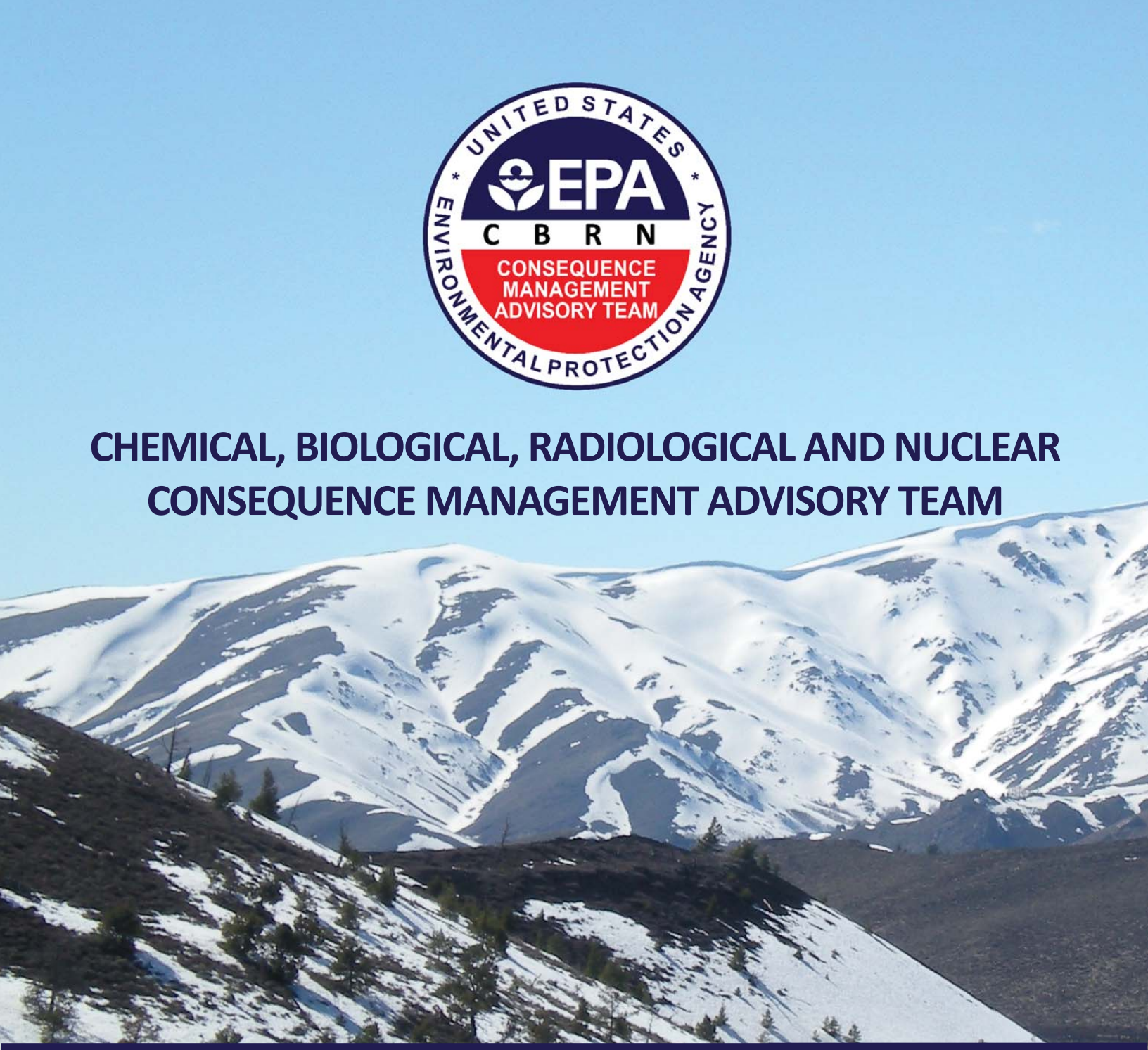
CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR CONSEQUENCE MANAGEMENT ADVISORY TEAM



FY 2012 Annual Report

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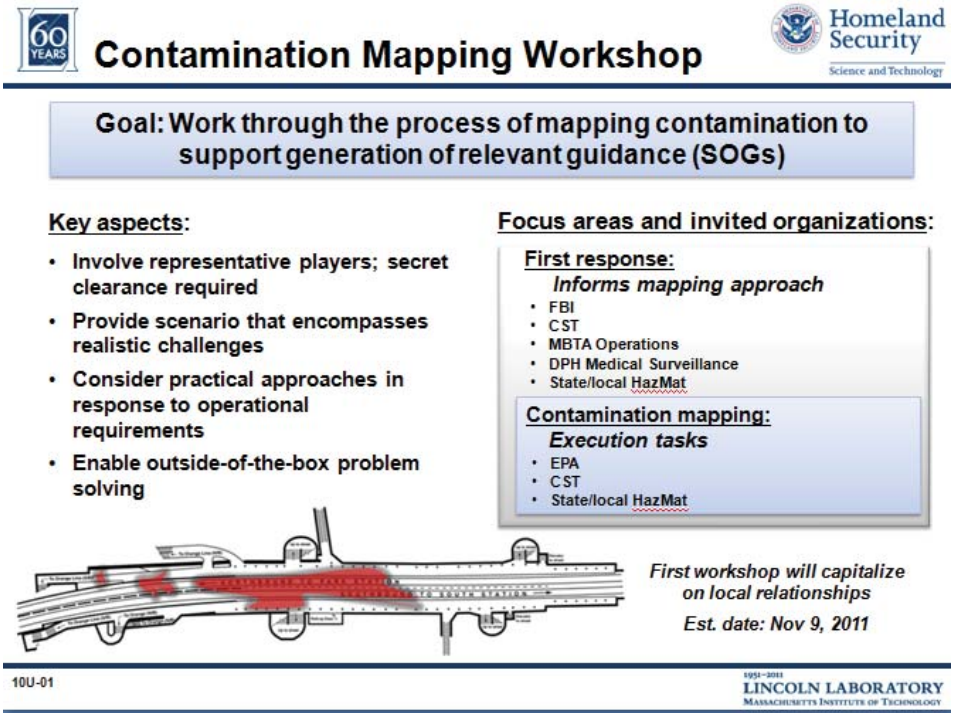
COLLABORATION AND COORDINATION

Detecting and Decontaminating Non-Traditional Agents Released in Transportation Hubs

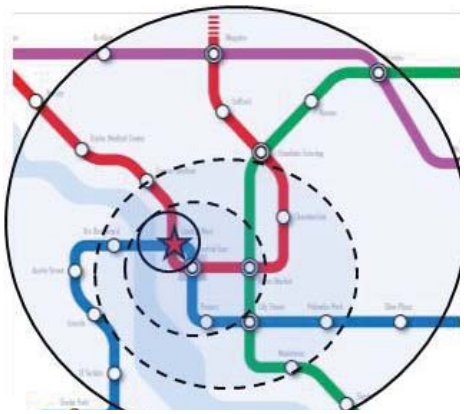
CMAT has been an active partner in the Integrated Detection and Decontamination Demonstration (ID3) Project sponsored by the Department of Homeland Security (DHS). This project aims to address the nation's response to a release of chemical emerging threat agents, also known as non-traditional agents (NTAs), into a large transportation hub, such as a metropolitan subway system. The Consequence Management Advisory Team (CMAT) has been involved in designing exercises, reviewing guidance documents and statements of work (SOWs) for various parts of the ID3 Project, and engaging regional Unitec States Environmental Protection Agency (EPA) resources. As part of a full-scale exercise and technology demonstration scheduled for New York City in the winter of 2012/2013, CMAT will also provide staff and equipment, including the Portable High Throughput Integrated Laboratory Identification System (PHILIS)—a mobile laboratory platform.

NTA remediation documents, operational field guides, cutting-edge novel sensor technologies, analytical methods, and a NTA mobile laboratory are just a few of the products expected from the ID3 Project.

For more information on PHILIS see the article starting on page 10 of this report.



Contaminant mapping at subway platform



Contamination zone (fictional transit system)

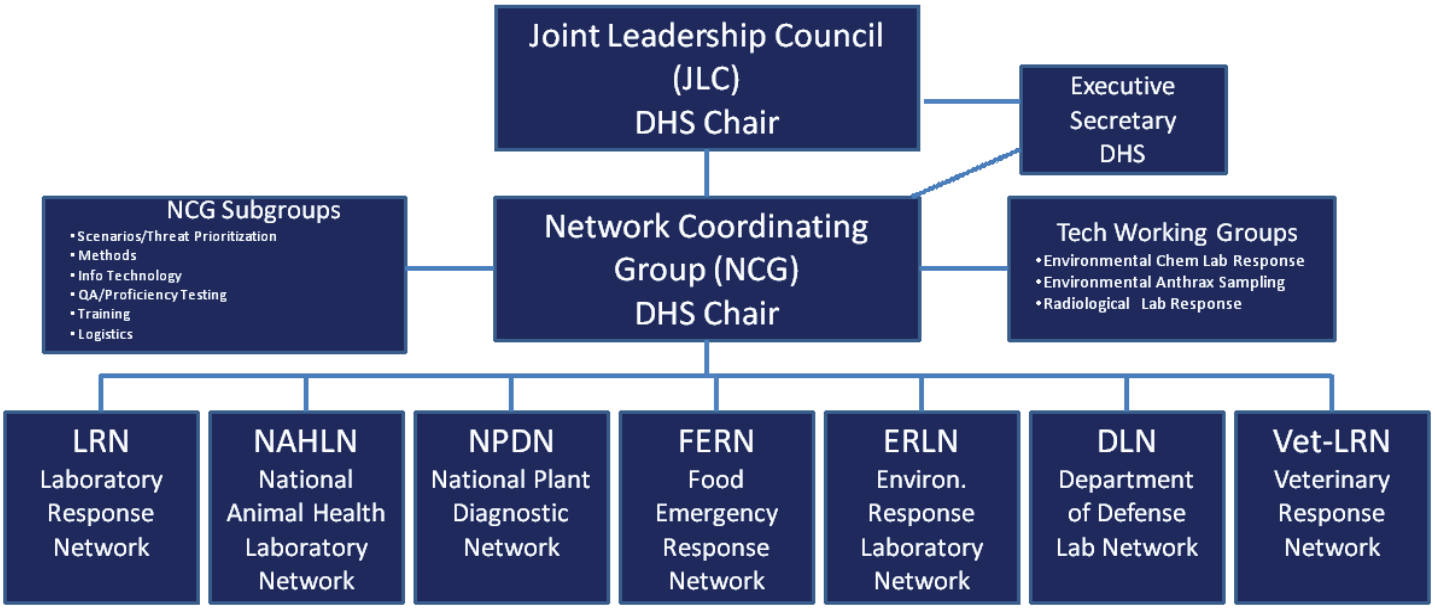
Typical New York City subway station

Partnering on CWA Activities

CMAT cannot operate in a vacuum, but must instead form strong partnerships with other EPA teams, the Program Offices, Office of Research and Development (ORD) and Regional Laboratories, and other federal agencies to be effective. Some of CMAT's existing partnerships include:

- Coordination with Regional Labs in Regions 1, 3, 6, 9, and 10 for the analysis of chemical warfare agents (CWAs): In combination with the capabilities of PHILIS, these Regional lab operations allow CMAT to provide analysis of CWAs in the event of terrorist attacks or other incidents involving CWAs (e.g. unearthed munitions). Through the cooperative efforts of EPA, DHS, and the Federal Bureau of Investigation (FBI), these labs have been established to safely receive, store, and handle CWA analytical standards, as well as environmental samples contaminated with CWAs. CMAT has an agreement with Lawrence Livermore National Lab (LLNL), through the Department of Energy, that allows the CWA labs to receive and use ultradilute CWA standards for analytical needs. The Regional CWA labs, PHILIS, LLNL, and ORD's National Homeland Security Research Center (NHSRC) also coordinate to develop and validate analytical methods for determining the presence of CWAs in environmental samples.
- Membership in the Environmental Response Laboratory Network (ERLN): PHILIS and the Regional CWA laboratories are members of the ERLN– EPA's member lab network in the Federal Integrated Consortium of Laboratory Networks (ICLN).

  The ICLN is composed of seven major Federal Agency laboratory networks, a network coordinating group, and numerous technical subgroups. The ICLN is administered through a Joint Leadership Council chaired by the DHS. The ICLN's mission is to foster formal communication between member networks concerning technical issues and laboratory capability and surge capacity needs during major homeland security events. The ERLN and Department of Defense's (DoD's) Defense Laboratory Network (DLN) are the only two networks with the capacity to analyze environmental samples for chemical and radiological contaminants, although the ERLN is the only network currently set up to analyze samples at clearance-level contaminant levels. The ERLN consists of approximately 120 federal, state, and private laboratories offering capabilities and capacity for analysis of CWAs, toxic industrial chemicals, limited biological agents, and radiochemical analytes. Basic ordering agreements are in place with the state and private labs to ensure rapid access during emergency-related incidents. Regional On-Scene Coordinators (OSCs) have access to these state and private laboratories via warrants, without having to work



An ICLN structure

through the Office of Emergency Management (OEM). Access to PHILIS is by request through CMAT and access to Regional labs is through personal contact with the lab.

