved rewarding. The City of Pasadena and the ASPECT Program designed and executed an impromptu radiological field exercise on January 3, 2014. The City of Pasadena hid radiological sources near the Rose Bowl Stadium and on or about the Tournament of Roses Parade route. ASPECT flew the areas and collected data over the sources. This showed the City of Pasadena our response time in producing quality assured results and assisted the ASPECT Program in identifying its sensitivity with live sources.

## Boston Marathon Aerial Support

From April 16-22, 2014 ASPECT deployed to Boston, MA, to conduct background surveys of the City of Boston and to remain on station at high alert during the running of the Boston Marathon. This deployment was in support of EPA Region 1 and the Massachusetts Department of Fire Services. A background survey was conducted for radiation and chemical sources prior to the Marathon. During the race, ASPECT was on 'hot standby' at Hanscom Field as a response asset in the event of an incident. An open house was also held prior to the marathon, during which members of the New England response community were briefed by CMAD staff on the capabilities of ASPECT.



Boston Marathon



## 64th Weapons of Mass Destruction Civil Support Team (CST) of New Mexico Exercise

The week of July 7th, 2014, the ASPECT Team joined the 64th WMD CST of New Mexico for a training exercise in Santa Fe, NM. The training involved both chemical and radiological exercises, including a chemical accident (ammonia) which was simulated by ASPECT's plume generator and an aerial search for lost industrial radiological sources (sources that CMAD has obtained through their Nuclear Regulatory Commission (NRC) License).

As demonstrated in this exercise, CMAD has already begun to accomplish their goals of using their radioactive sources for ASPECT training and exercises with other regions and organizations. This exercise brought together federal, state, and local first responders to develop and put into practice a set of Standard Operating Procedures that will transfer ASPECT products into the state and CST response structure. ASPECT's

cooperation with the CST has proven effective and a crucial step in the sharing of data with the New Mexico CST program and local first responders in the event of an emergency.



ASPECT & New Mexico CST

## CORE Summer Intern

For the past six years CMAD has sponsored a college student to participate in the College Operational and Research Experience (CORE) program. The students engage in a variety of research projects related to CMAD operations and participate in CMAD field deployments. Typically, CORE students have aspirations towards graduate studies in a STEM (science, technology, engineering, and mathematics) area closely related to one or more of CMAD operations. This summer, Malia Smolenski of Xavier University, Cincinnati, OH, was chosen to assist the ASPECT Team on two key deployments.



The first deployment was a unique radiation survey conducted in conjunction with NPS. This survey involved an aerial survey in the Grand Canyon designed to determine if former uranium mining operations had affected the side walls of the Grand Canyon. The second major operation where Malia assisted CMAD, was during the joint radiation exercise with the 64th WMD CST in New Mexico. Information about both of these operations is detailed in this Annual Report.



ASPECT Aircraft

# Collaboration & Coordination

## CMAD Trains and Exercises in Region 9 Annual Training and Visits USCG Pacific Strike (PAC) Team

During the week of May 12th, CMAD participated in EPA Region 9's annual training which was held at the EPA Regional Office and the United States Coast Guard (USCG) Pacific Strike Team (PAC Team) hanger in Novato, CA. The training included an 8-hour Health and Safety training; confined space entry; and a Geo Probe® field exercise. During the first two days, CMAD led the training and discussions, which were focused on CBRN response and safety.

On the third day of training CMAD, facilitated discussions on the current priority CBRN threats; provided a primer regarding response coordination with internal and external response partners on

behalf of OEM; conveyed lessons learned from prior biological and CWA responses; and outlined the response tools which have been developed by the CMAD and NHSRC partnership. Tours of the Lawrence Livermore National Mobile Biological Laboratory and the PAC Team response assets were also provided.

CMAD's trip to Region 9 and the USCG PAC Team resulted in the participants gaining a greater understanding of CMAD's technical and response assets and seeded possibilities for future collaboration.



## 2013 International Decontamination Research and Development Conference

The EPA International Decontamination Research and Development Conference hosted by NHSRC brought together the scientific community and practitioners tasked with performing on-site data collection and remediation.

For three days at the NHSRC campus in Research Triangle Park, NC, more than 170 national and international participants representing local, state, and federal government agencies, academia, industry, and public advocacy groups viewed presentations and actively engaged in panel discussions and a poster-viewing session. This diverse audience

brought together experts in emergency response, decision support tools, risk communication, sampling, detection, treatment, decontamination methods, and waste management related to biological, chemical, and radiological agents to explore current and future directions.

