Intro to CMAT

April 2014

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

CMAT Mission (cont.)

- Facilitate transition of the latest science and technology to the field response community, constantly promoting more efficient and effective consequence management through knowledge, tools, technology, playbooks/SOPs, policy, and guidance.

- Serve as the hub of leadership in OEM for all CBRN homeland security initiatives related to consequence management operations planning, specifically by fostering partnerships with other key players in the homeland security arena, especially (but not limited to) NHSRC, DHS, FBI, USSS, and DOD

Key Elements of Mission

- Bring the latest science and technology to the response community (primarily the EPA OSC), constantly promoting more efficient and effective CM through knowledge, tools, technology, playbooks/SOPs, policy, and guidance
- Identify gaps in CBRN remediation and develop/implement innovative solutions, strategies and tactics
- Develop and maintain approaches and options for how to implement CBRN remediation that can be quickly tailored to an individual site/incident; Provide national consistency in CBRN consequence management planning and operations
- Participate in the development of policy to ensure consistency with current or evolving technical approaches to CBRN response options.

Key Elements of Mission

- Maintain understanding of response assets of partner organizations (CSTs, USCG, DOE) and private sector so that the CMAT can provide capability and capacity information regarding various technologies to the field response
- Includes providing scientific and technical representation and leadership to federal workgroups focused on CBRN response and recovery

Key Elements of Mission

- Maintain a field component that can be deployed to support a site/incident/event including:
  - force multipliers
  - technical expertise at the ICP or EOC or,
  - deployment of unique tools/technologies in support of the homeland security customer.

- In major non-CBRN incidents, the team supports the Agency mission (although this is not the primary focus of the team's preparedness/planning/response efforts).

CMAT Personnel

- **Cardarelli:** CHP, CIH, PE, RSO; Capitol Hill anthrax, Katrina, Fukushima, numerous ASPECT deployments
- **Hudson** – CHP; RTFL; Remacor, Strube, and predeployments; Army deployments abroad
- **Mattorano** – CIH; Capitol Hill and NE anthrax, ricin, BOTE
- **Nalipinski**: Former RPM, OSC; sites include New England Anthrax sites, Major Hurricanes, Deepwater Horizon, Enbridge, BOTE etc
- **Kaelin:** Chemist/Environmental Scientist; WTC Response, Capitol Hill Anthrax, Hurricanes Katrina, Rita and Sandy; 20 years field experience; PHILIS sites, CWA lead
- **Smith:** MS Geochemistry, 40 years analytical testing in environmental and petroleum related industries, R&D, laboratory management (fixed and mobile lab), and QA management
- **Martinez:** PhD Toxicologist
- **Koch:** Contract Manager, business support, special projects
- **Mickelsen:** PE; numerous sites including New England Anthrax, Major Hurricanes, Drum sites, BOTE, etc
- **Griffin:** H&S lead, Finance, Logistics Section Chief in National Responses; BOTE
- **Thomas:** PhD, former OSC; Terra Nitrogen Fertilizer explosion, floods, major hurricanes, ASPECT PM
- **Kudarauskas:** MA Envir. Mgmt, PM, and Field Engineer for Libby, MT and Libby Sister Sites; Transportation and Disposal for CBRN wastes; ASPECT
- **Curry:** Engineer; RCRA inspector; OSC, ERs, Removals, drums, oil spill, dioxin, electroplating, etc.ASPECT
- **Givens:** Business Support and special projects
- **Serre:** PhD Chem Engineer; BOTE; MeBR; Co-manage Test and Evaluation Program including testing handheld monitors

For more info, CMAT bios can be found on our webpage at http://www2.epa.gov/emergency-response/cmat

CBRN Consequence Management Advisory Division

Consequence Management Advisory Division
Director: E. Canzler
Sandy Whittle (Admin Assistant/Travel Coordinator)

= manager/supervisory position

* Team and Branch will be closely integrated with various Division functions supported by both

Preparedness and Removal Team

L. Givens
N. Koch
L. Mickelsen
J. Griffin
J. Martinez
M. Ottlinger (detailed out of CMAT)
M. Nalipinski
S. Serre

- HQ liaison with NORTHCOMM, DSCA, DHS, USSS
- CBRN operational planning and support of CBRN technical issues
- Represent OEM on national workgroups focused on advancing CBRN preparedness
- Internal and external CBRN gap analysis
- Lead collaboration with NHSRC
- International partnerships focused on CBRN consequence management
- Lead operational field studies

Field Operations Branch

M. Thomas
P. Kudarauskas
T. Curry
S. Hudson
J. Cardarelli
L. Kaelin
D. Mattorano

- Procure and maintain all deployable equipment
- Manage the ASPECT and PHILIS programs
- Manage RTFL training
- Develop and implement team and specialized OSC CBRN training
- Lead/support all field deployments
- Evaluate new technologies/tools for response
- Manage NIRT
- Liaison with ORIA/ERT/NCERT
- Liaison with NGB, DHS, FBI

CMAT Contract Support (DYNAMAC)

- DATS II – Decontamination Analytical & Technical Services
  - Training & Preparedness
    - Level A & Level B exercises
    - Develop SOPs and Plans
  - Field Support Capabilities
    - 400 Responders
    - 4100 OSHA trained staff
  - Laboratory Support
    - Chemical
    - Biological
    - Radiological
  - Waste Disposal Oversight

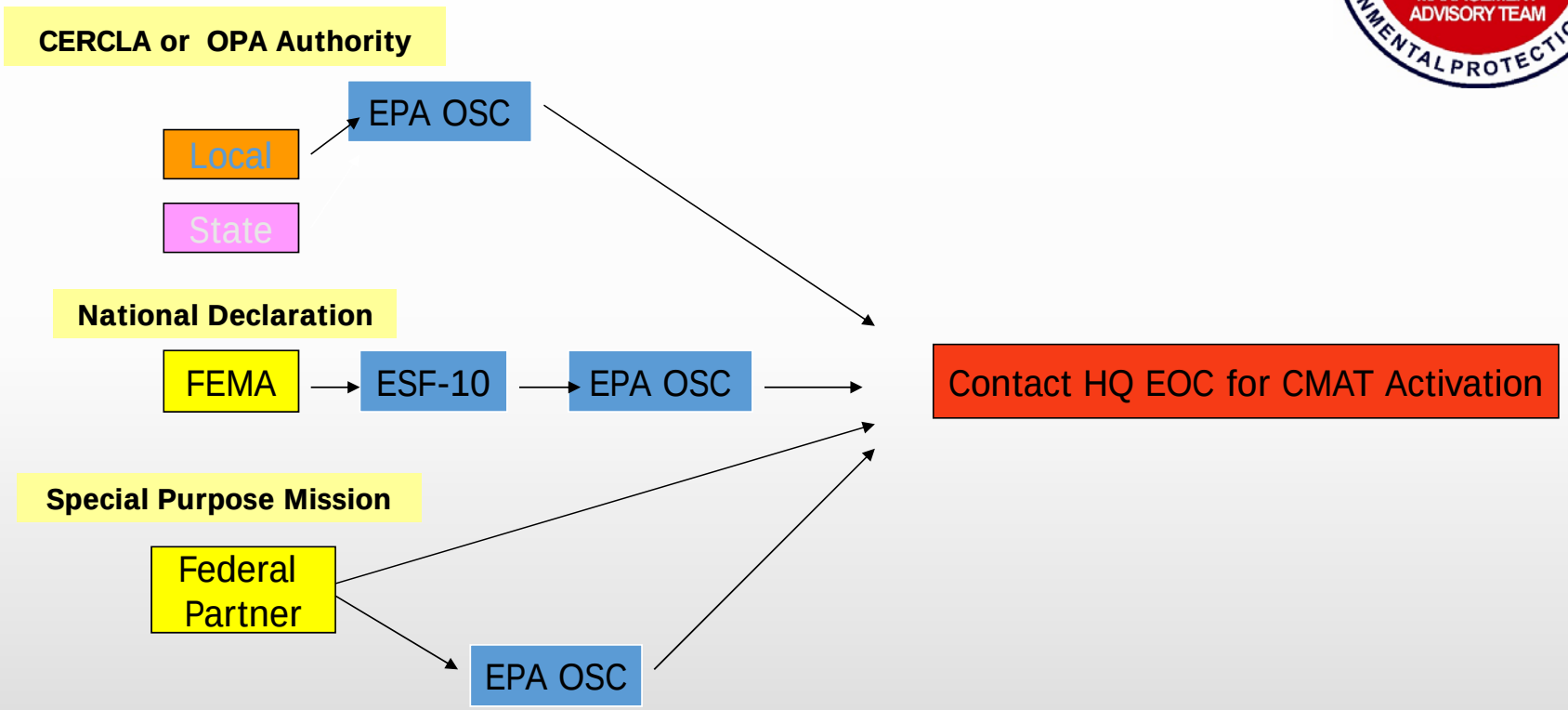
Example of Training Activities

- Level A & Level B exercises
- Bio-Sampling Techniques
  - Swab Collection Protocol
  - Sponge-stock Collection Protocol
  - HEPA Vacuum Protocol
- RTFL Training Course
- Equipment Tracking Support
  - EMP Portal usage training
  - Barcode scanner training

When to Contact CMAT?