- Coordination with NHSRC: CMAT and NHSRC have worked diligently over the last year in the area of CWA and CWA degradation product analytical method development. NHSRC currently holds an agreement with LLNL to provide for CWA single-laboratory method development and other CWA-related research efforts. CMAT and NHSRC staff also sit as subject matter experts on a number of cross agency workgroups, including (but not limited to):

  - Integrated Detection and Decontamination Demonstration (ID3): Workgroup concerned with CWA contamination of large transportation hubs, such as a metropolitan subway system;
  - Deep Dive: National and international workgroup forum for mitigation of emerging threats. Contains a smaller "Tiger Team" subgroup discussing issues related to personal protective equipment (PPE), toxicology, detection, and information dissemination; and
  - White House Chemical Sub Interagency Policy Committee (IPC): Multi-agency workgroup with discussions on Federal response activities and classified information dissemination.

ASPECT Assists NGA with Greenhouse Gas Detection Program

The Airborne Spectrophotometric Environmental Collection Technology (ASPECT) program is participating in a greenhouse gas detection and methods development project involving various federal and state government organizations. The project is being lead by the National Geospatial-Intelligence Agency (NGA) and aims to identify carbon dioxide ($C0_2$) and water vapor concentrations in the lower atmospheric column and develop spectral data processing methods that permit reasonably-accurate CO_2 and water vapor outputs to be generated using remote sensing platforms. CMAT received funds from the NGA to collect spectral data concurrent with whole air samples and direct reading measurements. Whole air samples will be analyzed in the laboratory and combined with the data from the field instruments; these data will serve as the reference data for modification and testing of the spectral processing algorithms developed. The first phase of the project involves designing and developing a set of reproducible, high-quality field collection and laboratory analytical procedures. The field effort will involve a campaign of several airborne measurements and laboratory analyses to encompass a broad range of atmospheric conditions. During each of these campaigns, the time period of collection will be synchronized with the passing of the National Aeronautics and Space Administration's (NASA's) Atmospheric Infrared Sounder (AIRS) satellite so that the two datasets can be merged. This project will be on-going for several seasons.

Top: ASPECT plane

Bottom: ASPECT's control console

PHILIS Accredited by National Environmental Laboratory Accreditation Program

On February 23, 2004, EPA's Science and Technology Policy Council approved a Policy Directive developed by the Forum on Environmental Measurement (FEM) stating that all EPA-operated laboratories, including Agency-owned, contractor-operated facilities, must address the specific items listed in the Laboratory Quality System Components section of the directive, as well as maintain a documented quality system that meets the existing specifications of the EPA Quality System as defined in EPA Order CIO 2105.0, *Policy and Program Requirements for the Mandatory Agency-wide Quality System.*

All laboratories are required to demonstrate adherence to their quality system through periodic independent assessments and by participation in inter-laboratory comparisons. In addition, where appropriate accreditation programs are available for one or more components of a given laboratory's operations, the laboratory will seek accreditation for those components.

To meet this policy requirement, PHILIS mobile laboratory units at both the Castle Rock, Colorado, and Edison, New Jersey facilities gained accreditation through the National Environmental Laboratory Accreditation Program (NELAP). This level of accreditation will go toward instilling a high level of confidence in environmental data produced by PHILIS. Gaining accreditation for the PHILIS operations was an extensive exercise requiring approximately twelve months of writing, reviewing, and approving Quality Management Plans, Health and Safety Plans, and analytical method-specific standard operating procedures. Once all of the necessary documentation was approved, both PHILIS sites were subjected to internal on-site audits and performance evaluations conducted by EPA's Quality Assurance Technical Support (QATS) contractor. Once this process was complete, EPA applied for accreditation through The NELAC Institute (TNI).

LECO Pegasus III gas chromatograph/mass spectrometer (GC/MS) with an auto-sampling mechanism on top (a Time-of-Flight MS)

PHILIS PAL - Analytical Laboratory

Accreditation via TNI is conducted by one of fourteen specific states that have been classified as NELAP Recognized Accreditation Bodies. Because of logistics issues, PHILIS had to be accredited by two separate state bodies. The Castle Rock PHILIS

unit was accredited by the state of Florida, while the Edison PHILIS unit was accredited by the state of New Jersey. Accreditation of both PHILIS units required successful performance on accredited vendor-supplied performance evaluation (PE) samples, as well as successful completion of two-day on-site audits performed by accreditation staff of each state.

Accreditation is not a one-time exercise. To retain accreditation, PHILIS operations will be required to pass annual PE samples and on-site audits conducted every three years by the accrediting state. In addition, both PHILIS units will undergo internal audits and PE sample analyses to ensure on-going competency. While this is a continuous process requiring resources and additional costs, accreditation is necessary to ensure that data generated by PHILIS is of the highest level of quality.

Part of the sample PHILIS log-in station. The metal box is a pass-through for obtaining samples from outside the trailer. The samples are weighed and then bar-coded for tracking in the data system

PHILIS Helps Improve Site Efficiency and Decision Making

In the spring of 2011, heavy rains flooded Stevens Brook in St. Albans, Vermont, and residents at the Colony Square Apartments in St. Albans noticed coal tar waste in a sump in their basement. Colony Square was a former EPA removal site where more than 4,000 tons of polycyclic aromatic hydrocarbon (PAH)-contaminated soils were excavated and disposed of off-site in 2005. St. Albans city employees also noticed coal tar wastes in several area manholes, and residents in the area noted an oily odor. The Vermont Department of Environmental Conservation (VT DEC) stepped in and temporarily stabilized the situation. After Hurricane Irene and associated heavy rains exacerbated the situation in the fall of 2011, VT DEC requested assistance from EPA Region 1 to determine whether coal tar waste contamination existed at the Colony Square apartments and on residential properties abutting Stevens Brook.

On May 7, 2012, Region 1 conducted surface and subsurface soil, sump water, sediment, gas, and indoor air sampling of select residential properties along Stevens Brook to determine the extent of coal tar waste contamination. On-site analytical results were provided by CMAT, using the PHILIS mobile laboratory platform. The contaminants of concern included benzene, naphthalene, and semivolatile organic compounds, particularly PAHs. In the course of approximately 4 days, over 250 samples were collected and analyzed on-site for contamination. PHILIS provided same-day confirmatory NELAP-certified analytical data, allowing on-site decision making without the need for a secondary confirmation via an outside fixed lab. The PHILIS on-site analysis helped the OSC to:

- Direct on-going soil coring activities and maximize usage of contractor on-site assets;
- Capture boundaries of the extent of contamination in a single mobilization;
- Provide rapid, on-site confirmatory data for daily decisions and briefings to local (VT DEC) authorities;

- Reduce the number and longevity of site visits normally required to determine and initiate a removal action memo (RAM); and
- Base further excavation activities on a single 4-day site mobilization of PHILIS ("One and done").

Region 1 OSC, Mike Nalipinski, was able to confer with VT DEC representatives on a daily basis, using the most recent soil PAH analytical data, which was summarized and depicted on site maps to allow for a clearer presentation and better interpretation. Based on these on-site PHILIS analytical results, the OSC was able to submit a draft of the RAM recommending a new round of soil excavation activity at the Colony Apartments within 4 days of mobilization.

The ability of PHILIS to more effectively direct sampling teams, define the extent of contamination, and have reliable data sufficient to make decisions based on a single 4-day site visit created an efficient worksite that ultimately cut costs. Estimations of probable costs and actual costs from the May 2012 St. Albans site effort are being evaluated to determine how much time and money can be expected to be saved when using the PHILIS mobile labs in support of typical EPA regional response and cleanup activities. Initial estimates for the PHILIS on-site mobilizations range from $250-325 per sample, which includes fuel, mobilization/demobilization costs, travel, per diem, analysis, quality assurance (QA) review, and report writing. The mobilization of PHILIS to the Region 1 St. Albans site provided CMAT with useful information and lessons learned that will be used to further reduce costs for future mobilizations.

GeoProbe soil coring

PHILIS mobile labs

EPA-VT DEC daily briefings

ASPECT Conducts Surveys for Region 6

Bayou Corne Sink Hole

On August 23, 2012, the ASPECT Program was requested to support the State of Louisiana Department of Environmental Quality (DEQ) with an investigation of a salt dome that developed a sink hole and was leaking natural gas near Bayou Corne, Louisiana. This salt dome was historically used as a solution salt mine and subsequently, as a natural gas storage facility and potentially, as a repository for low-level radioactive pipe scale (a residue of naturally-occurring radioactive materials left in pipes used in oil and gas production). ASPECT flew a programmed flight radiological and chemical survey over the affected area, and results of the surveys indicated no abnormal radiation or elevated methane levels were present in the area.

ASPECT Responds to Chemical Fires

The ASPECT aircraft conducted two emergency response missions during FY 2011. During data collection for the Ambrosia II radiological survey in October 2011, Region 6 requested that ASPECT respond to a large chemical fire in Waxahachie, Texas. Magna Blend, a large chemical blending facility, had erupted into a major fire and forced the shutdown of both Highway 287 and Interstate I-35E; a large, dense column of smoke was visible for miles. At the time of the request, the ASPECT aircraft was over Grants, New Mexico and was re-routed directly to Waxahachie. Once on station, ASPECT collected chemical and situational data and provided this information to the Region 6 OSC. Results showed that the majority of compounds, including many industrial solvents, were being consumed by the fire; very low levels of isobutylene and propylene oxide were detected in the smoke column being emitted from the fire.

On March 22, 2012, Region 6 requested that the ASPECT aircraft be deployed to support a chemical fire at the Westlakes Chemical facility located near Geismar, Louisiana. A vinyl chloride unit at the facility had caught fire and forced an evacuation of nearby residents. While ASPECT was over Western Texas, the fire was extinguished, but the OSC was concerned that vapor might be lofting from the unit. ASPECT made several passes over and downwind of the facility and found only trace amounts of vinyl chloride.

Ongoing ASPECT S & T Projects

Chemical Detection Software Development

During fiscal year 2012, the ASPECT program made several software enhancements to the chemical detection system. The ASPECT program has fully tested a complement of 72 automated compounds which have been tuned for minimum false alarm. This compound set has been incorporated into the on-board software engine in the aircraft and permits near real-time and fully automated detection of compounds contained in the library. The fully-automated process takes about 20 seconds to complete. Outputs include a screening table, geo-locations of the detections, and if detections are made, a subset of compressed raw data that is used by the ground team to confirm the detection. During deployments and responses over this last year, the ASPECT program has consistently provided near real-time chemical results to the OSC in less than 5 minutes. Based on the success of the current set of compounds in ASPECT's library, an additional 25 chemical compounds are to be considered for inclusion in the library. It is anticipated that these compounds will be available for testing in January 2013.

In addition to the detection library, work continues on an automated compound concentration algorithm. A method using fixed gas to ground radiometric temperature estimates has been developed and tested on selected data. The product of this method includes a geo-located concentration estimate for each detected compound. This output permits a convenient way to present concentration data in various GIS packages. A companion project is currently developing a temperature estimation method to forecast the gas (plume) temperature based on observed flight- level temperature data.

Science and technology (S & T) enhancements were also made during fiscal year 2012 to ASPECT's radiological detection system. These enhancements are presented in detail on page 29 of this report.

Assisting Region 5: Field Study to Determine Reoccupation of Residence

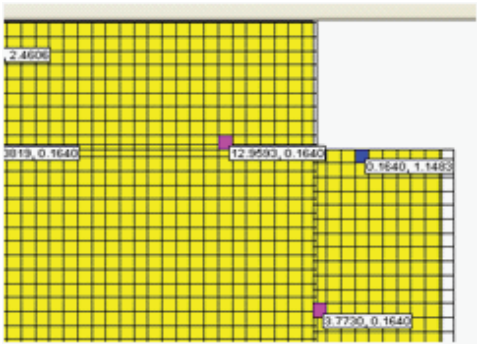
In July 2011, an EPA Region 5 OSC approached CMAT about conducting a decontamination study at a duplex residence in Cincinnati, Ohio. The property owner had hired a contractor to decontaminate the duplex in 2010 after it had become infested with bedbugs. A year after this initial decontamination attempt, malathion and/or other degradation products remained at measurable levels.