During the event, CMAD provided a "hands on" demonstration on sponge stick sampling to the Singaporeans representing three different entities of Singapore including, The Ministry of Home Affairs, Defense Medical & Environmental Research Institute, and National Environmental Agency. This

demonstration provided the Singaporeans with information on sampling strategies, environmental collection methods, and analytical techniques. As a result, EPA has been requested to provide continued subject matter expertise to Singapore and continue interaction.





# Collaboration & Coordination

## Transatlantic Collaborative Biological Resiliency Demonstration (TaCBRD) Tools Tested

The Transatlantic Collaborative Biological Resiliency Demonstration (TaCBRD) is a collaborative program between DoD Defense Threat Reduction Agency (DTRA), Department of State, and DHS. The purpose is to develop and demonstrate a U.S. government capability for resiliency in countering a wide-area biological incident (including contagious and persistent threats) that impacts US, key infrastructure, and Partner Nation civilian and military personnel.

The program builds on the outcomes of the Interagency Biological Restoration Demonstration (IBRD), a collaborative DoD and DHS program, with the goal to reduce the time and resources needed to recover following a release of a biological agent. The partner Nation for the TaCBRD program is the Republic of Poland.

The outputs from the TaCBRD project will be nine computer-based models that support epidemiological monitoring, resource estimating, decontamination selection, critical infrastructure identification, dynamic operational sampling, etc.

EPA has been identified by DTRA as an end user of these models since the models are applicable for addressing any area wide contamination either in the U.S. or overseas. CMAD participated in the development of these models by providing an operational perspective and providing insight relative to the adaptability of the models in a homeland response.



During FY14 the TaCBRD project has developed concept of operations (ConOps), field collection, resource tracking and epidemiological monitoring tools have been developed and exercised in both table top and field conditions. Exercises have occurred in both the United States and in Europe. Thanks to DTRA sponsored travel, CMAD has been able to participate in one event in the U.S and two in Europe.



Setting up a Dry Filter Unit (DFU)

## Sample Prioritization Guidance for Labs

Concerns from private, public and federal and state laboratories have highlighted the issue of limited laboratory capacity for response to large incidents. The labs' concerns stem from historical sampling and analysis loads during responses to the World Trade Center, Katrina hurricane and Deep Water Horizon. During these incidents, both state and federal responders submitted large numbers of samples designed to provide information on immediate and long term public health, environmental characterization, site clearance, and wide area monitoring. In most cases, samples were submitted without regard to laboratory capacity. To help resolve this issue the ICLN has developed a Sample Prioritization Guidance Document that will be provided to EPA officials who have the responsibility of directing sampling during. The document is designed to inform officials of the need to consider sample capacity at the laboratories. Sampling efforts can then be prioritized by need at the laboratory, or at the field site during sampling (e.g. immediate public health data will be needed before site clearance data is needed).

ERLN members from OEM and NHSRC provided subject matter expertise and leadership to draft the text and illustrative tables, based upon historical incident scenarios detailing the type of sampling that would be expected during a biological, chemical or radiological incident.

# Collaboration & Coordination

## PARTNER: CMAD and NHSRC Working Together for Better Response Readiness

NHSRC and CMAD enjoy very symbiotic relationship due to overlapping and complimentary missions. Both organizations work collectively to leverage NHSRC applied bench research and scale it to operational response through applied field studies. We are constantly partnering to both fill gaps that will better enable and equip an OSC to respond to a CBRN incident as well as evolve operational guidance based on new scientific and technical breakthroughs.

OSCs are the prime customers for both CMAD's operational products and NHSRC's research products. The Program to Align Research and Technology with the Needs of Environmental Response (PARTNER) is in place to pull OSCs, Special Teams, and NHSRC together to discuss and prioritize operational and research programs and projects. CMAD focuses on the operational aspects of NHSRC's research, providing consistent engagement in research projects, with a constant focus on field applicability and ultimate OSC usefulness.