- Assistance with planning an exercise (field or TTX) with a CBRN component
- Assistance with developing or providing CBRN related training
- Technical questions related to CBRN
- Field support for emergency response or removal related to CBRN
  - CMAT can provide leadership to the TWG, EU, and/or SSC positions, depending on the incident.
  - Deployment of specialized assets
- Special Event Deployments of ASPECT, PHILIS, and/or personnel

Methods of CMAT Activation



EPA Emergency Operations Center:
202-564-3850

National Response Center:
1-800-424-8802

How to contact:

- CMAT no longer has a 24/7 phone number b/c we have integrated operations into the HQ EOC
- General requests for CMAT support should be made to CMAT Director at 202-431-3146
- After-hours emergency requests should be directed to call the HQ EOC at 202-564-3850
  - Updated watch officer job aid
  - ASPECT and PHILIS

Examples of Past Projects

- Biological Operational Test and Evaluation (BOTE)
  - Phase 1 Report has been released
- Radiation Task Force Leader Training
- Development of Ricin Training
- Development of Crisis/Quarantine Exemption with OCSPP
- Non Traditional Threat Agents Efforts
- EPA/CDC Interim Clearance Guidance for Anthrax
- Post Fukushima Assistance in Japan
- WARRP/IBRD

For more info, CMAT Annual Reports can be found on our webpage at http://www2.epa.gov/emergency-response/cmat

Building Anthrax Lab Capacity

Biological Capabilities

- 2 Bio-safety Level 3 facilities owned and operated by EPA
- OEM has developed partnership with OCSPP, NEIC, and NHRSC to integrate anthrax analysis into labs daily operations
- Equip and train the labs to analyze anthrax samples in order to increase capacity utilizing the RV-PCR technique

Partnership with NHSRC

- Aggressive Air Sampling
- Decon Decision Support Tool
- Standardized Decon Line
- Evaluation of Methyl Bromide
- Robotic Vacuum sample
- SPORE – reaerosolization
- Self Remediation Guidance/Videos
- Operational field studies

Bio-response Operational Testing and Evaluation (BOTE)

- To take laboratory testing to a field scale and wed applied research to field operations.
- Multi-agency: DoD, EPA, DHS, CDC, FBI, DOE
- To conduct and evaluate field-level facility biological remediation
  - Evaluate various decontamination technologies
  - Exercise multi-agency biological incident response

Radiation Task Force Leader Training

- 10-day radiation safety course for EPA Response Support Corps personnel who will augment the existing Emergency Response Program personnel in a response to a major radiological contamination incident.
- 50 trained to date
- Funding comes from OEM and Regions
- Refresher Training Hammer Facility Richland, Washington (Using Tc-99m sprayed in training areas).
- Two week boot camp course in Erlanger, KY for new RTFL recruits.
- Considering development of a Bio and Chem TFL program

Key Initiatives

CMAT FY14

MeBR Fumigation: Problem Statement

- The US lacks the capacity to clean up a large *Bacillus anthracis* (*Ba*) release in a timely manner.
- It will take time to ramp up capacity, adding to the impact of an incident.
- Many technologies cause corrosion and collateral damage; creating large amounts of waste.
- In the case of sensitive or historic infrastructure, corrosive remediation technologies may not even be a viable option.

Why Methyl Bromide (MB)

- **MB is efficacious against *Ba***
- **There is an industry that is skilled in it's application**
- **MB is less corrosive than alternatives**
- **MB can be captured after fumigation**

MB Operational Results

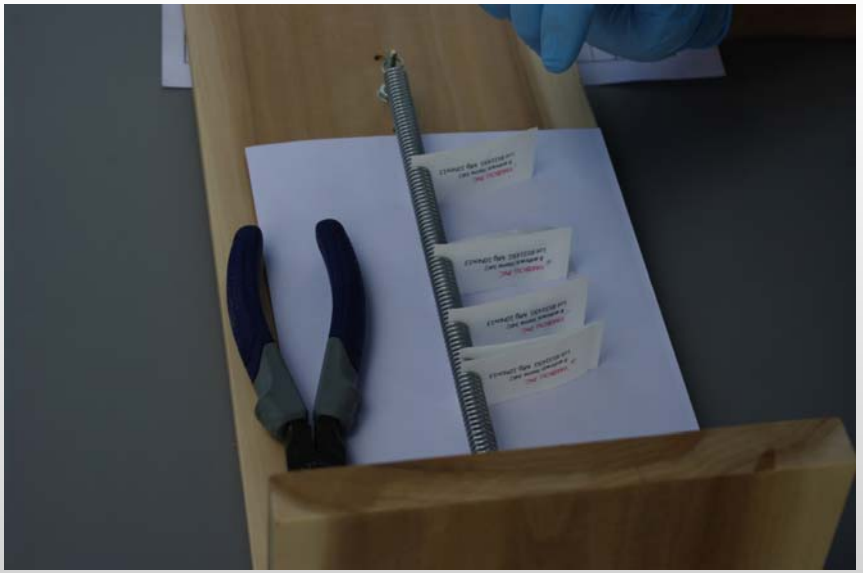
- Safely Completed
- Successfully met parameters
- Monitored in & outside structure
- All test coupons were negative
- Successfully scrubbed MB

Preparation

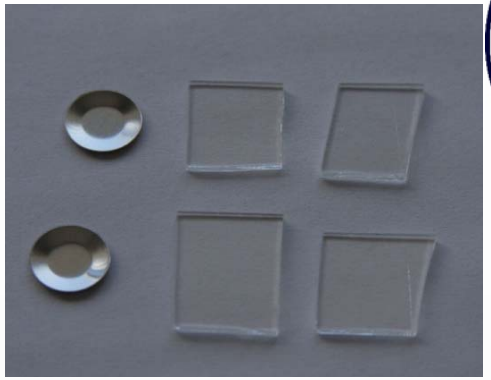
Connections made

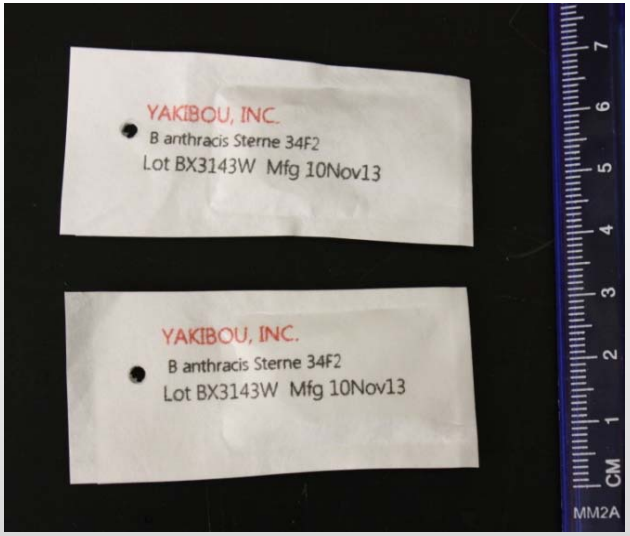
Key Steps include:

- Tenting
- Humidification preparation
- Temperature and Relative Humidity Monitoring
- Coupon Loading
- Coupon Placement

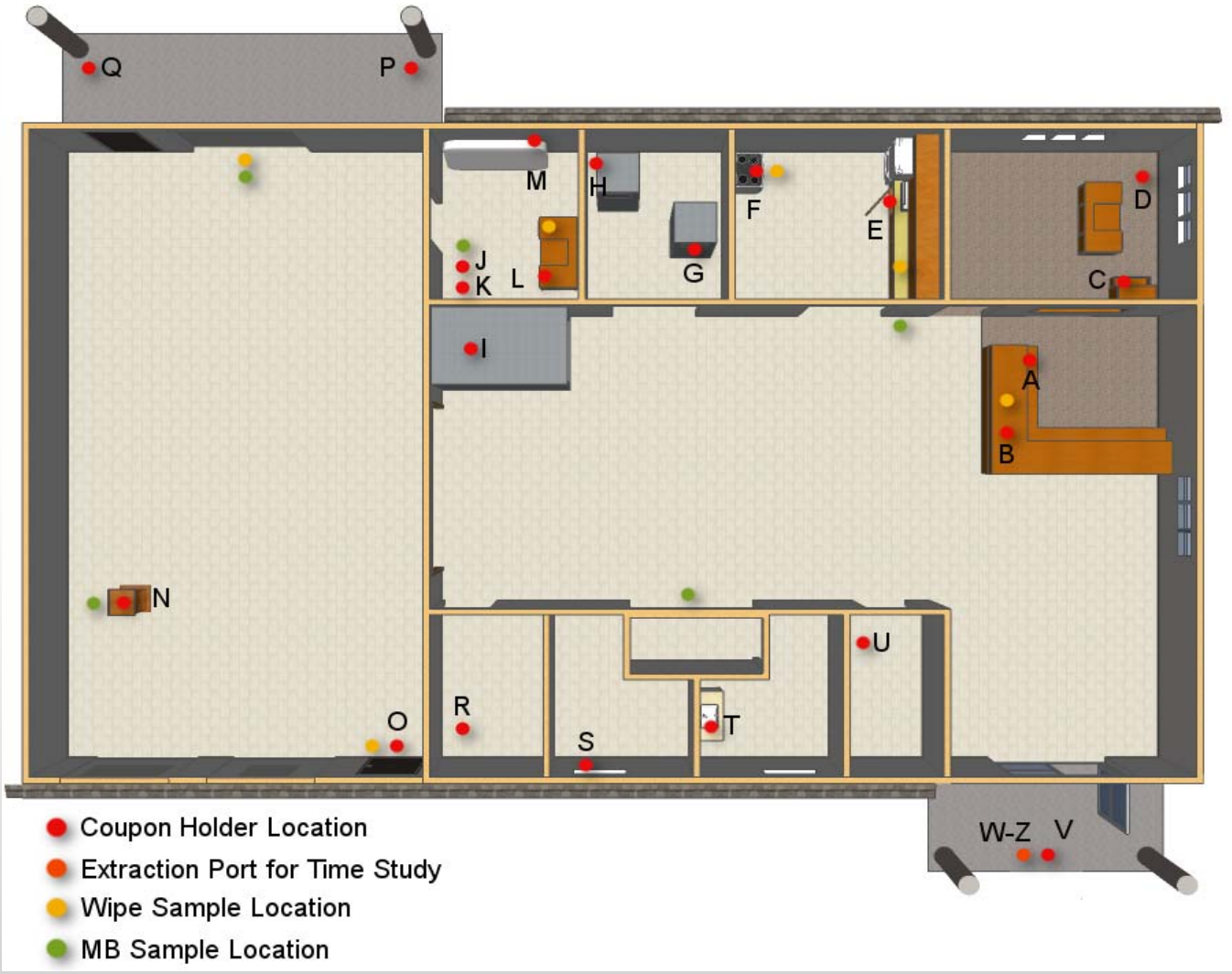


Wood and Glass Coupons





Spores of *Bacillus anthracis* Sterne 34F2, the vaccine strain (strain obtained from Colorado Serum Co., Denver, CO), were used as surrogates for fully-virulent *Bacillus anthracis* spores.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Coupon Holder Location
Extraction Port for Time Study
Wipe Sample Location
MB Sample Location

Inside Duct

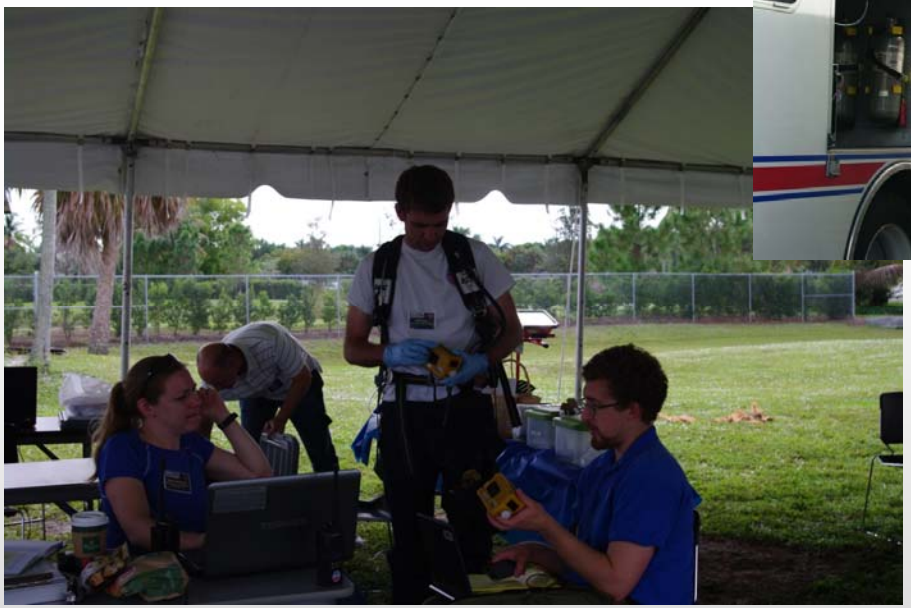
Time Series Coupons

Conditions

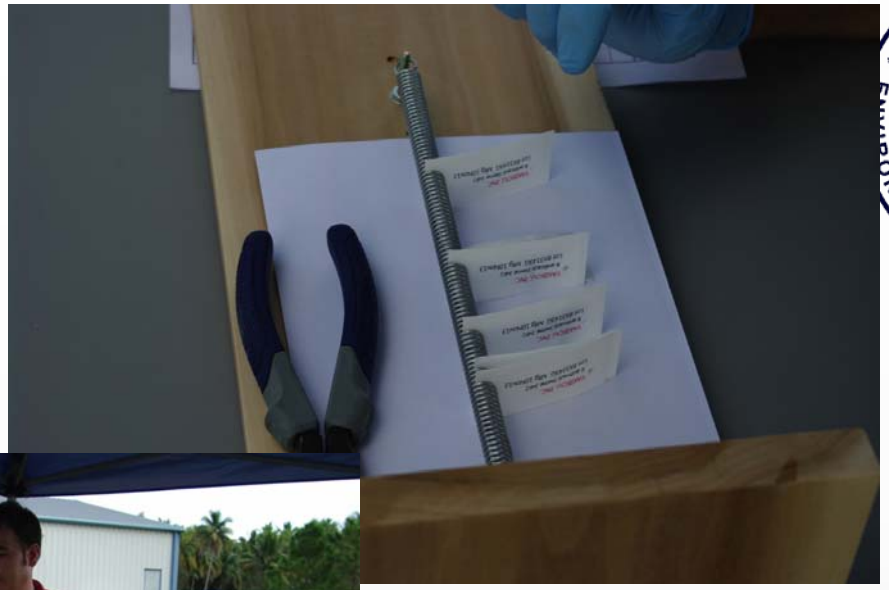
- 212 mg/l MB concentration (5%)
- 80 degrees F
- 70 percent RH
- 48 hours