On June 2, 2010, an unlicensed applicator sprayed the residence with a pesticide, purchased at Home Depot, to exterminate the bedbugs. The product, manufactured by Spectracide®, contained 50% malathion and was labeled "For Outdoor Use Only." Following an initial decontamination attempt by the homeowner, one of the two contaminated units in the duplex was not cleared for reoccupation. In 2011, over a year after this initial decontamination attempt, 20% of the wipe samples taken at the residence contained levels of malathion that were approximately 5 times the Agency for Toxic Substances and Disease Registry (ATSDR) action clean-up values. CMAT compared the ATSDR surface clean-up values to values produced using a proposed Hybrid Model that takes into account skin contact rate (cm^2/hr) and a surface-specific fraction transferred value (P/NP) and determined that the surface clean-up values being used for this site were very conservative and thus, protective of human health.

There are a number of different procedures available for conducting wipe sampling of chemical agents on surfaces. Some are specific for lead or non-volatile species of analytes, while others are more general; for example, for sampling of smooth surfaces or organic compounds. Each method has its own specifications for the type of wipe, wetting solvent, and determinative step(s) to be used, depending upon the contaminant of concern. But, in general, no overwhelming consensus can be drawn from the current literature on how to collect a wipe sample for organophosphate or other pesticides. As a result, CMAT used a modified sampling approach at this residence, utilizing pre-cleaned twill wipes, 10x10 cm templates, 2 milliliters (mL) of acetone to charge the media, and a three-step National Institute for Occupational Safety and Health (NIOSH) surface wipe protocol.

Visual Sampling Plan software was used by CMAT to evaluate the appropriate surface sampling plan for the existing field conditions. A combined judgmental and random (CJR) sampling approach was used to establish, with high confidence, that a large fraction of the area was acceptable (i.e., met the clean-up values). For example, to achieve 95% confidence that 95.5% of a 12x15-ft room was acceptable, 12 targeted (judgmental) samples and 10 additional random samples were required to be taken and found to be below established clean-up action levels.

Pre-cleaned twill wipes were used



Representation of Visual Sampling Plan

Picture of home in Cincinnati, Ohio where field study was conducted

2 mL of acetone was used for wetting agent

10x10 cm templates were used

To implement a cost-effective and commercially-available decontamination approach that achieved clean-up values, CMAT chose to use a decontamination agent previously used in decontamination of CWAs and methyl parathion—one of the most toxic organophosphate pesticides. Gross decontamination involved removing the carpet and foam padding, as well as any dirt and debris. The decontamination agent was prepared by mixing 12.8 oz of Sterilex® Solution 1 and 12.8 oz of SterilexActivator® with up to 1 gallon of tap water. As a pre-soaking step, this Sterilex® decon solution was first sprayed on the walls and baseboards. The walls and baseboards were then scrubbed with a brush, and after 10 minutes, rinsed with water. Excess water was removed with a wet/dry vacuum.

Components of the Sterilex® solution used for decontamination


Preparing the Sterilex® solution


Pre-soaking the walls and baseboards


Scrubbing the walls and baseboards with the Sterilex® solution

On April 3, 2012, CMAT informed the Cincinnati Health Department (CHD), the Ohio Department of Agriculture (ODA), and the property owner that the study was complete and post-decontamination sample results were all below the ATSDR malathion action level.

Decontamination technologies based on CWA approaches may be effective for remediating pesticide misuse indoors, but further studies are required. This field evaluation clearly demonstrated that malathion is more persistent in an indoor environment than predicted from investigations based on outdoor usage. This makes indoor malathion contamination a decontamination priority and challenge.

For additional information regarding this study, please visit the following website: http://www.epaosc.org/cincinnatimalathionsite.

Multi-Agency Collaborative Effort: Quick Reference Guides

Two workgroups of multi-agency subject matter experts (SMEs) have been publishing Quick Reference Guides (QRGs) to provide guidance for early response to chemical and biological agent releases, with the federal OSCs as their primary audience. CMAT has supported the update of existing guides and development of new QRGs for the National Response Team (NRT) website (www.NRT.org). A similar workgroup is being assembled to develop QRGs for radioactive species that might be encountered in a terrorist attack, including an improvised nuclear device (IND) or radiological dispersion device (RDD) scenario.

Developing Remediation Tools and Approaches to Address Indoor Contamination from Pesticide Misuse

Efforts to control insects in indoor environments have led to an increased incidence of pesticide misuse, which is only expected to worsen given the recent bed bug epidemic. These incidents of pesticide misuse include the use of pesticide products not registered for indoor use by the EPA, improper application of approved pesticide products, or application of pesticide products at concentrations that far exceed the labeled rates. When pesticides are applied illegally or in unintended ways, pesticide manufacturers offer minimal assistance.

EPA Regional Offices are often called on to assist local communities in remediating homes and businesses where indoor pesticide levels may be unsafe following these types of misapplications. However, there are currently no tools for adequately evaluating pesticide residues on indoor surfaces and determining potential risk to occupants, nor effective cleaning procedures to reduce pesticide levels in affected structures. As a result, occupants continue to inhabit contaminated buildings, are forced to vacate contaminated properties, or often attempt to decontaminate the structures themselves, further dispersing the contamination and creating more toxic by-products. In the 1990s, while working on guidance for malathion, one of the most widely used organophosphate insecticides in the U.S., the EPA found a lack of data on effective decontamination agents for pesticides. In 2011, the EPA's Chemical, Biological, Radiological, and Nuclear (CBRN) CMAT, in coordination with Region 5, developed guidance for indoor facilities contaminated with carbaryl (a chemical used mainly as an insecticide), but more must be done.

In order to provide responding agencies with the information necessary to evaluate indoor pesticide misuse incidents and reduce occupant exposures, CMAT developed a research project. The project includes validation of surface sampling protocols, guidance on safe concentrations for selected pesticides in various indoor environments, and recommendations for safe, effective decontamination procedures that reduce exposure risk to building occupants without creating toxic by-products. CMAT was particularly interested in this project because of the application to CWA response. The three primary objectives of this project are to:

- Develop risk-based surface threshold concentration values for use in determining whether remediation is warranted and, in cases of remediation, evaluating the success of mitigation efforts;
- Develop sampling, analytical, and assay methods to determine if surface pesticide residues left after decontamination are below a health-based threshold value; and
- Determine the feasibility of using decontaminants developed or adapted specifically for cleaning surfaces contaminated with chemical warfare agents for remediation of surfaces contaminated by pesticides.

This research project intends to generate surface screening values and decontamination procedures that can be applied by federal, state, and local agencies responding to indoor pesticide misuse incidents requiring remediation. A functional database was developed using pesticide measures derived from previous studies and risk-based surface threshold values developed from existing field and laboratory studies and the Stochastic Human Exposure and Dose Simulation (SHEDS) Model. These surface threshold values were evaluated against those that CMAT previously developed in a 2011 white paper titled, *Surface Clean Up Evaluations and Calculations for Chemical Warfare Agents*. Initial solution-based testing was performed with four potential decontaminants, representing a range of reaction chemistries, to determine their efficacy against malathion and carbaryl. After decontamination, any remaining pesticide residues was compared to the newly-developed surface threshold values and an *in vitro* assay used to determine whether the post-decontamination residues will inhibit cholinesterase—the primary toxicity endpoint for malathion and carbaryl.

This project addresses both the ORD's Sustainable and Healthy Communities (SHC) and Homeland Security (HS) research priorities by developing economical approaches for the remediation of facilities contaminated with these pesticides. Results will allow communities to be more resilient to pesticide misapplications and will inform HS research activities, given the similar modes of action (MOAs) seen for organophosphate pesticides and some CWAs. Because of these similar MOAs, the results from this research project could be used to indicate the presence of potentially toxic and previously unidentified by-products of CWA decontamination. This project is transdisciplinary, linking HS research interests to a recurring problem experienced by EPA Regions, while taking advantage of scientific expertise across ORD.

The carbaryl guidance and other pesticide decontamination documents are available at: http://epaosc.org/PesticideDeconDocuments.

CMAT Supports BOTE

Chemical, Biological, Radiological and Nuclear Consequence Management Advisory Team Members Play Lead Roles in the Bio-Response Operational and Testing Evaluation Project

In the intervening years since the September 11, 2001 terrorist attacks, major domestic and international events, including terrorist attacks, chemical and biological incidents, significant hurricanes, and other natural catastrophes have occurred, requiring prompt, organized, and effective response and recovery efforts. In response to these events, the federal government has increased its investment in preparedness and training, resulting in major improvements at the federal, state, and local levels.

The United States Environmental Protection Agency's (EPA's) Office of Emergency Management (OEM) and Consequence Management Advisory Team (CMAT) have a critical role in our nation's ability to prepare for, respond to, and recover from accidents, natural disasters, and terrorist attacks. With the growing asymmetric threat picture, EPA's role has grown from one of responding to hazardous material spills to a role of providing vital scientific support and technical expertise to train, respond, and recover from a Chemical, Biological, Radiological and Nuclear (CBRN) event. CMAT provides many federal, state, and local response agencies with preparedness and training support in the decontamination of buildings, building contents, public infrastructure, agriculture, and other media. They routinely work with other federal, state, and local agencies to develop joint strategies, standard operating procedures, and new technologies.

Top: A CMAT member preps a sampling team before facility entry during BOTE Phase I

Bottom: A sampling team with their sampling cart about to make facility entry during BOTE Phase I

Most recently, CMAT played a major role in the Bio-Response Operational and Testing Evaluation Project (BOTE), an inter-agency project that included coordinated project planning, support, and/or involvement from:

- Department of Homeland Security (DHS);
- EPA;
- Centers for Disease Control and Prevention (CDC);
- National Institute for Occupational Safety and Health (NIOSH);
- Laboratory Response Network (LRN);
- Department of Energy (DOE) National Labs;
- Department of Defense (DoD);
- Defense Threat Reduction Agency (DTRA); and
- Federal Bureau of Investigations (FBI)

The BOTE Project took place at a DOE facility located on-site at the Idaho National Laboratory (INL) near Idaho Falls, Idaho, using *Bacillus atrophaeus (B. atrophaeus)*, a harmless spore-forming bacterium, as a surrogate for *Bacillus anthracis (B. anthracis)*—the biological agent that causes anthrax. The overall purpose of the project was to conduct and evaluate field-level facility biological remediation studies of various decontamination technologies and to exercise biological incident response, including health, law enforcement, and environmental response.

The BOTE Project was divided into two phases: (1) a field-level decontamination assessment, and (2) a multi-agency operational exercise. Phase I of BOTE evaluated three decontamination methods: fumigation with vaporized hydrogen peroxide, fumigation with chlorine dioxide, and a treatment process using a pH-adjusted bleach spraying technique. Phase II mirrored a potential real-life scenario where government officials were informed of an anthrax-like contamination of a building. The resulting contamination in the scenario was called a covert release, which meant the government officials did not know what happened, just that there

Biological

were spores present. This phase of the exercise tested the response of health officials, law enforcement officials, and environmental response teams to a biological incident.

CMAT played a variety of leadership roles in the planning, execution, and exercise play of the BOTE project. CMAT was selected as the Region 10 Resource Coordinator and the Group 3 Sampling Lead. CMAT also provided input to support the planning, resourcing, standards, synchronization of the Quality Assurance Plan, Test Plan, and Evaluation/Analysis Plan, and assisted in setting up the decontamination line in Phase I of the project.

As EPA Region 10 Resource Coordinator, CMAT was responsible for coordinating and supervising EPA Region 10 resources supporting test bed operations. A CMAT member serving as the Group 3 Sampling Lead was responsible for the sampling efforts in Phase I and Phase II of the project, including both surface sampling and air sampling. This CMAT member also fulfilled the role of sampling quality control (QC), monitor/sampling subject matter expert (SME) and ran all on-ground sampling activities, including creation of sampling maps using the Building Restoration Operations Optimization Model (BROOM), coordination with labs for analysis, and collection and analysis of results for the final report. As Group 3 Sampling Lead, the CMAT member also provided training to all of the samplers who took part in the project. The samplers had one day of classroom and hands-on training before beginning sampling the following day. This method of training samplers who had come from various backgrounds proved to be an ideal approach for future response events.

Phase I of the BOTE Project was completed during May 2011 and Phase II was completed during September 2011. Although the field portions of the two phases are complete, data analysis is still on-going. A comprehensive report is expected to be available in late 2012.

The BOTE test site at Idaho National Laboratory

CMAT reviews sampling map locations during BOTE Phase I

CMAT provides instruction to a sampling team before facility entry during Phase I

Feds and Private Industry Collaborate to Test and Develop Clearance Procedures for Use After a Foreign Animal Disease

A CMAT member decontaminates a truck during the October 2011 sampling event

Environmental characterization, decontamination, and clearance are critical components of a comprehensive public health recovery strategy in the aftermath of a foreign animal disease (FAD) event or a biological agent used in a terrorist event. Rendering plants—facilities that use animal carcasses and by-product materials for the production of tallow, grease, and high-protein meat and bone meal—could play a critical role in the nation's response to a FAD event by assisting in the control of disease and providing a mechanism for recycling animal carcasses into safe and usable products, such as those used in livestock and poultry feed, soaps, cosmetics, and other industries. The National Response Framework requires multi-agency participation in the wake of a FAD and identifies the EPA as the lead coordinating agency for long-term recovery.