CMAD is a major customer of NHSRC's research and the two groups collaborate on a number of issues and projects throughout the year, including:

- New York City *Bacillus anthracis* response plan development
- Attenuation of ricin at elevated temperature and humidity
- Material compatibility with ethylene oxide
- Surface decontamination with diluted bleach
- Decontamination of soil and other outdoor materials contaminated with *Ba*
- Persistence of vegetative *Ba*
- Decontamination with methyl bromide at relatively low temperature and humidity
- Capture of methyl bromide emissions following fumigation for *Ba*
- Methyl bromide operational fumigation evaluation
- Building aware dispersion modeling for contaminants and fumigants
- Exposure assessment of livestock carcass disposal options
- Transportable gasifier for animal carcasses
- Infectious carcass disposal pretreatment feasibility study
- Spreadsheet tool to estimate CBRN wide-area incident response costs
- Inactivation of *Ba* spores in decon wash down wastewater using chlorine bleach solution
- Decontamination line protocol evaluation for biological contamination incidents
- Development of a vacuum-based biological agent all surface sampler
- On-site treatment of bundled/bagged waste
- Scalability challenges for radiation decontamination technologies applied to the wide area
- Natural attenuation of persistent chemical warfare agents on nonporous surfaces
- Efficacy of sporicidal wipes on select surfaces
- Developing decontamination tools and approaches for indoor pesticide contamination

OSC involvement is always welcome and encouraged. With a limited amount of time and effort the OSC can have a large impact in directing research and operational guidance through PARTNER and involvement in individual projects.

## Agencies Work to Coordinate Lab Operations

CMAD continues coordination with other federal agencies on issues of laboratory operations through the ERLN's active participation with the DHS chaired ICLN. The ICLN has many functions, one of which is to convene an annual meeting of the ICLN Joint Leadership Council (JLC), which is comprised of senior managers from EPA, DOD, US Department of Agriculture (USDA), US Food and Drug Administration (FDA), and Health and Human Services (HHS). Senior leaders from EPA's OEM and the Office of Homeland Security (OHS) serve as JLC members. The Data Exchange MOU that is under development is being designed to provide guidance to the ICLN member Agencies on data sharing during incidents in which the ICLN may be involved.

During this year's JLC meeting, the National Coordinating Group (NCG) of the ICLN discussed the additional work necessary to achieve ICLN functionality. Key areas of focus included the progress made to the development of a Data Exchange MOU, planning for a "Senior Leadership Exercise (SLE)" and a *B. anthracis* analytical capacity exercise.

At the suggestion of the JLC in previous meetings, DHS is applying the framework of the Integrated Terrorism Risk Assessment (ITRA) to estimate the number of samples that may be generated in ITRA-incorporated scenarios, and input from the networks on capacity and capability (e.g., staff, throughput, etc.) of labs to produce a laboratory response-oriented risk analysis which will be documented by DHS as Risk-based Laboratory Capability Assessment.



# Collaboration & Coordination

## Who Needs HGTV when you can have the CMAD Webinar Series?

CMAD developed and presented a new series of webinars with the goal to improve the communication of CMAD's capabilities and work efforts with the OSC community as well as hold a forum to and receive feedback from OSC community. The first webinar in the series was an overview of CMAD's mission and key initiatives. The second provided information on the ELRN, PHILIS, and biological laboratories. The third webinar discussed the ASPECT Program highlighting its capabilities and operations. The last webinar offered in FY14 provided an in depth look and update for key projects the division has been working on. The webinar series is scheduled to continue In FY15 offering updates on projects and programs and provide a forum for OSC feedback.

### Subway recovery challenges

**Problem:**  
Subway systems not prepared to quickly remediate and re-open after bioterrorism event

- Loss of **billions** of dollars to city and businesses (Super-storm Sandy - \$125M - 3 days)
- Logistical nightmare for commuters (NYC > 5 ml riders per weekday)
- Above-ground release can also contaminate system

**"Urban Dispersion Program"**

Tracer Concentration versus Distance  
Tracer Release: 1100-1130 EDT Aug. 8, 2005

Subway contamination presents challenges (e.g., bio-load, grime, metal particulates, airflows, materials) unlike a 'clean', indoor environment

### US EPA – Special Team for CBRN

CBRN Consequence Management Advisory Team (CMAT)