- Series coupon extractions
  - 16
  - 24
  - 32
  - 40 hours

Coupon Extraction Preparation



Coupon Handling



Ambient Air Monitoring

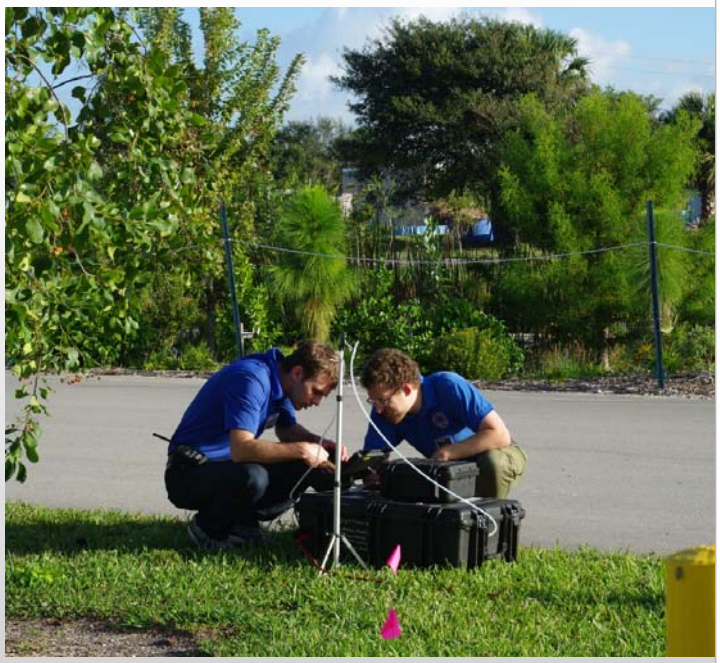
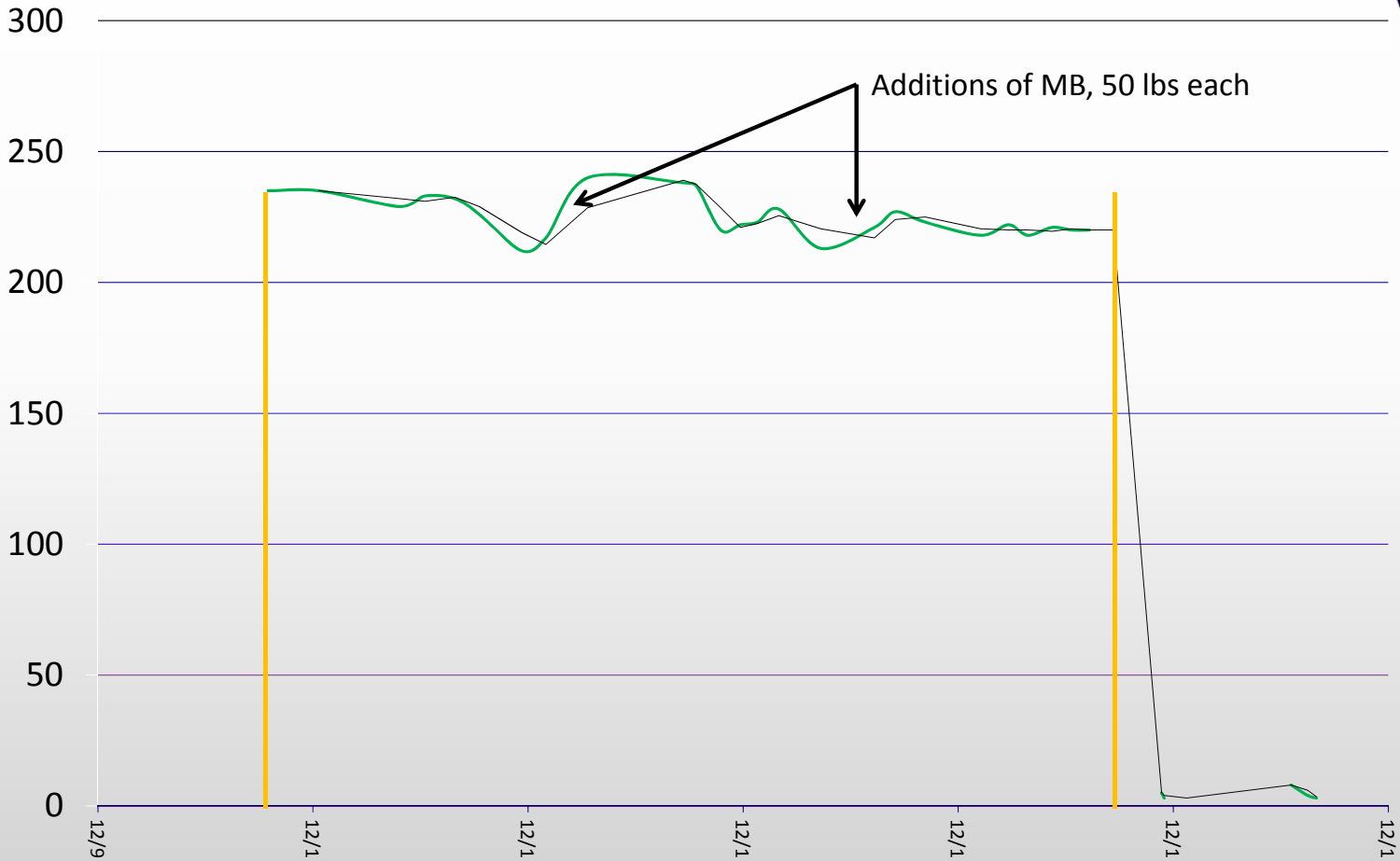