As a step in developing clearance goals for returning a rendering plant back to normal operation following a FAD event, the EPA, U.S. Department of Agriculture (USDA), and private industry worked together to evaluate fugitive emissions from the rendering process. The evaluation process included characterizing the biological footprint of the rendering plant, determining a biological surrogate, pre-release sampling, post-release sampling, decontamination of the rendering facility, and post-decontamination sampling.

Under the support of USDA, CMAT and EPA's National Homeland Security Research Center (NHSRC), with assistance from Dynamac Corporation, the Decontamination Analytical and Technical Services (DATS) contractor, conducted a study on fugitive emissions of *B. atrophaeus* (a biological surrogate) from the rendering process. The facility selected for this study was the Darling International, Inc. (Darling) rendering plant located in Des Moines, Iowa. A CMAT member

Top: CMAT and DATS members collect air samples during the October 2011 sampling event

Bottom: The Darling International, Inc. rendering plant in Des Moines, Iowa

served as the EPA Work Assignment Manager (WAM) for the study and was responsible for providing the resources required to perform the scope of work.

In January 2010, CMAT participated in a pre-planning visit to the Darling plant, and in October 2010, the team conducted pre-release sampling at the plant. A total of 24 swab samples, 2 wastewater samples, and 2 field blank swab samples were collected from 13 different locations within the Darling rendering plant by DATS personnel. Two samples were also collected by DATS personnel from adjacent areas to each sample location; one sample was used for community characterization (polymerase chain reaction (PCR)/ deoxyribonucleic acid (DNA) sequencing) and the other was used for culture and enumeration.

Biological

In October 2011, animal carcasses entering the Darling facility were inoculated with the biological surrogate *B. atrophaeus* to simulate a FAD. Following processing of the contaminated carcasses, a second (post-release) sampling event took place. CMAT assisted with sample kit preparation, background sampling, decontamination of the Darling trucks transporting the contaminated carcasses, and during post-release sampling, led a sampling team. In this post-release sampling effort, a total of 124 locations were selected for sampling from throughout the Darling rendering plant (including the process room, grinders, and cooker) and its surrounding vicinity. DATS personnel collected samples from the 34 identified air sample locations and 90 surface and equipment sample locations. Air sample locations were picked randomly and included locales both inside and outside of the plant; outside locations were stationed on all sides of the plant, but the majority of the samples were collected downwind of plant operations. Inside air sample locations were concentrated in high dust areas or areas where crushing and grinding could aerosolize the surrogate or processing could produce items carrying the surrogate.

DATS personnel collected four wipes from each of the surface sampling locations. One wipe (designated as A) was collected for community characterization by PCR, one wipe was collected for enumeration (designated as B), and a third wipe was collected for poly(lactic-co-glycolic acid), or PLGA, identification (designated a C). A fourth sample was collected and stored for archival purposes (designated as D).

Data and lessons learned from this study will be used to develop standard operating procedures (SOPs) to appropriately contain fugitive emissions and clear a rendering facility for normal production following a FAD event.

NHSRC's Paul Lemieux contaminates incoming carcasses with B. atrophaeus (a biological surrogate) to simulate a FAD event

Inactivation of Anthrax Spores in Decontamination Wash Down Liquid Wastes

Cleaning up Capital Hill and U.S. Postal Service locations after the *B. anthracis* attacks in 2001 resulted in generation of solid and liquid wastes. In an endeavor to dispose of those liquid wastes, the EPA treated the liquids to inactivate the spores and subsequently analyzed the liquids to verify inactivation. Despite these efforts, wastewater treatment plants (WWTPs) were still reluctant to accept the liquid wastes. In the end, the inactivated liquid waste was further treated by incineration, adding to the cost of this already costly undertaking. At the request of Region 4 On-Scene Coordinator (OSC) Ken Rhame, CMAT established a working group consisting of CMAT members, Region 4 OSCs, the Environmental Response Team (ERT), NHSRC researchers, and representatives from a county WWTP to develop field guidance for site treatment, conveyance, and acceptance of bio-liquid wastes at a local WWTP.

NHSRC data was used by ERT to create a National Response Team (NRT) *Quick Reference Guide: Bacillus anthracis PPE Wash Water Decontamination*. This quick reference guide was a first step in the process; additional research questions have since been formulated by the working group to expand the scope of this document to include all liquid wastes from a biological incident. These research questions include:

- What type and how much sampling is needed to verify disinfection?
- What percent of bleach is needed for inactivation?
- Can percentage of bleach be reduced as contact time is increased from minutes to hours and even days?
- Is acidification of the bleach solution needed and helpful?
- How does temperature affect efficacy?
- Is de-chlorination needed prior to WWTP acceptance?
- How do suspended solids affect efficacy?
- When waste liquids sit for long periods, do the spores settle out?
- Does settling of solids and spores affect efficacy of treatment?
- Will mixing ameliorate settling?
- What is the fate and transport of spores in a WWTP?

NHSRC will continue to design and conduct research to answer these questions and provide a basis for the expanded field guide.

Wash down waste liquid

Use of Methyl Bromide for Anthrax Emergency Response

Methyl bromide (MeBr) may have a significant impact on timely emergency response to a wide-area anthrax incident by increasing the capacity to decontaminate the area. At elevated concentrations, MeBr has been shown to be efficacious for decontamination of *B. anthracis*, and there is currently one manufacturer in the U.S. who produces seven million pounds of methyl bromide annually, keeping one million pounds in stock at any given time. Prior to the phase out of MeBr structural fumigation in 2005, fumigators used methyl bromide for pest control. Many other substitutes for MeBr, such as sulfuryl flouride, are applied in a similar manner. With this institutional knowledge of how methyl bromide is applied, the structural fumigation industry could potentially be deployed for MeBr fumigation in response to a *B. anthracis* attack.

Although familiar with methyl bromide application, the industry is not permitted to perform MeBr structural fumigations any longer, so no efforts have been made in recent years to improve the fumigation process. For this reason, EPA has taken on the task of improving the MeBr fumigation process for emergency response

use. In preparation for such a response, methyl bromide was recently used during Phase II of the multi-agency BOTE Project. Based on that deployment of MeBr, a draft removal action plan (RAP) was written by CMAT and reviewed by OSCs, NHSRC, and the University of Florida School of Structural Fumigation. Comments have been incorporated into the draft RAP, but further research is needed to close several gaps identified in the plan. Next steps in the project include:

- Completing the development of the Methyl Bromide RAP and health and safety plan (HASP) (both currently in draft);
- Developing an ambient air monitoring plan; and
- Work with NHSRC's researchers on essential data gaps, such as the containment and capture of MeBr during fumigation and determining process dependence on temperature and relative humidity.

Collaboration between NHSRC and CMAT

In addition to the BOTE Project, rendering plant emissions study, and MeBr and bio-liquid waste guidance development, CMAT and NHSRC are collaborating on several other projects that could prove useful in the event of a biological release. CMAT, along with several OSCs, are assisting NHSRC on the ***Development of an Automated Floor Sampling Device for Bacillus anthracis Spores and the Systematic Evaluation of Aggressive Air Sampling for Bacillus anthracis Spores.*** Both are DHS science and technology (S&T) Wide Area Recovery and Resiliency Program (WARRP) projects, and both have the potential to reduce the sampling burden following a biological contamination event.

The automated sampler project evaluates commercially-available robotic floor cleaners for *B. anthracis* spore sampling capability. The benefits of using this type of sampling device following a wide-area attack include: whole room or floor/ composite sampling, lower exposure risks, time and cost savings, reduced numbers of personnel, reduced burden on processing labs (composite sampling), and lower risk of cross-contamination.

The air sampling project evaluates the asbestos aggressive air sampling (AAS) method to determine its potential use for *B. anthracis* spore sampling and compare its efficacy to that of standard surface sampling methods. The aggressive air sampling method would be beneficial following a biological release because it would allow for numerous building interiors to be sampled rapidly, with fewer personnel, and with much fewer laboratory resources than required for discrete collection methods.

Automated floor sampling device

During an exercise in Florida, a structure is tented prior to fumigation with methyl bromide

For more information on the BOTE Project, see the article starting on page 14 of this report.

Seeking to Understand: Commercial Industry Bio Decontamination Resource Survey

CMAT, in collaboration with NHSRC, developed a questionnaire for distribution to a defined list of biological remediation companies that could be called upon to assist EPA's clean-up efforts following a wide-scale biological release event. The goal of the survey was to better understand the availability and capabilities of existing commercial decontamination resources. The questionnaire provided a simple scenario and posed a few relevant questions. Responding to the survey was strictly voluntary. The intent of the effort was to be inclusive of several types of companies that provide different types of decontamination services, some of which may be directly applicable to a large area environmental clean-up and others that serve important niche functions. It is anticipated that information from this survey will be saved in a database for future access and use by Agency response personnel.

Response Resources

Increasing Biological Response Resources: Bio Task Force Leader Training Development

CMAT developed a draft training curriculum intended to be used in training supplemental responders for biological remediation clean-up. Curriculum topics included basic information on potential pathogens, low-tech decontamination approaches, sampling procedures, and safety and health. Currently, the training is envisioned as a multiple-day course with a special emphasis on field training skills, although the content of the curriculum could be varied to meet the level of experience and backgrounds of the participants.

Community Engagement and Case Analysis: Methods for Developing Post-Incident Risk Communication Guidelines for an Intentional Biological Environmental Contamination

CMAT, NHSRC, and several academic collaborators from the University of Kentucky have developed a working relationship with the shared objective of analyzing existing case studies of biological contamination, critiquing post-incident risk communications, and developing more effective communication guidelines.

The aim of this project is to analyze lessons learned and develop more effective risk communication products to be used following a significant biological release, such as pre-scripted messages intended for specific stakeholders. The focus of the effort is on the environmental clean-up issues that accompany the decontamination, clearance, and recovery processes. Specifically, guidelines and documents will be developed to address the following:

- Best practices in risk and crisis communication;
- Lessons learned from robust case studies;
- Principal population segments to be targeted by post-incident communications;
- Distinct stakeholder group characteristics, such as base-knowledge, values, beliefs, etc;
- Self-identified group information needs;
- Stakeholder groups' preferred information modes;
- Specific stakeholder groups' most and least trusted information sources; and
- Opportunities to combat community knowledge gaps related to environmental contamination and incident response.

National Biological Agent Response Tactical Guidebook

CMAT is leading the development of the National Biological Agent Response Tactical Guidebook. The concept of the guidebook was developed by the National Biological Response Group (consisting of the EPA BioWatch OSCs, CMAT, and NHSRC) to provide all of the information that an OSC would need to respond to a biological release. In creating the guidebook, the National Biological Response Group planned the outline of contents and where necessary, drafted original sections.

The goal for this document is to address any current gaps in guidance for biological response, summarize all existing guidance, and include resources that may be accessed for additional information. The complete document will be very extensive and contains many appendices, so a field guide will be developed to highlight the most pertinent information and provide reference to the additional information that can be accessed in the full Guidebook.

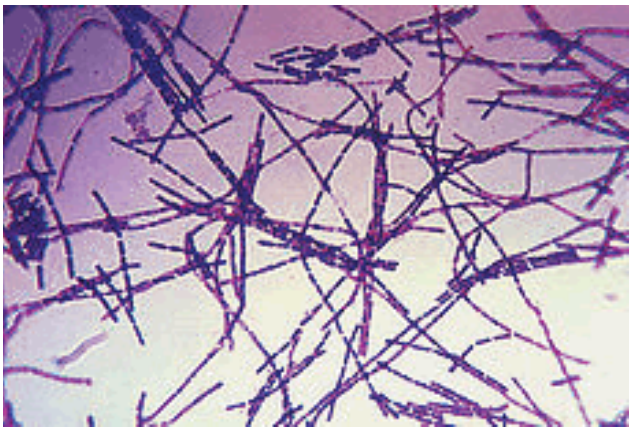
CMAT is in the process of summarizing other relevant guidances and combining these with the materials developed by the National Biological Response Group using consistent language and uniform format. The first review of the Guidebook will be completed by the National Biological Response Group in FY 2012 before it is sent to the full EPA response community for comment. The field guide will be developed from the Guidebook and will be sent through the same review process.

Interim Clearance Guidance for Environments Contaminated with Bacillus anthracis

If a *B. anthracis* incident occurs in the United States or within its territories, the public health and environmental response communities must work collaboratively during the response to most effectively address the risks posed by the incident. The ultimate goal is to effectively and efficiently remediate the environment so that local or state public health officials or private building owners can make follow-on decisions.