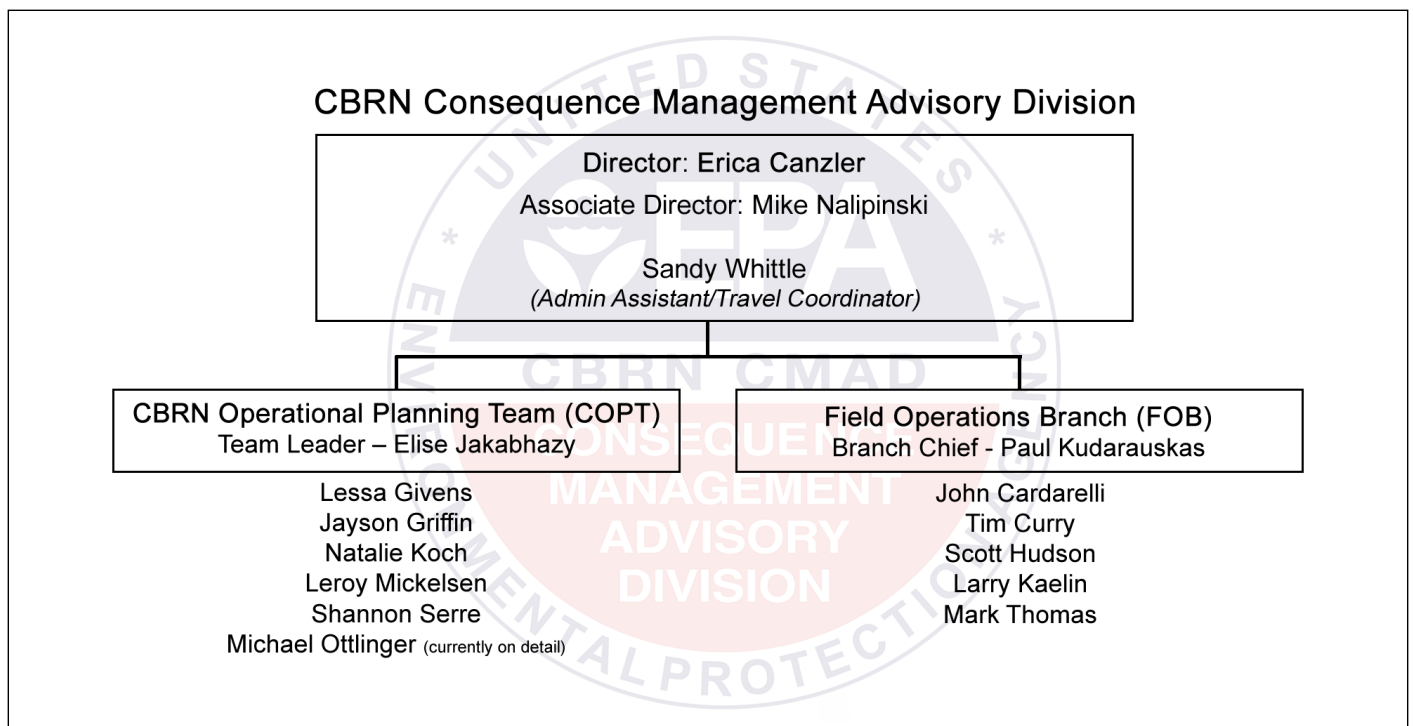
**Mission:** provides scientific and technical expertise for all phases of CBRN consequence management and is available to support the On-Scene Coordinators (OSC) 24/7

**Focus:** Operational preparedness for CBRN agents. Maintain ASPECT and PHILIS

**Support:** All phases of CBRN response, including characterization, decontamination, clearance and waste management

*Buildings, infrastructure, indoor and outdoor environments, transportation sectors*

## CMAD Organizational Chart



## Acronyms

Though all acronyms have been spelled out at least once in this document, we hope that this acronym list will help when reading sections of the report out of order.