Figure 1
Air Monitoring Locations
Methyl Bromide Fumigation Study

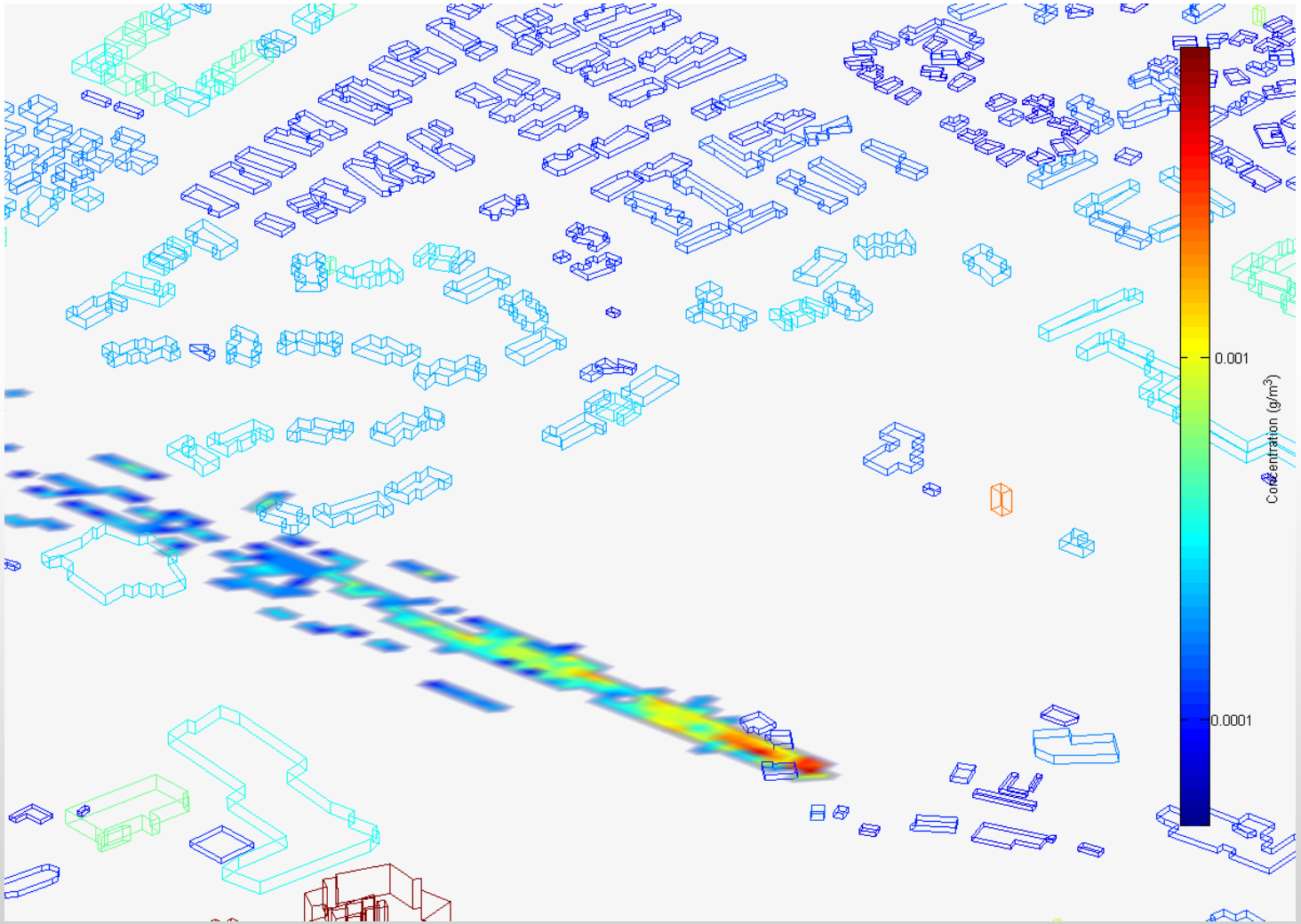
Location ID	HOBO ID	Location	T (°F)	RH (%)
A	29	Entry room	81.9	81.7
B	17	Entry room	82.6	79.7
C	18	Office	79.9	84.3
D	10	Office	79.0	89.6
E	47	Kitchen	81.3	86.1
F	31	Kitchen	81.7	83.2
G	24	Mech room	83.2	80.0
H	34	Mech room	78.8	91.9
I	22	Hurricane Shelter	82.3	83.7
J	38	Attic	84.4	75.0
K	42	Attic	84.6	77.9
L	None	Storage room	N/A	N/A
M	57	Storage room	84.1	79.6
N	20	Classroom	84.8	77.2
O	44	Classroom	83.8	80.1
P	54	Back-porch	80.9	87.0
Q	11	Back-porch	81.6	83.8
R	55	Custodial	81.3	84.5
S	21	Restroom (Men)	82.3	82.8
T	30	Restroom (Womens)	81.6	84.3
U	43	Janitors Closet	82.7	79.6
V	58	Front porch	81.1	88.3
		Average	**82.1**	**82.9**

MB release in lbs beginning 9DEC13. Each 100 lbs MB released equals ca. 34 gMB/m3.			
day/time	elapsed time hours	est. conc.	lbs
1/12:00 hrs	-9.0	0	0
1/12:24 hrs	-8.6	34	100
1/16:27 hrs	-4.5	102	201
1/17:12 hrs	-3.8	136	100
1/18:11 hrs	-2.8	170	100
1/19:43 hrs	-1.3	204	100
1/21:00 hrs	0.0	212	Start
1/21:22 hrs	0.7	238	100
2/18:00 hrs	21	225	50
3/08:00 hrs	35	230	50

MB Concentration (mg/l), Classroom southwest

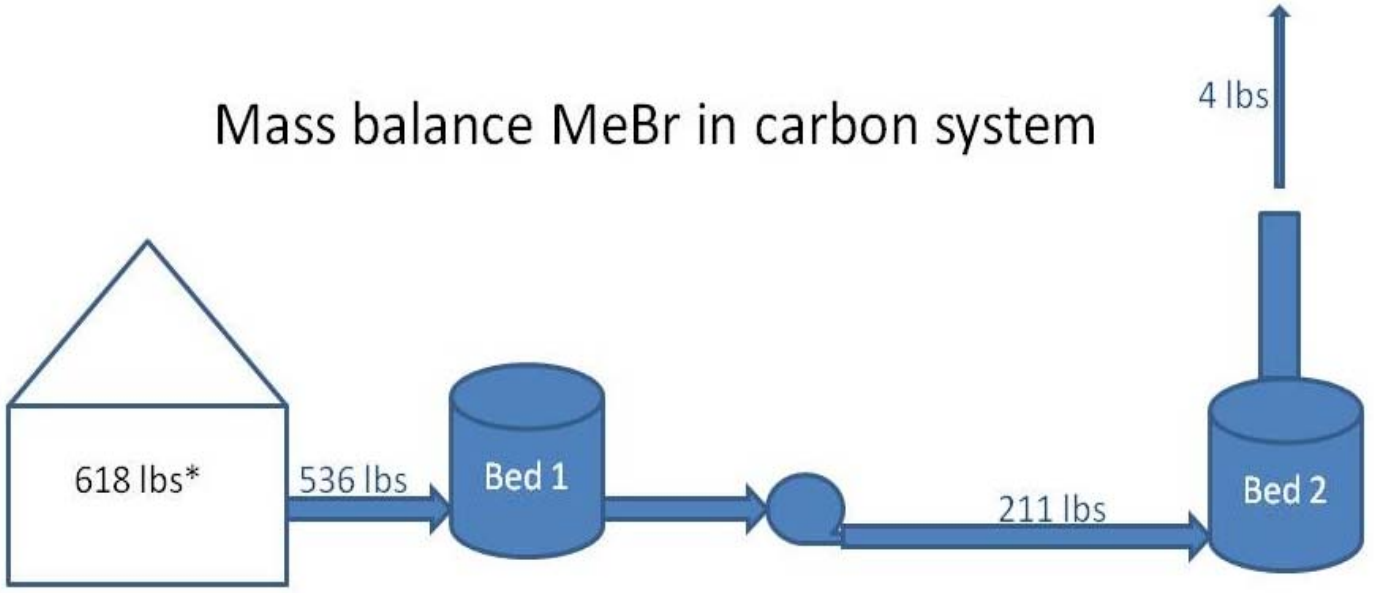


Model Leak Simulation



Activated Carbon System

Mass balance MeBr in carbon system

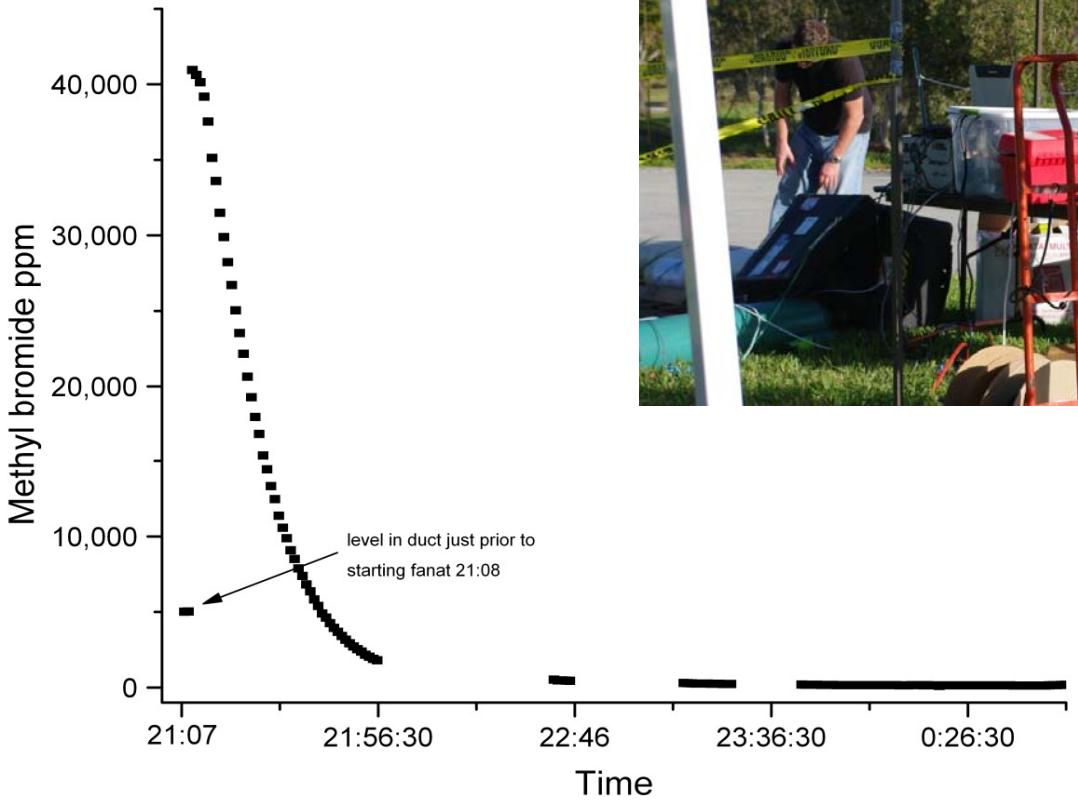


NOTES:

*Calculated total mass of MeBr in house air just prior to scrubbing, based on Fumiscope reading of 218 mg/L and a house volume of 45,348 ft^3

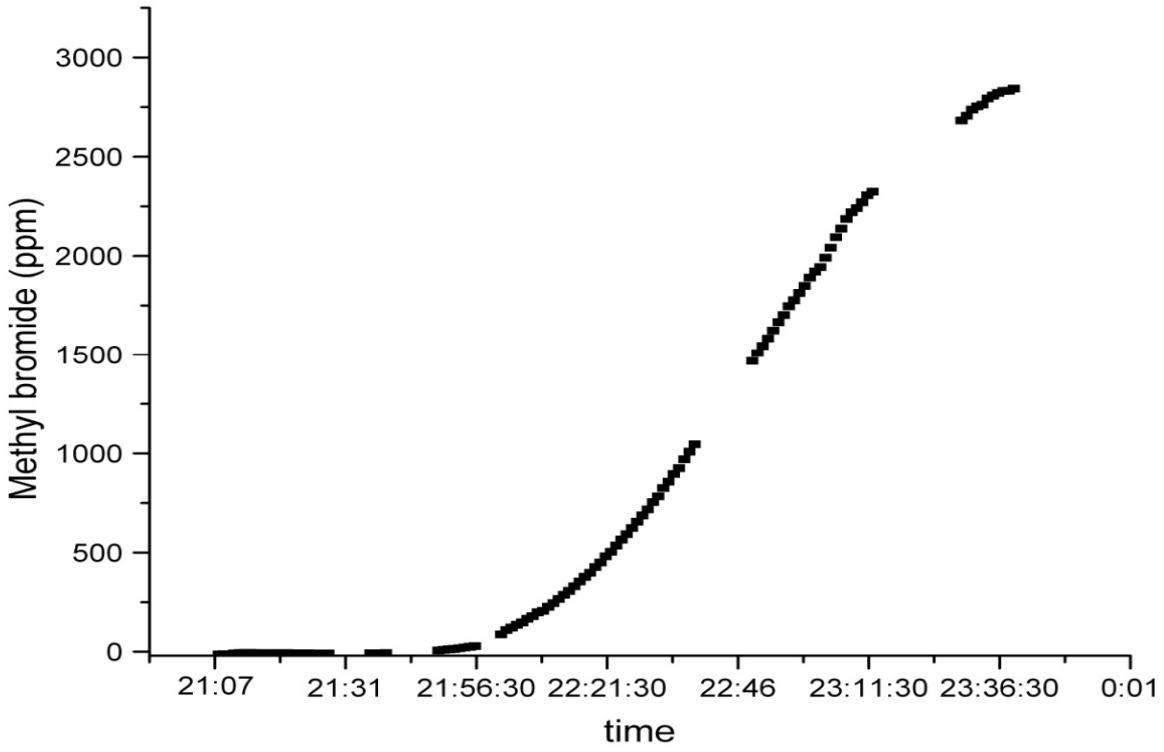
Total mass in house air right after carbon bed scrubbing stopped was calculated to be 3 pounds (Fumiscope reading was 1 mg/L)

Numbers reported in blue font are the total cumulative mass flow of MeBr during carbon bed operation, calculated based on air flow rate and FID readings for that location