To that end, CMAT met with a group of experts from the Centers for Disease Control (CDC) and EPA to discuss the current state-of-the-science and most practical approaches to risk assessment, sampling strategies, decontamination technologies, and operational logistics as they relate to the development of a clearance strategy. The clearance strategy is defined as the approach used to meet a pre-defined clearance goal and the associated process to determine that the goal has been achieved. *The Interim Clearance Guidance for Environments Contaminated with Bacillus anthracis* was developed as a result of this meeting and is a living document that will be updated as the state-of-the-science changes. This strategy document is complementary to the broader overarching 2009 Office of Science and Technology Policy (OSTP) draft document, *Planning Guidance for Recovery Following Biological Incidents*.

The *Interim Clearance Guidance* is intended for use by federal public health and environmental responders supporting the Incident Command/Unified Command (IC/UC) to clear a building or outdoor environment after an incident involving contamination with *B. anthracis.* This guidance document was finalized by the EPA in July 2012 and is currently undergoing a final review by CDC. The clearance goal described in the document will remain the same, and following CDC review the document will be available on CDC's anthrax website.



Photograph of a Gram stain of the bacterium Bacillus anthracis, the cause of the anthrax disease (source: Wikipedia)

Subway Biological Response Working Group

Following a request by OSCs, CMAT led the development of a working group focused on responding to the release of biological agents in a subway system. Initially, membership in the group was limited to EPA OSCs from Regions with subway systems, CMAT, and ERT, with the OSCs being asked to share information from their state, local, and other response organizations. As the mission of the group is refined, membership may be expanded to include participants from state and local governments, as well as the national laboratories.

Working with a lead OSC, a mission statement for the group was developed as follows:

Identify and address gaps related to a response in a subway system, primarily to a biological agent. Provide a mechanism to share lessons learned, research advances, and best practices across EPA Regions, EPA OEM and ORD, State and Local government organizations, the private sector, and other research institutions on all aspects of a response in a subway system.

Initially, the group is working to collect existing guidance and information relevant to biological response in a subway system. A review of that information and a gap analysis will be performed to prioritize the group's next steps. The group meets at least monthly via teleconference to discuss topics decided on by the group leads and based on the group's priorities, but may also work independently to address identified issues. Meetings primarily focus on addressing gaps identified by the group, but also allow for report-outs on activities across the country (such as subway response training and exercises) and presentations on critical topics or new technologies relevant to the group. The current priorities identified by the group are:

- Gap identification
- Health and safety
  - Site access to subway and adjacent areas for sampling teams
  - Hot versus cold zones
  - Personnel decontamination (methods, locations, etc.)
  - Vehicle decontamination (methods, locations, etc.)
  - Preventing or addressing cross contamination
  - National best practices
  - What plans are available? Should there be national guidance?
- Opportunities for exercises (including the potential for a full-scale exercise sponsored by the workgroup)
- Decontamination
  - Rail car
  - Subway station
  - Subway tunnels
- Others to be determined by the group

BioWatch

BioWatch is a DHS air monitoring program that serves as an early warning system for detecting pathogens that have been intentionally released. Public health and other local and state officials use this early detection system to initiate a situational assessment and to transition rapidly to appropriate emergency response, medical care, and consequence management plans. The combination of early warning and rapid public health response can substantially minimize the potentially catastrophic impact of these types of releases on the population.

The BioWatch program is operational in more than 30 of the largest metropolitan areas in the United States. CMAT manages the $1.25 million Interagency Agreement between EPA and DHS, which designates EPA as the lead for writing sampling plans, training locals, performing sampling, and participating in special events. Throughout the past year, EPA wrote and updated site-specific sampling plans for every monitor in the network. OSCs attended trainings and exercises (such as BOTE Project exercises or the CMAT-Office of Criminal Enforcement, Forensics, and Training (OCEFT) sponsored cross-training in Charleston, South Carolina) to keep proficient in biological environmental sampling, and executed trainings and exercises in their own jurisdictions to train locals, Superfund Technical Assistance Response Team (START) contractors, and/or Civil Support Teams (CSTs) to be primary sampling teams where appropriate. The OSCs also provided technical or operational support for special events, namely the Asia-Pacific Economic Cooperation (APEC) summit, North Atlantic Treaty Organization (NATO) summit, G8 summit, Republican National Convention (RNC), and Democratic National Convention (DNC).

Obviously, the work EPA has been doing with BioWatch is important. However, it is the unintended consequence of relationships fostered with the locals that has a major positive effect. With nearly 40 years of environmental sampling and response expertise, EPA is a respected partner with the locals. These relationships transcend biological response incidents and allow other responses to flow more efficiently and effectively.

BioWatch automated sampler

Biological OSC Group and Biological Steering Committee

Since every Region had one OSC dedicated to BioWatch work, it became a logical springboard to draw from this pool when issues concerning overall biological response came up. Originally, BioWatch OSCs met face-to-face at least once a year and via conference call at least monthly. In addition to these BioWatch updates, the OSCs were also solicited for thoughts and suggestions concerning biological response issues or projects. Realizing that EPA could be better served by not taking OSCs away from other work, the decision was made to convene a Biological Steering Committee.

The purpose of the Biological Steering Committee is to bring together key EPA personnel from the Offices, Regions, and Special Teams to coordinate and facilitate biological response preparedness activities. The steering committee collects information, prioritizes operational needs, and evaluates recommendations, then communicates these recommendations to senior staff and removal managers, seeking support to move projects forward. With representation from different groups who have a stake in biological response it was thought that this group could more efficiently and effectively prioritize and evaluate biological issues of interest, with the goal of attaining national consistency.

Specifically, the Biological Steering Committee engages in the following activities:

- Coordinating national BioWatch issues;
- Developing and/or enhancing Conduct of Operations for Special Events planning;
- Supporting and coordinating EPA's Bio-Guide;
- Evaluating core National Approach to Response (NAR)-CBRN activities specific to biological preparedness;
- Developing a proposal for high-hazard training, preparedness, and exercising; and
- Developing a communication agenda for the team.

While these six items are just a start, new activities can be added as the Steering Committee deems appropriate. The Biological Steering Committee meets via conference call on a monthly basis and face-to-face at least once a year, as travel budgets allow. Since the Steering Committee has taken the bulk of the biological response coordination work from the BioWatch OSC Group, the BioWatch OSCs meet on a less frequent basis—usually via quarterly conference calls and one face-to-face meeting annually, as travel budgets allow.

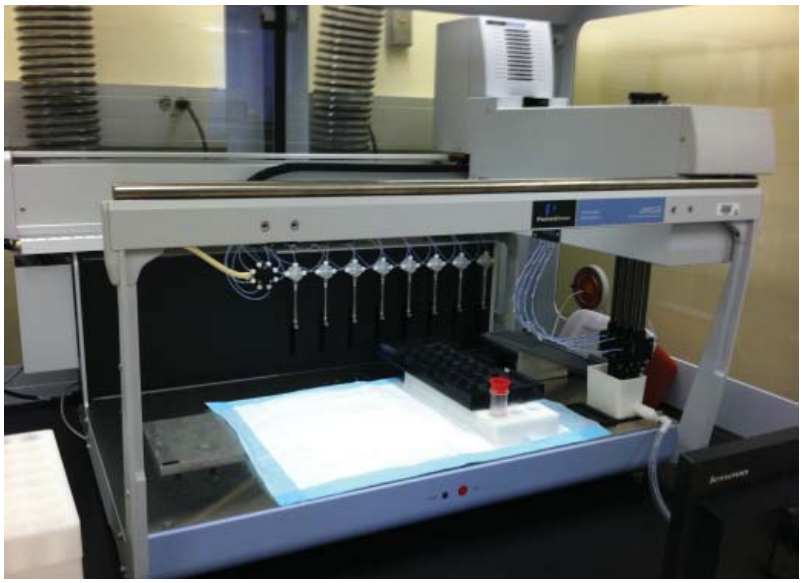
Increasing Lab Capacity: RV-PCR Method and Equipment

If there is a wide-area anthrax release, EPA currently relies on the CDC LRN for the processing of environmental samples. However, the LRN informed EPA that there will be a tremendous backlog on sample processing, with priority given to clinical samples. As a result, CMAT is looking to build an internal EPA capability and capacity to process environmental samples for remediation.

Laboratory capacity remains one of the biggest impediments to progress in a wide-area release scenario. The CDC's method of culture is known as the gold standard with respect to laboratory analysis; however, this method is time consuming and the materials generated would most likely exceed the spatial constraints of the laboratory, even if the LRN were to dedicate all resources toward the analysis of environmental samples.

In order to remedy this issue, EPA's NHSRC, along with the Lawrence Livermore National Laboratory (LLNL), created a laboratory method that can assess the viability of *B. anthracis* from an environmental sample in much less time. The method is called Rapid Viability Polymerase Chain Reaction (RV-PCR). Although technically still a research method, the scientists at NHSRC believe this method could be used operationally if an incident were to occur tomorrow.

Appreciating the utility of this method, OEM purchased laboratory equipment to outfit three laboratories, rendering them capable of running the RV-PCR method. EPA's Ft. Meade laboratory will serve as EPA's hub for RV-PCR work in the Environmental Response Laboratory Network (ERLN). At this lab, all of the equipment has been installed and five scientists have been trained to carry out the RV-PCR method. The Ft. Meade lab also participated in the analysis of samples from both phases of the BOTE Project.



Equipment to conduct RV-PCR method

The goal of making a new method operationally successful is the ability for any lab to perform the method seamlessly, with little intervention from the lab that developed the method. To that end, LLNL will be conducting a two-week training in September 2012 at the Ft. Meade laboratory to troubleshoot any apparent issues with the method. The Ft. Meade lab will then continue with monthly proficiency tests.

The second laboratory that received equipment was the University of Cincinnati laboratory; EPA employees and contractors work in this lab under a cooperative agreement. The equipment is operational at this laboratory; however, CMAT is still in the process of working out an agreement for training.

Lastly, equipment was sent to the EPA's National Evidence Investigation Center (NEIC) laboratory in Lakewood, Colorado. This laboratory has not been commissioned or certified, so NEIC is currently supporting a detailee to get the lab operational. A General Services Administration (GSA) contract is being established to make modifications to structures in the lab and perform needed electrical work. CMAT has purchased some general laboratory equipment as well, and once all of the modifications are complete, the equipment will be set up and programmed accordingly.

ASPECT Conducts Radiological Survey of St. Croix, Virgin Islands

Until earlier this year, St. Croix, Virgin Islands, was the home of HOVENSA, LLC, the second largest oil refinery in the United States and one of the ten largest in the world. Before it ceased production, HOVENSA processed about 550,000 barrels of crude oil daily, accounting for some 20% of the Virgin Islands' gross domestic product.

Oil leaks from HOVENSA's processing and storage facility have contaminated St. Croix's most productive aquifer, with plumes of oil floating on groundwater and ultimately out to the Caribbean Sea. An estimated 900,000 to 2 million gallons of oil were released by HOVENSA and an adjacent plant, St. Croix Alumina, between approximately 1978 and 1991. Under the requirements of HOVENSA's 1999 Resource Conservation and Recovery Act (RCRA) Operation Permit, the company is addressing cleanup of the spilled oil under EPA oversight; this process is expected to take 5 years.

In 2010 and 2011, HOVENSA experienced a number of chemical releases, some of which affected residents of surrounding communities. A release in December 2010 lasted 8 minutes and included a mixture of oil-related chemicals and hydrogen sulfide; that release affected more than 200 students from nearby St. Croix Central High School, including 36 who received treatment at a local hospital. During May 2011, additional releases shut down class at the high school when students reported foul smells that made them nauseous, burned their eyes, and caused nose bleeds.

Survey boundaries for radiological (St. Croix Alumina) and chemical (HOVENSA) surveys.

In January 2011, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Justice, and HOVENSA, LLC entered into a consent decree, which stipulated that HOVENSA would pay a $5.3 million penalty for Clean Air Act violations and spend more than $700 million on new pollution controls for its refining operations.

> ***"The ASPECT twin engine aircraft is the only aircraft in the nation with remote chemical, radiological, and photographic detection capabilities."***

Requirements under the settlement included upgrading and adding pollution controls, making emission limits more stringent, aggressively monitoring emissions, and improving leak-detection and repair practices to reduce emissions from refinery equipment and process units. The St. Croix Alumina site was another source of contamination in this area of the island. Before it was shut down in 2001, the plant had operated for at least 30 years extracting alumina from an ore called bauxite. This process produced a residue called "red mud," which contained the naturally-occurring radioactive materials thorium-232 and radium-226. St. Croix Alumina had several releases of red mud from its containment ponds during heavy rains, and as the mud flowed from the ponds toward the ocean, it contaminated sensitive mangrove lagoons.