AAMP	Ambient Air Monitoring Plan	HASP	Health and Safety Plan
AAR	After Action Report	HHS	US Department of Health and Human Services
AGL	above ground level	IBRD	Interagency Biological Restoration Demonstration
AHRF	All-Hazards Receipt Facility	ICLN	Integrated Consortium of Laboratory Networks
ASPECT	Airborne Spectral Photometric Environmental Collection Technology	IDDD	Integrated Detection and Decontamination Demonstration
<i>B. Anthracis</i>	<i>Bacillus anthracis</i>	IMT	Incident Management Team
<i>Ba</i> Sterne	<i>Bacillus anthracis</i> Sterne 34F2	IP	DHS Office of Infrastructure Protection
<i>Ba</i>	<i>Bacillus anthracis</i>	IT	Information Technology
BI	Biological Indicators	MOU	Memorandum of Understanding
CBRN	Chemical, Biological, Radiological, & Nuclear	JLC	Joint Leadership Council comprised of senior managers from EPA, DOD, USDA, FDA and HHS
CBRN <sub>e</sub>	Chemical, Biological, Radiological, Nuclear, and high yield Explosives	LC MS/MS	liquid chromatography-tandem mass spectrometry
CDC	Center for Disease Control	MBTA	Massachusetts Bay Transportation Authority
CIA	Central Intelligence Agency	MeBr	Methyl Bromide
CMAD	Consequence Management Advisory Division	MIT	Massachusetts Institute of Technology
CMAT	Consequence Management Advisory Team	NCG	National Coordinating Group
CORE	College Operational and Research Experience	NELAP	National Environmental Laboratory Accreditation Program
CST	National Guard Weapons of Mass Destruction Civil Support Team	NHSRC	National Homeland Security Research Center
CWA	Chemical Warfare Agent	NLM	National Library of Medicine
Decon	Decontamination	NPS	National Park Service
DHS	Department of Homeland Security	NYC DOHMH	New York City Department of Health and Mental Hygiene
DoD	Department of Defense	NYC MTA	New York City Metropolitan Transit Authority
DOHMH	Department of Health and Mental Hygiene	NYC	New York City
DTRA	Defense Threat Reduction Agency	OCSPP	Office of Chemical Safety and Pollution Prevention
ECBC	Edgewood Chemical and Biological Center	OEM	Office of Emergency Management
ECC	Environmental Clearance Committee	OHS	Office of Homeland Security
EDD	Electronic Data Deliverables	OCCDH	Oklahoma City County Health Department
EPA	Environmental Protection Agency	ORCR	Office of Resource Conservation and Recovery
ERL <sub>N</sub>	Environmental Response Laboratory Network	OSC	On-Scene Coordinator
ERT	Environmental Response Team	OSRTI	Office of Superfund Remediation and Technology Innovation
EU	Environmental Unit	OTD	Operational Technology Demonstration
FBI	Federal Bureau of Investigation		
FDA	US Food and Drug Administration		
FE	Functional Exercise		
FSE	Full Scale Exercise		
GC/MS	Gas Chromatography/Mass Spectrometry		
GC/MSD	Gas Chromatography/Mass Selective Detector		
GC/TOF-MS	Gas Chromatography/Time-of-Flight Mass Spectrometry		
GTRI	Georgia Tech Research Institute		



## Acronyms

OW	Office of Water
PARTNER	Program to Align Research and Technology with the Needs of Environmental Response
PHILIS	Portable High-Throughput Integrated Laboratory
PPE	Personal Protective Equipment
PROD	Preparedness & Response Operations Division
PT	proficiency testing
QAPP	Quality Assurance Project Plan
QATS	Quality Assurance and Technical Support
RAP	Remediation Action Plan
RERT	Radiological Emergency Response Team
RSC	Response Support Corps
RTG	Rad Tactical Guide
RTLTF	Radiation Taskforce Leader
RTP	Research Triangle Park, North Carolina
SAM	Standard Analytical Methods for Environmental Restoration Following Homeland Security Events
SAP	Sampling Analysis Plan
SCC	Scientific Support Coordinator
SLE	Senior Leadership Exercise
SOP	Standard Operating Procedures
SSC	Scientific Support Coordinator
SVOC	Semivolatile Organic Compounds
TaCBRD	Transatlantic Collaborative Biological Resiliency Demonstration
TTX	Table Top Exercise
TWG	Technical Working Group
UF	University of Florida
UK	United Kingdom
USCG	United States Coast Guard
USDA	US Department of Agriculture
UTR	Underground Transportation Restoration
Vet-LIRN	Veterinary Laboratory Investigation & Response Network
VOC	Volatile Organic Compounds
WebEDR	Web-based Electronic Data Review
WISER	Wireless Information System for Emergency Responders
WLA	US EPA Office of Water's Water Laboratory Alliance
WMD	Weapons of Mass Destruction



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Chemical, Biological, Radiological and Nuclear**  
**Consequence Management Advisory Division**

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