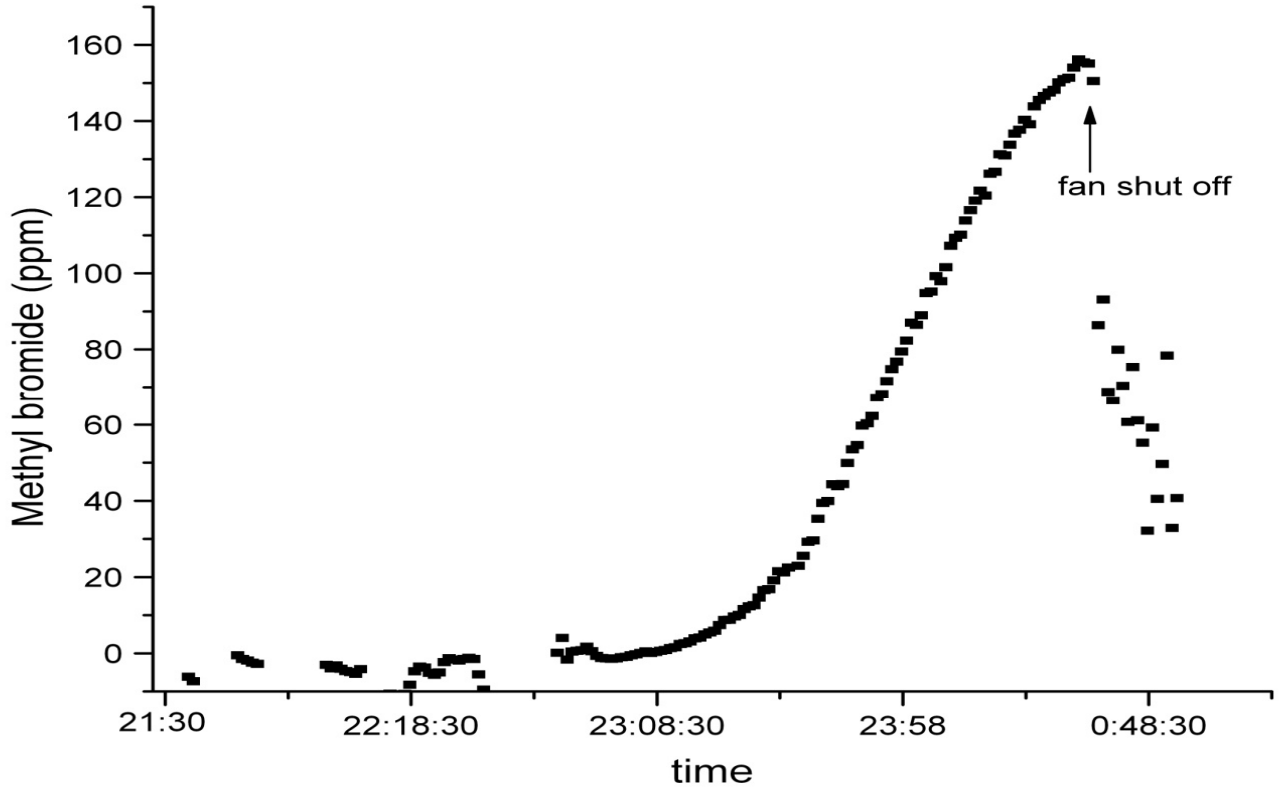


MB Conc. At Scrubber

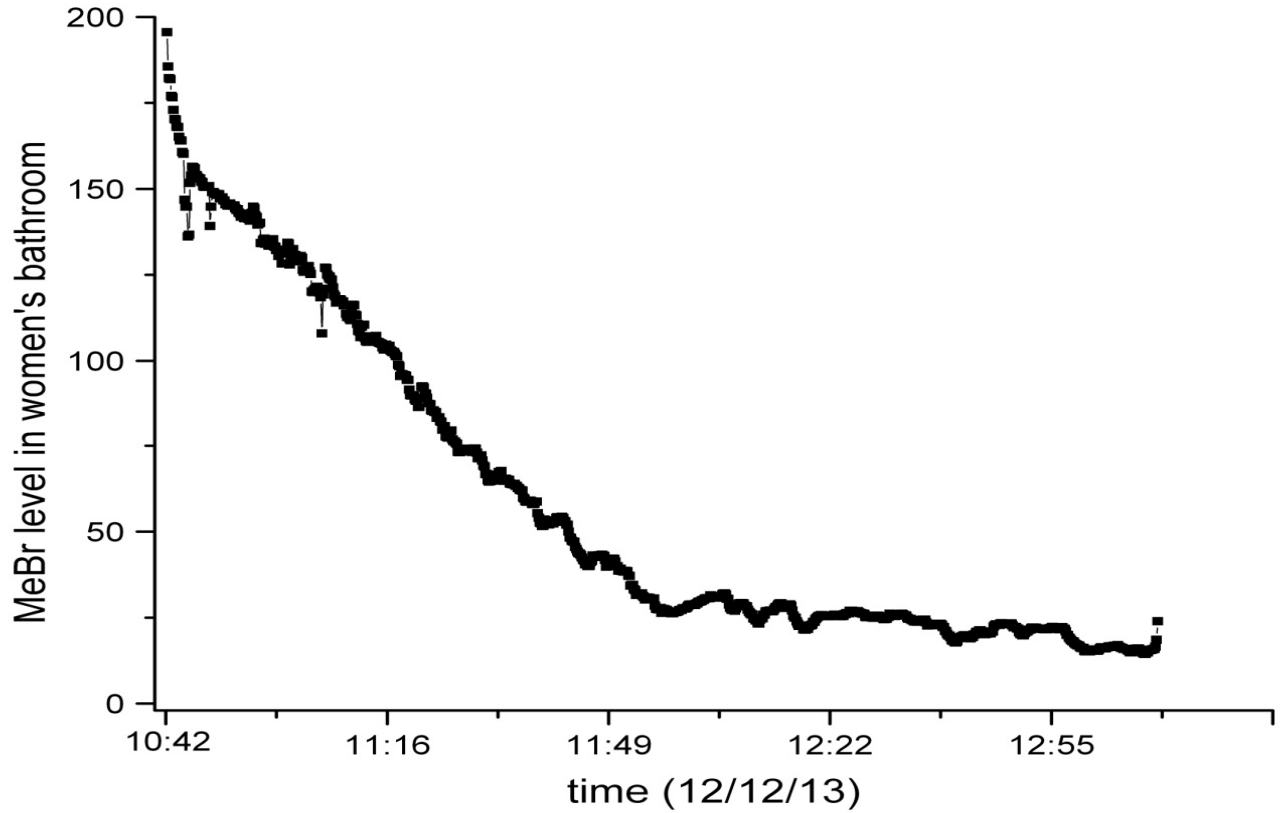
MB Concentration Between Carbon Beds



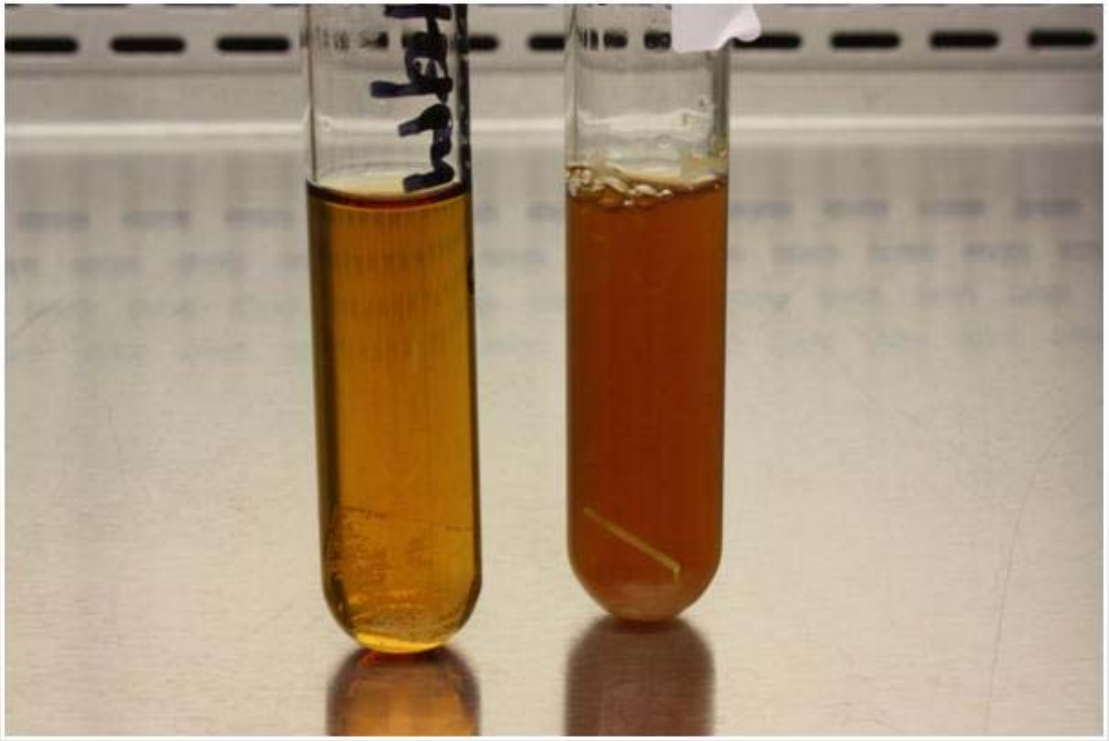
MB Concentration, Carbon Bed Stack



MB Concentration, in Women's Bathroom



Biological Indicators



Photograph of representative turbid (right) and lucid (left) culture tubes, representing growth positive (right) and growth negative (left), respectively.

Location	Location ID	Test Coupons (growth-positive BIs / total BIs)		Procedural Blanks (growth-positive BIs / total BIs)	
		Wood	Glass	Wood	Glass
1	A	0/4	0/4	0/1	0/1
2	B	0/3	0/4	0/1	0/1
3	C	0/4	0/4	0/1	0/1
4	D	0/4	0/4	0/1	0/1
5	E	0/4	0/4	0/1	0/1
6	F	0/4	0/4	0/1	0/1
7	G	0/4	0/4	0/1	0/1
8	H	0/4	0/4	0/1	0/1
9	I	0/4	0/4	0/1	0/1
10	J	0/4	0/4	0/1	0/1
11	K	0/4	0/4	0/1	0/1
12	L	0/4	0/4	0/1	0/1
13	M	0/4	0/4	0/1	0/1
14	N	0/4	0/4	0/1	0/1
15	O	0/4	0/4	0/1	0/1
16	P	0/4	0/4	0/1	0/1
17	Q	0/4	0/4	0/1	0/1
18	R	0/4	0/3	0/1	0/1
19	S	0/4	0/4	0/1	0/1
20	T	0/4	0/4	0/1	0/1
21	U	0/4	0/4	0/1	0/1
22	V	0/4	0/4	0/1	0/1
Total		0/87	0/87	0/22	0/22
		Positive Controls (growth-positive BIs / total BIs)		**Negative Controls†** (growth-positive BIs / total BIs)	
		Wood	Glass	Wood	Glass
Not Exposed		24/24	24/24	2/24	0/24

Biological Culturing

Photograph of representative dilution plates containing *Bacillus anthracis* Sterne colonies recovered from biological indicators.