In the summer of 2011, EPA deployed the Airborne Spectrophotometric Environmental Collection Technology (ASPECT) aircraft, which is managed by the Consequence Management Advisory Team (CMAT) to conduct airborne chemical and radiation surveys over the HOVENSA and St. Croix Alumina sites. The ASPECT twin engine aircraft is the only aircraft

Radiological and Nuclear

in the nation with remote chemical, radiological, and photographic detection capabilities.

EPA initiated ASPECT shortly after the terrorist attacks of September 11, 2001 and has responded to more than 110 incidents, including the 2010 BP Gulf oil spill. ASPECT, which was developed by EPA in partnership with the U.S. Department of Defense (DoD), uses high-resolution digital photography, video, and global positioning system (GPS) technology, combined with navigation data, to produce a picture of the contaminated area or dispersion cloud of contamination. That information is then wirelessly transmitted to the ground in as little as 5 minutes, to be used immediately for homeland security, emergency response, and EPA monitoring actions.

Using state-of-the-art equipment, ASPECT collects radiological data every second and chemical data 70 times per second, along with GPS coordinates and other reference information, as the aircraft flies predetermined flight lines over the sampling area. ASPECT is operated by two pilots and one technician; additional scientific staff support the surveys from the ground.

On a radiation sampling mission, ASPECT collects data on gamma radiation—a naturally-occurring type of radiation that occurs at background levels in soils around the world and is produced by the decay of radioactive elements. Measurements taken by ASPECT are then compared to background levels to assess whether excess levels of radiation exist in the area of interest.

The radiation survey of the St. Croix Alumina site covered 3,700 acres over the site and adjacent neighborhoods. ASPECT collected more than 2,300 one-second gamma radiation measurements and only 16 of those measurements indicated an excess of the radioactive element, thorium; all of these results were associated with the red mud pile. Analysis of the survey results suggested that the average exposure rate from the red mud was about 9 times higher than local background.

The chemical survey conducted by ASPECT covered approximately 8,000 acres over the St. Croix Alumina site, HOVENSA LLC, and several neighborhoods to the north. ASPECT's detection capability includes an "airborne library" of 72 chemicals and a manual library of 526 chemicals that could affect human health. ASPECT collected more than 65,000 data readings, but none of these chemicals were detected during sampling. Manual analysis of the data collected over the HOVENSA, LLC refinery showed high concentrations of ozone,

Flight lines for the radiological survey over St. Croix, Alumina site

Flight lines for the chemical and photographic surveys over St. Croix, Alumina and HOVENSA sites

mostly over or slightly downwind of the refinery. Ozone is a common product of reactions involving hydrocarbons and nitrogen oxides, and those classes of compounds seem to have been emitted from the refinery in sufficient quantities to generate ozone. A few readings directly over the red mud pile on the St. Croix Alumina site showed trace levels of ammonia (near the detection limits of the equipment used).

CMAT, with contract support from Dynamac Corporation (a subsidiary of Consolidated Safety Services, Inc.) and ARRAE, Inc., produced a report on the findings of the ASPECT deployment. This report contains technical information on the data collection protocols and the equipment used, as well as more detailed information on the findings of the sampling.

Exposure Rate Contour
St. Croix Alumina Survey
July 19, 2011

Parameter	Exposure Rate (microR / h)		
	< 5.0000		15.000 : 17.500
	5.0000 : 7.5000		17.500 : 20.000
	7.5000 : 10.000		20.000 : 22.500
	10.000 : 12.500		22.500 : 25.000
	12.500 : 15.000		> 25.000

Flight Parameters
500 ft. altitude
250 - 500 ft. line spacing
110 knots
1 second aquisition time

The exposure rate measurements shown in the figure above represent only terrestrial radiation from naturally occurring radionuclides: potassium, uranium, and thorium. Cosmic radiation contributes an additional 3.2 μR/h to these values. To properly compare these measurements with ground-based measurements, one must either subtract 3.2 μR/h from the ionization chamber measurement or add 3.2 μR/h to the ASPECT results.

This image should not be used independently to assess potential health risks.
Additional information is necessary to make appropriate health-related decisions.

Airborne Radiation Surveys For Spokane Tribe of Indians

The Airborne Spectrophotometric Environmental Collection Technology (ASPECT) aircraft

In 2007, EPA Region 10 began a project, in coordination with the Spokane Tribe of Indians, to conduct radiation surveys on the Spokane Indian Reservation located approximately 30 miles northwest of Spokane, Washington. This area of Washington was mined for uranium ore from the 1950s until the 1980s. The survey area comprised approximately 40 square miles, including the former Midnite Mine, Dawn Mill, and Sherwood Mine.

The Midnite Mine deposit was discovered in 1954 on the Spokane Indian Reservation. The uranium was contained in autunite, uraninite, and coffinite, with gangue minerals, pyrite, and marcasite deposits. The mine was operated from 1955 until 1981 by Dawn Mining Company (DMC). DMC is a subsidiary corporation owned by Midnite Mines, Inc. and Newmont Gold, Inc. The property is leased by DMC from the Spokane Tribe and individual tribal members; leases of this sort are administered by the United States Bureau of Indian Affairs (BIA).

During mining operations, uranium ore was transported from the Midnite Mine to Dawn Mill, some 25 miles east of the mine, just outside the reservation boundary. Mining operations produced approximately 2.9 million tons of ore, averaging 0.2% uranium oxide, over the life of the mining operations.

The Midnite Mine is currently inactive and was listed as a Superfund site on May 11, 2000. The mine contains two open pits and several backfilled pits containing approximately 2.4 million tons of stockpiled (uranium oxide) ore and 33 million tons of waste rock, which contribute to elevated levels of radioactivity at the site.

The final cleanup plan for the Midnite Mine site was issued September 29, 2006 and called for a cap over the backfilled pits containing mining waste; consolidation and engineered containment of the remaining waste in the two open pits; removal of water entering the pits; and operation of a treatment system to treat contaminated water from the pits and seeps.

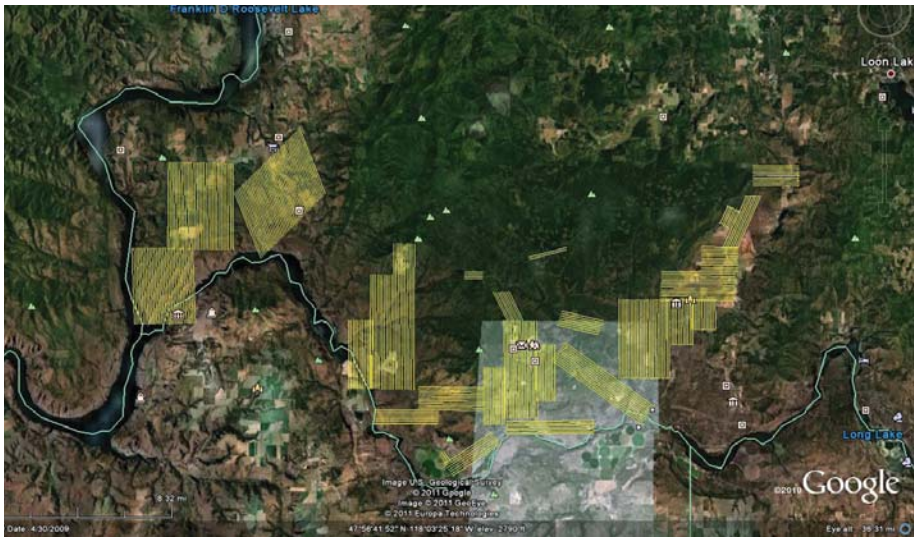
From September 17 through September 22, 2011, the ASPECT program conducted an aerial survey of the nearly 40 square miles of land near Spokane, Washington. The aerial survey included both radiological and photographic surveys of the former uranium mines and adjacent areas to determine if residual contamination was present.

Roughly 25,000 one-second spectra were collected and analyzed for exposure rate, equivalent uranium (eU) concentration, and statistical analysis (via SigmaPlot). The results of the radiological analyses showed:

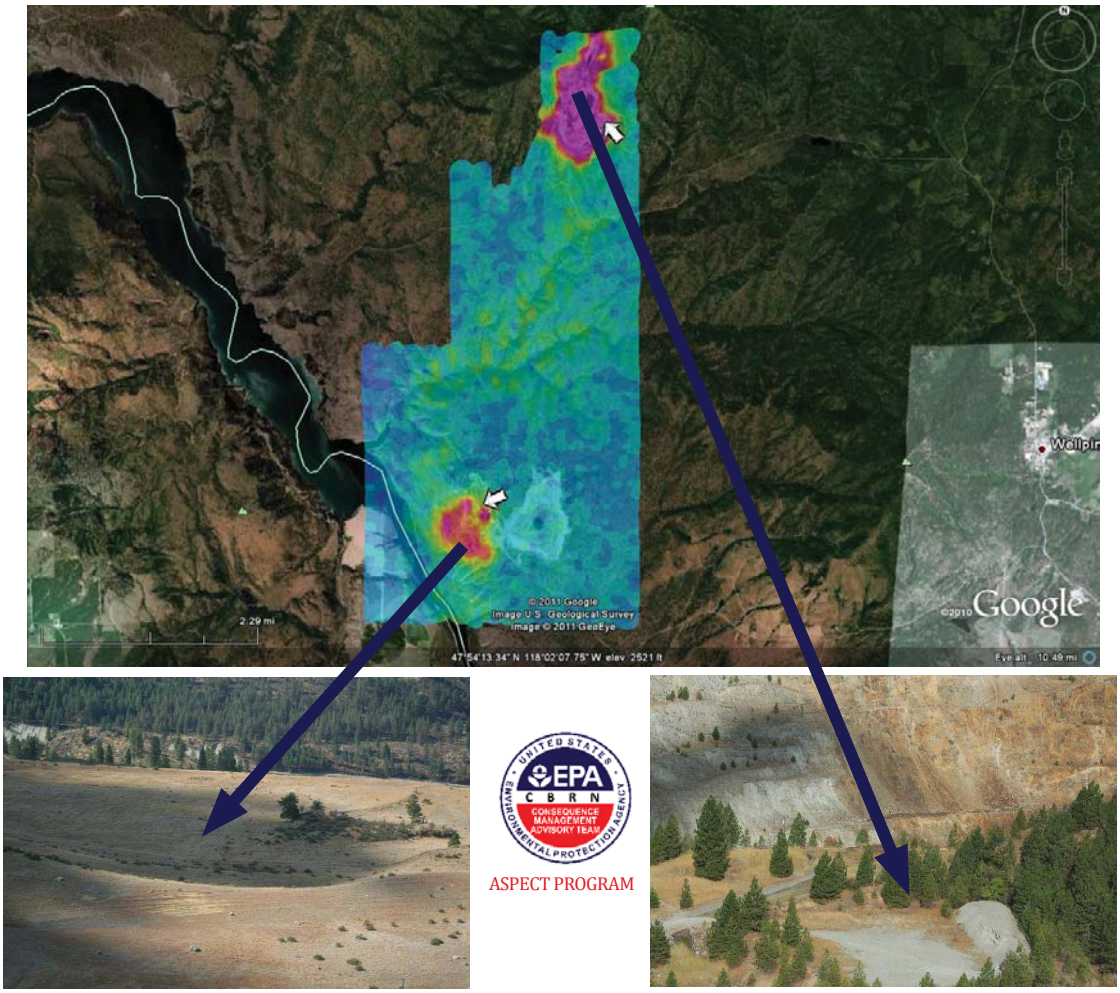
- Three distinct areas had exposure levels that exceeded 25 µR/h. These were the Midnite Mine, Sherwood Mine, and Dawn Mill areas.
- Of the nearly 25,000 data points taken, 733 indicated eU in excess of 2 standard deviations from the normal background (mean), while 84 were greater than 4 standard deviations from the mean, and 42 were greater than 6 standard deviations from the mean value.
- All of the data above 6 standard deviations from the mean were located at Midnite Mine or Dawn Mill.
- Of the 42 data points between four and six sigma, 35 were located at Midnight Mine or Dawn Mill; the other 7 points were found in the McCoy Lake area, East Sherwood, Martha Boardman East, and the New House area.
- Two of the seven points of potential interest were likely due to the extremely challenging terrain in the area and not associated with actual elevated eU concentrations; one of these is located on "The Farm" and the other in South Martha Boardman 2.

Spokane Tribe of Indians Airborne Radiological Survey — September 17 - 22, 2011

Approximately 600 downward-looking aerial and 200 oblique aerial photographs were also taken over the entire survey area. These photos were meant to record the actual conditions of the site at the time of the survey and could indicate differences from standard Google Earth images. All imagery, including radiological data and digital photos are available for viewing in a Google Earth application.



Survey flight lines for the Spokane Reservation radiological survey



ASPECT PROGRAM

Approximately 200 oblique photographs were taken over the entire survey area and have been geo-referenced for incorporation into Google Earth or other geospatial software applications. Oblique photographs were taken out the right side of the plane at an angle consistent with the direction of the white arrows in the figure above. The oblique photographs shown here are of Midnite Mine (left) and Sherwood Mine (right). Access to the photos is available by contacting Ellie Hale, Region 9.

Ongoing ASPECT S & T Projects

Radiological Sensor and Software Development

A number of radiological science and technology (S & T) enhancements were made to the ASPECT system including the addition of upward looking sodium iodide detectors to the airborne sensor package, the incorporation of an automated anomaly detection algorithm, and the incorporation of a pattern recognition algorithm for cesium-137.

An upward looking sodium iodide detector was installed in the aircraft and permits the cosmic contribution to the total gamma count to be removed in real-time as survey data is being collected. This reduces the need to collect separate high altitude cosmic survey lines and permits a more accurate cosmic removal technique since each data point collected by the downward looking sodium iodide sensors can be compared to an upward looking sample point. It is anticipated that the new configuration will be optimized as part of the Albuquerque Balloon Fiesta (ABF) and during an upcoming calibration exercise.

A new anomaly detection algorithm has been installed in the aircraft which permits unknown isotopes to be identified and tagged for subsequent analysis by the ground team. This algorithm provides a visual indication to the system operator that a potential isotope may be present in the raw data. The system operator can then notify the ground team that an unknown isotope was observed and data can be pulled from the aircraft using the satellite system and then analyzed with various software tools. The anomaly algorithm was tested during the Gryphon test and has been optimized for routine service.

Additional high end software algorithms were developed for the ASPECT radiological sensors to utilize a form of pattern recognition to detect cesium-137. This method uses a combination of digital filtering and software training to permit very low level signatures of cesium-137 to be extracted from the raw data. The method was tested using a data set collected as part of the Federal Emergency Management Agency (FEMA) Nuclear Incident Response Team (NIRT) project conducted at the Nevada Test Site. An old weapons contamination field was surveyed and processed using both the traditional U.S. Department of Energy (DOE) methods and the new pattern recognition method. The pattern recognition method provided a more detailed map of the contamination field and failed to false alarm on natural geological structures as was evident in the DOE methods. The program is currently planning to expand the pattern recognition method to include other common isotopes.

View of gamma spectrometer in ASPECT plane

ASPECT Conducts Surveys for Region 6

Ambrosia II Radiological Survey

At the request of EPA Region 6, a radiological survey was conducted in a former uranium mining area 20 miles north of Grants, New Mexico. This survey was called the Ambrosia II survey and was initiated on October 5, 2011, while ASPECT was deployed to support the 2011 ABF. The purpose of the survey was to locate and assess potential onsite and offsite impacts from the previous mining operations. The survey area encompassed approximately 30 square miles and required one day to complete. Preliminary radiological products including a total 5,000 feet above ground level photo survey were provided to the remedial project manager in 2 days.

View of chemical detection system in ASPECT plane

Sharing Lessons Learned (Chernobyl Video Series)

What a Radiological Event Entails, the Aftermath, and the Recovery Process

In an age in which terrorist attacks are becoming more frequent and more lethal, an attack on the United States that releases radiation—the explosion of a "dirty bomb" or improvised nuclear device—is a frightening and very real threat. Such a radiological assault would aim to inflict mass casualties, widespread panic and disruption, and could cause contamination that lasts for months or even years after the event.

U.S. government agencies at the state, local, and federal levels are preparing for such an event and have been rehearsing the emergency responses that would occur immediately after such an attack. But how would the nation cope in the aftermath of the event? What could we do to recover from its longer-term consequences?

The long-term recovery lessons learned from the 1986 Chernobyl Nuclear Power Plant disaster help to answer these questions. The accident at Chernobyl resulted in unprecedented radiological contamination of a densely inhabited area. Local and national authorities were not prepared for an incident of such size and severity. It caused major economic, social, and psychological hardships to those living in the region. The Soviet response to that disaster and the analyses that followed give us insights into what does and does not work in responding to such a situation.

At 1:23 a.m. on April 26, 1986, operators in the control room of the Chernobyl Nuclear Power Plant Reactor #4 committed a fatal series of errors during a systems test, triggering a meltdown and explosion that resulted in the world's largest nuclear accident to date. A fire burned for 10 days, and the radioactive fallout from the explosion spread over tens of thousands of square miles, driving more than a quarter of a million people permanently from their homes.

When Soviet authorities finally ordered the evacuation of the 150 villages located within a 19-mile radius of the power plant, the hasty departure of residents often meant leaving behind their most personal belongings. The Soviet Union admitted to the world that the accident had occurred three days after the explosion, only when scientists in Sweden noticed radiation on their shoes before entering a nuclear facility. The explosion at Chernobyl unleashed radiation that more than tripled the world's background radiation level.

Today, the Chernobyl Nuclear Power Plant sits inside a fenced area known as the Exclusion Zone. Radioactive remnants of the failed reactor linger inside a sarcophagus—a 24-story concrete and steel encasement—hastily erected after the accident. Leaky and structurally unsound, it now threatens to collapse. A new, safer confinement structure is currently being designed to address the shortcomings of the sarcophagus and to further isolate the reactor

Chernobyl Plant after the 1986 explosion and fire

core and the most contaminated wastes for the next 100 years.

There are many high quality sources of public information about the health, environmental, and socio-economic issues associated with radiation exposure. If a radiological emergency were to occur in the United States, government and news sources would provide information to guide those being affected, but the U.S. could be better prepared and the terror associated with such an event could be greatly reduced by improving public awareness and helping people educate themselves on the issues associated with a possible radiological emergency.

To this end, CMAT produced a video that examines the basics of what a radiological attack on the United States would involve and what the countermeasures and restoration actions taken after the Chernobyl accident tell us about what to expect following such an event. The video reviews: basic concepts and terms about radiation and radioactivity; the four types of incidents that might result in the exposure to or release of radioactive materials; radiation exposures and the effects resulting from a radiological exposure device (RED), radiological dispersal device (RDD), improvised nuclear device (IN), or targeted attack on a nuclear power plant or installation; how people in the region reacted to the Chernobyl incident and the measures they took to cope with the accident; and how the cleanup of Chernobyl proceeded and what life was like in the affected areas.

The video contains reports of two women with first-hand, personal experiences living in the aftermath of Chernobyl that provide perspective on how people in the region reacted to the incident. The first is Larisa Leonova, a chemist with the EPA, who was one of the early responders to the Chernobyl event. At the time of the accident, she was managing a laboratory in Moscow on a part-time basis, while earning her PhD in chemistry. Larissa volunteered to help with the response and traveled to Kiev several weeks after the incident. She worked in the area around Pripyat, the town nearest the reactor, trying to convince local residents to leave the area.

The second is Vira Yakusha, a computer scientist with a consulting firm in Fairfax, Virginia. At the time of the accident, Vira was a resident of Kiev and a recent graduate of Kiev University. Vira was pregnant with her first child, and she brings the perspective of an expectant mother and member of the general public reacting to the events occurring around her.

Using the first-hand accounts of Larissa and Vira, the video explores several key aspects of the recovery: countermeasures to reduce exposure to the radiation released during the incident; coping with contamination of the food supply; and special health concerns associated with the accident for pregnant women and their children.

Top: Vira Yakusha with her daughter, born in Moscow four months after the Chernobyl incident

Bottom: Vira, now a computer scientist in the United States, with her daughter in 2011

The CMAT video can be viewed at:

www.epa.gov/emergencies/content/community/multimedia.htm

Refresher Training Continues to Better Prepare Agency for Radiological Events

Approximately 30 of the existing EPA Radiation Task Force Leaders (RTFLs) attended on-site, live agent refresher training at the Volpentest HAMMER facility in Richland, Washington during October 2011. The refresher training consisted of three days of lecture, hands-on instrument use, and exercises and demonstrations. The training concluded with an all-day full-scale exercise involving an outdoor contamination simulation where measurements and samples were collected, and a full Level C decontamination (decon) line was staffed and operated.

In the classroom, students had opportunities to regain familiarity with the same equipment they used during their 2-week initial course. Instructors helped guide activities and calibration checks and provided tips for operation and use

The full exercise required a significant amount of equipment support, including air samplers, detectors, ion chambers, sample supplies, decon line supplies, and lots of personal protective equipment (PPE)

Decon activities can be challenging outdoors. Here tarps, tables, bags, and boards are seen. These are used to contain contamination and allow students to doff their PPE effectively, as they exit the contaminated area

Radiological and Nuclear

Several students, dressed in Level C PPE, about to begin their exercise. The exercise included two separate activities — a "parking lot" with a contaminated vehicle (background at left edge) and a "lab" with bomb-making materials and some indications of radioactive material (trailer at right edge). The students successfully detected the elevated radiation levels, collected valid samples, exited the hot zone through the decon line (directly behind the students), and came out clean

The HAMMER facility has access to a local "bomb-pit," where live-agent radiological training supported by WA State Radiological Health personnel, can be held. Both HAMMER and WA State employees were professional and friendly and helped make the training a success

During the final day of class, a live-agent (Tc-99m) scenario required the students to don appropriate PPE, take measurements and samples, correctly fill out forms and chain of custody, and process equipment, samples, and themselves through the decon line

Radiation Response Procedure Standardization Effort to Improve Field Operations

CMAT has initiated a significant effort to upgrade and standardize the procedures used by the various Special Teams in response to a radiological release. A framework of Radiation Response Standard Operating Procedures (RRSOPs), written several years ago as part of the Radiation Response Guidelines (RRG) effort, is being used to organize all the SOPs used by various Special Teams for radiation-related field operations. The overall project consists of collecting all relevant SOPs, analyzing them for applicability, separating them into series of similar tasks according to the RRG framework, and establishing an RRSOP master guidance document that specifies content, format, and approval processes for new RRSOPs. Finally, the project will also identify any gaps or desired RRSOPs, which will be written in compliance with the master guidance. Currently, 13 RRSOPs are being formatted and revised and will be submitted for approval once finished.

National Radiological Preparedness Group

CMAT was given a charge by OEM to develop and lead a workgroup to address radiological response issues and to develop radiological tactical guidance for use by EPA On-Scene Coordinators (OSCs). This group began meeting in June 2012. The membership of the group consists of a radiological OSC from each Region and representation from the Emergency Response Team (ERT), National Homeland Security Research Center (NHSRC), and Office of Radiation and Indoor Air (ORIA), with leadership from CMAT. While the initial charge for the group focused on terrorist-related incidents, the National Radiological Preparedness Group decided to expand its focus to include all radiological responses.

The group's chief responsibilities are to identify readiness issues, produce and evaluate operational guidance, and make recommendations to management on issues related to radiological response. In support of these chief responsibilities, members of the group may participate in training and product development, propose and review research projects or policy positions, and gather information to further the goal of response readiness.

The first priority of the group is to develop a tactical radiological response guidebook for OSCs. The group will determine all of the information and resources an OSC could need to respond to a radiological release and combine it in this document. It is anticipated that this will be an extensive document with many references, so a field guide will also be developed to easily summarize the information most needed by the OSCs.

Project Gryphon

The Domestic Nuclear Detection Office (DNDO) Systems Engineering and Evaluation Directorate is conducting a multi-phase testing program called Project Gryphon for the use of aerial systems in detecting illicit nuclear materials. This extensive testing program is designed to test the merits of several manufacturers' aerial radiation detection systems. ASPECT was requested to participate in the testing program due to its large lanthanum bromide (LaBr) detectors, which were unavailable elsewhere and represented a technical step forward in radiation detector design. ASPECT team members participated in the crane testing phase of the project, which investigated the angular response of the detectors to known radiation fields. Radioactive sources, including cobalt-60 and cesium-137, were placed at various angles and offset distances to measure variations in detector response encompassing 360 degrees.

In addition, the ASPECT team participated in the flight portion of the test wherein the aircraft spent several days flying over radioactive sources, including special nuclear materials. ASPECT flew at various altitudes and offsets above and to the sides of the sources, flying as low as 300 feet above ground level and as high as 1500 feet, while monitoring the sources. ASPECT also flew offset lines to the side of the sources to help determine how close the aircraft needed to be in order to have a positive detection of the source.

Additional patterns were flown to study the effects of flight line spacing on the detector's ability to accurately find and identify radiation sources. The aircraft flew parallel lines that were spaced a mere 165 feet apart, resembling the spacing of a typical helicopter survey rather than that of a traditional fixed wing aircraft.

The ASPECT team will participate in the final phase of the Gryphon testing in FY 2013; this phase will test the effect of flight speed on detection capability.