Population Determination

BI Coupon Type	Pre-Test Population	Post-Test Population	n	p-value (two tailed Student's t-test)
Stainless Steel	2.2×10^6	2.5×10^6	10 pre-test, 10 post-test	0.1297
Glass	2.0×10^6	2.2×10^6	3 pre-test, 3 post-test	0.2499
Wood	9.6×10^5	4.6×10^5	3 pre-test, 3 post-test	0.0659

Time Series Results

Time Point (hours)	Sample ID	Test Coupons Total CFU Recovered (n=6)		Procedural Blanks Total CFU Recovered (n=2)	
		Wood	Glass	Wood	Glass
16	W	0^{Ψ}	$828 \pm 2027^{\dagger}$	0	0*
24	X	0	0	0	0
32	Y	0	0	0	0
40	Z	0	0	0	0

NYC Anthrax Response Plan
CMAT Webinar
Shannon Serre
April 8. 2014

NYC Anthrax Response Plan

- NYC Department of Health and Mental Hygiene
- Scalable Plan Specific for NYC
- Develop
  - Sampling and Analysis Plan (SAP)
  - Remedial Action Plan (RAP)
  - Decision Support Tree
  - Waste Management Plan (WMP)
  - Health and Safety Plan (HASP)

In response to an intentional *B. anthracis* release

- Roles and Responsibilities

NYC Anthrax Response Plan Building Engineering Study

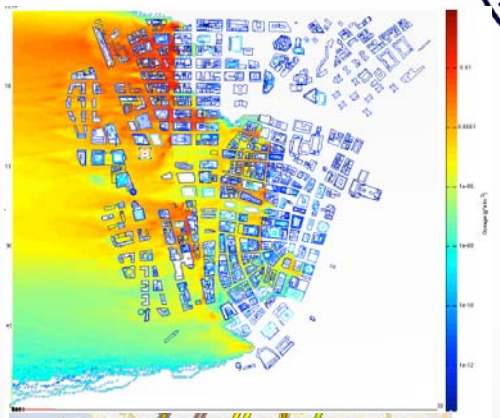
- Conduct a Building Engineering Study
- Single building with interior contamination
  - Multi-Story Office Building in NYC
  - >1,000,000 SF
- Look at logistical challenges associated with:
  - Sampling
  - Decontamination
  - Waste Management
  - Health and Safety
- Decon Decision Tool

NYC Anthrax Response Plan Wide Area

- Wide Area Event
  - Multiple buildings
  - Indoor and Outdoor surfaces
  - Vehicles
  - Subway System
- Develop
  - SAP for indoor and outdoor as well as subway
  - RAP for buildings and subway system
  - WMP
  - HASP
  - ECC and TWG Guidance
  - Roles, Regulations and Responsibilities

NYC Anthrax Response Plan Challenges

- Large buildings
- Transportation
  - Subway system
  - Personal vehicles
- Capacity Issues
  - Lab/analysis
  - Decontamination contractors/options
- Waste
  - Treatment
  - Staging
  - Disposal
- Homeowners/businesses
- Time



Teams and Gaps

- Multi-Disciplinary Teams
  - Operational – Office of Emergency Management & OSCs
  - Research – National Homeland Security Research Center
  - Waste – Office of Resource Conservation & Recovery
  - NYDHMH
- Gaps
  - Large buildings
  - Outdoor areas
  - Vehicle decontamination
  - Wastewater
  - Subway systems (Underground Transportation Restoration Project UTR)

CBRN Tactical Guides

- Objective: Develop consistent operational guidance for field response to a CBRN incident (tactical guide); provide for a 1-stop shop for all Agency info for CBRN (compendium)
  - There will be a guide for Chem, Bio, and Rad
- All 10 EPA regions represented
- ORD/NHSRC
- EPA Special Teams
  - CMAT
  - ERT East/West
  - RERT

Tactical Guides Include:

- Framework for Decision Makers
- Response Phases
- Sampling Strategies and SOPs
- Decontamination Strategy and Technologies
- Waste Disposal
- Clearance
- H&S
- Self Remediation
- Policy

Bio Tactical Guide example section

- Clearance Strategy
  - Clearance Goals
  - EPA's Position on Clearance Goals and Authority
  - Interim Clearance Strategy for Environments Contaminated with *Bacillus anthracis*
    - Purpose
    - Overview of EPA Clearance Strategy
    - Indoor Clearance Guidance
    - Outdoor Clearance Guidance
    - Annex A – Clearance Strategy
  - Clearance Environmental Sampling and Analysis
  - Clearance Decision

CWA Tactical Guide example section

- Sampling Strategies
  - Characterization Sampling Strategy
  - Qualitative Approach
  - Ad Hoc Approach Support Source Reduction in Class 1 Zones
  - Detailed Characterization in Class 2, 3 and 4 Zones
  - Detailed Characterization Based on Dispersal Pattern and Decontamination Method
- Numerical Modeling Approach
- Visual Sampling Tool
  - Judgmental Sampling Approach
  - Probability-based Sampling Approach
  - Determining the Number of Probabilistic Samples

Rad Tactical Guide – example section

- Develop Initial Health and Safety Plan
  - Select Initial Incident Limits
    - Exposure Rate
    - Dose
    - Surface Contamination
    - Dosimetry
  - Select Initial Personal Protective Equipment
  - Select Instruments and Measurement Techniques
    - Primary Type of Instruments
    - Scanning Surveys
    - Static Surveys
    - Removable Contamination Sampling and Analysis.
  - Select Monitoring and Decontamination Procedures
    - Monitoring Responders and Equipment for Contamination
    - Monitoring Victims for Contamination
  - Develop Incident Emergency Plan
  - Select Initial Entry Objectives
    - Determine Exposure Rates
    - Determine Control Zones
  - Consider All Hazards

CBRN Guide Schedules:

- Bio-Guide Draft Completed; Will be sent for extensive OSC review by summer 2014
- CWA-Guide in final draft stage; will be sent for extensive OSC review by summer 2014
- RAD-Guide currently being drafted; initial draft sent for OSC review summer 2014
- Contact your regional rep to participate in any reviews

US Environmental Protection Agency Partner in Training the OSC

Paul G Kudarauskas - *Environmental Scientist, CBRN CMAT*
Mike Nalipinski – *OSC Emeritus, CBRN CMAT*
Scott Hudson – *Health Physicist, CBRN CMAT*
Larry Kaelin - *Chemist, CBRN CMAT*
w/ support from
Jason Musante, Region 9

EPA National Training Academies

- Advanced training tracks for OSC certification in the following areas:
  - CERCLA
  - Oil
  - Leadership/Incident Coordination
  - CBRN
  - IT/GIS
- Advanced training will be developed by different training teams; CMAT is developing the CBRN track
- Oil and Leadership tracks will be introduced in 2014
- CBRN track will be introduced in 2015

OSC Advanced CBRN Training

- Provide OSCs who have been selected to lead CBRN responses advanced training.
  - ✓ This training is for OSCs, so OSC input is welcome
  - ✓ Bridging the gap on how an OSC can use their day-to-day skills and implement them into the event that may never happen AND on how the OSC can use these new technical skills in their day-today responses so the skillset is not lost and forgotten
  - ✓ Show the OSC….
    - ✓ the plans in place
    - ✓ how EPA will fit into these major responses as the beltway is planning (National Approach to Response)
    - ✓ what CMAT, ERT, RERT can bring to assist them
    - ✓ State of the science
  - ✓ Identify expectations of the OSCs in this position
  - ✓ Includes Live Agent Exercise to practice classroom skills

End of the day, the goal of the training team is to design a curriculum relevant to the plans and procedures in place that the OSC can still use daily. We will offer what is available with respect to science and technology so the OSC can be successful.

Training Support: CBRN CMAT NRC License

- Enables us to own/rent and deploy radioactive sources for training or exercise purposes
- Issued: March 2014
- Authorized for
  - Several gamma emitting nuclides
  - AmBe neutron source
- Civil Defense Applications
  - Training
  - Exercises
  - ASPECT algorithm development
- Sources can be used anywhere in the United States
  - CMAT handles all logistics
- RSO : John Cardarelli (Cardarelli.john@epa.gov)

CMAT Webinar Summary

- Goal is to better share information with the OSC community
- Please give us feedback on what we can do for you!!
  - EMAIL: canzler.erica@epa.gov OR reach out to any CMAT team member

- This was 1 of 4 webinars scheduled
- Future webinars and topics include:
  - April 10, 1-3pm EST: ERLN, PHILIS, and the Bio Labs
  - April 17, 1-3pm EST: ASPECT
  - April 24, 1-3pm EST: Key Projects (TACBRD, Rad Responder App, Underground Transportation Restoration Project, NHSRC Partner efforts)