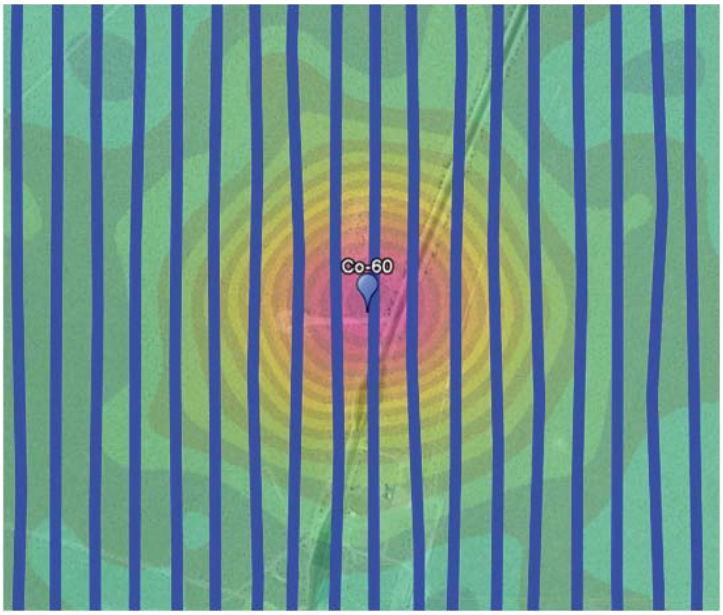


Image shows the actual flight lines flown by ASPECT to collect data of a cobalt-60 point source. Extremely tight flight line spacing of 160 feet was completed with precision under challenging environmental conditions. These data help determine technology response at various offset distances from a point source

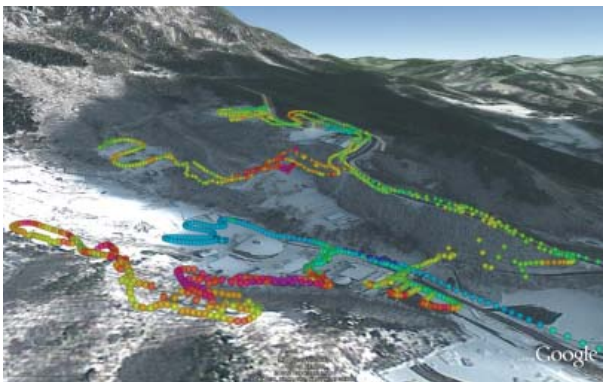
Assisting Japan in Aftermath of Fukushima

Japan's Ministry of the Environment (MOE) was given the authority to establish and implement decontamination policies and activities associated with the long-term clean-up and recovery from the Fukushima Daiichi Nuclear Power Plant accident following the great earthquake and tsunami on March 11, 2011. In March 2011, MOE requested EPA support through the US Embassy in Tokyo. EPA was asked to provide a speaker for the International Symposium on Remediation of the Contaminated Site Caused by the Fukushima Accident, held in Fukushima, Japan in May 2012. The objective of the symposium was to help develop an effective and sound remediation path forward by promoting understanding of the current state of contamination and any interdisciplinary and/or technical developments, as well as information sharing among scientists, policy makers and citizens from around the world. A presentation titled "US EPA Decontamination and Risk Communication Strategies" was delivered to an audience of more than 300 attendees, ranging from local to international representatives.

To maximize this opportunity and strengthen international relationships with Japanese officials, CMAT personnel coordinated additional field activities with the Japan Atomic Energy Agency to demonstrate unique technologies for conducting ground-based and airborne wide-area characterization measurements available only through the ASPECT Program. CMAT personnel also visited and interviewed local government officials who completed the first decontamination efforts– at a Children's Museum Center in Date City, Japan. This locale, about 30 miles northwest of the nuclear plant, was selected for decontamination first, because experts predicted this populated area to have an annual dose estimate exceeding 20 mSv/year. The area was decontaminated within four months of the accident and generated about 700 cubic meters of waste, which was temporarily stored on-site. Prior to the accident, the background exposure rate in this area was estimated to be about 0.2 mSv/hour. After the decontamination efforts, the "new background" exposure rate was measured to be about 0.6 mSv/hour; a rate affected by the residual contamination surrounding the site. Additional field trips were also conducted in the Sendai area to observe and learn how the Japanese handled the massive debris cleanup resulting from the tsunami destruction.

In December 2011, the International Atomic Energy Agency (IAEA) requested that the EPA provide a subject matter expert to give another presentation, this time during the IAEA Session at the Global 2011 Conference held that month in Chiba, Japan; this request was also coordinated through the U.S. Embassy in Tokyo, as well as the EPA Office of International and Tribal Affairs. The title of the presentation was "Decontamination Strategies Adopted by the USEPA in the Clean-up of Radiologically Contaminated Sites" and authorship included members from EPA Special Teams, EPA regional experts, and the National Homeland Security Research Center. The presentation summarized the EPA Superfund program, decontamination technologies, and research and development activities, and through case-studies and exercises described efforts taken by the Agency to better prepare itself for large-scale radiological incidents, should they occur domestically. During that trip, a CMAT representative met with officials of MOE to establish a working relationship and offer EPA support in the wake of the continued decontamination efforts.

CMAT personnel with Umetsu Yoshiyuki, Date City Official, who lead the first radiological decontamination efforts. He provided decision making experience regarding decontamination methods, waste storage, worker health and safety, and community involvement and participated in the ground-based survey throughout Date and Fukushima's Iitate cities



ASPECT ground survey results near Date City (Fukushima Prefecture) showing the impact of the very first decontamination project undertaken by the Japanese government following the incident. The light blue dots represent the decontamination efforts undertaken at the Children's Museum about 30 miles northwest of the nuclear plant. The purple dots represent sample points with exposure rates about 10 times the exposure rates at the decontaminated site

Wide Area Recovery and Resiliency Program

The Department of Homeland Security (DHS) and Denver Urban Area Security Initiative (UASI) initiated a collaborative Wide Area Recovery and Resiliency Program (WARRP) aimed at enhancing wide-area recovery capabilities in large urban areas, military installations, and critical infrastructure following a large-scale chemical, biological, or radiological (CBR) incident. This program builds on the success of the Interagency Biological Restoration Demonstration (IBRD) that took place in the greater Seattle, Washington region from 2007–2010 and explored recovery from wide-area biological threats to civilian and military installations. As was the case with IBRD, DHS closely coordinated with the Department of Defense (DoD) to meet WARRP objectives. Additional agencies, including the United States Department of Energy (DOE), Environmental Protection Agency (EPA), and Department of Health and Human Services (DHHS) are also collaborating in this effort.

The purpose of WARRP is to develop and demonstrate solutions (i.e., frameworks, operational capabilities, and interagency coordinations) that will enable a timely return to functionality, restore basic services, and re-establish social and economic order following a catastrophic event. WARRP focuses on a coordinated systems approach to the recovery and resiliency of wide urban areas, including all types of critical infrastructures, key resources (both civilian and military), and high traffic areas (transit/transportation facilities) following a CBR incident.

Environmental Remediation Operations Workgroup

To better serve the WARRP initiative taking place in Denver, Colorado, CMAT led an Environmental Remediation Operations Workgroup (EROWG) to explore, develop a better understanding of, and propose solutions to some of the key challenges and gaps associated with the various phases of remediation as they relate to the operational component of environmental remediation. Membership consisted of representation from the Centers for Disease Control and Prevention (CDC), EPA, DHS, and DOE; state and locals representatives of the Denver UASI; and the private sector. Although the overarching goal of all environmental remediation is to protect the environment and public health, this workgroup was not focused on the public health response (such as epidemiology investigations, hospital surge capacity, fatality management, decontamination of citizens and animals, distribution of medical countermeasures, etc).

Under the WARRP initiative, EROWG focused on the following topics:

- Strategies to characterize a wide-area urban environment, accounting for key chokepoints and available resources in the implementation phase of characterization;
- Prioritization of key areas in the city for characterization and immediate decontamination, including application of existing processes or development of new processes to prioritize critical infrastructure and other areas the city deems critical;
- Strategies to mitigate spread of contamination until remediation;
- Plans and processes for self-remediation by both the private sector and individual property owners;
- Development of clearance goal(s) for the city, including the link to the remediation timeline;
- Discussion of available decontamination strategies and technologies (as informed by clearance goals), identification of chokepoints, and remediation implementation;
- Waste management, including consideration of environmental justice impacts; and
- Clearance sampling and clearance decision-making processes for indoor and outdoor areas, as well as publicly and privately owned areas.

To address these topics, EROWG developed clearance strategy documents for the chemical and radiological scenarios of WARRP. The chemical and radiological clearance strategies, in addition to a biological clearance strategy document developed by EPA and CDC, were used and referenced in other key products of WARRP, and also included as stand-alone WARRP products.

Interim Clearance Strategy for Environments Contaminated with Hazardous Chemicals

Characterization and clean-up following a wide-area hazardous chemical release, such as the release of a chemical warfare agent (CWA) or toxic industrial chemical (TIC), requires clearance criteria that allow for the eventual re-occupancy

of the impacted areas. To this end, a federal inter-agency group of experts surveyed the current state-of-the-science on risk assessment, sampling analysis strategies, laboratory capacity, decontamination technologies, regulatory environment, and operational logistics and developed an interim clearance strategy to complement the broader, overarching White House Office of Science and Technology Policy (OSTP) draft document, *Cleanup Decision-Making Guidance for Chemical Incidents*. *The Interim Clearance Strategy for Environments Contaminated with Hazardous Chemicals,* document created through the interagency effort provides a framework for federal, state, territorial, tribal, and local government officials to use in expediting decisions for characterizing and cleaning up after a wide-area hazardous chemical release.

Practical incident- and site-specific clearance criteria will reduce residual risks from a wide-area release to levels acceptable to the Incident Command/Unified Command (IC/UC). The framework of the *Interim Clearance Strategy* defines a strategic methodology by which these incident- and site-specific clearance criteria can be developed. This interim framework is a living document that will be updated as needed to reflect the state-of-the-science and policy.

Interim Clearance Strategy for Environments Contaminated with Cesium-137

The Interim Clearance Strategy for Environments Contaminated with Cesium-137 reflects a federal inter-agency approach for state and local recovery managers to take when establishing radiological clearance levels following the terrorist detonation of a cesium-137 radiological dispersal device (RDD). The prescribed clearance levels address a range of values pertaining to public health and safety, debris management, business, agriculture, and environmental concerns. These values help the affected community define the goals for site- and incident-specific clearance, so that the physical, social, political, cultural, and economic infrastructure of the community can be expeditiously recovered. The range of values is consistent with accepted risk assessment processes that bridge dose-and-risk criteria.

The overall intent of the *Interim Clearance Strategy* is to assist planners and recovery workers with effectively recovering a community to pre-event or near pre-event viability levels (i.e., restoring the population, industry, commerce, and environment) within a target period that is commensurate with the size, scope, and urgency of the recovery needs. The time frame for recovery operations is technically and socio-economically driven, and the risk assessment process outlined in the *Interim Clearance Strategy* is designed to support time frames ranging from months to even decades.

The clearance level decisions made by recovery managers should be consistent with the principles of the Federal Emergency Management Agency (FEMA) National Disaster Recovery Framework (NDRF), which prescribe the inclusion of multiple stakeholders and the general public in the recovery effort. Because recovery is both time and budget sensitive, it is imperative that the community addresses and has agreement on these values before a disaster strikes. Pre-event clearance level concurrence is key to a community's resiliency and speedy recovery. As such, technical and socio-economic considerations (inclusive of stakeholders and public input) are factored into this clearance strategy.

EPA Review of WARRP Products

In order to support the WARRP initiative, Consequence Management Advisory Team (CMAT) led a review of the primary documents developed under the program, including:

- *National Urban Area Recovery Plan Guidance;*
- *Denver UASI All-Hazards Regional Recovery Framework*
  - Biological Incident Annex
  - Chemical Incident Annex
  - Radiological Incident Annex;
- *Key Response and Recovery Planning Factors for Chemical Incidents;*
- *Key Planning Factors for Recovery From a Wide-Area Biological Terrorism Event;*
- *Key Planning Factors for Recovery From a Wide-Area Radiological Terrorism Event;* and
- *Recovery from Chemical, Biological, and Radiological Incidents: Critical Infrastructure and Economic Impact Considerations.*

The reviews were conducted across all applicable EPA programs, including the Office of Solid Waste and Emergency Response (OSWER), Office of Emergency Management (OEM), Office of Superfund Remediation and Technology Innovation (OSRTI), Office of Air (OA), Office of Radiation and Indoor Air (ORIA), Office of Research and Development (ORD), National Homeland Security Research Center (NHSRC), Office of Water (OW), and Regions 1 & 8. EPA provided extensive technical comments and recommendations on these documents to ensure that they were technically accurate, complete, and of greatest benefit to the end users.

CMAT & NHSRC: Working Together

CMAT collaborates extensively with the National Homeland Security Research Center (NHSRC). Almost all CMAT members work with NHSRC on a regular basis and this cross communication and program knowledge provides a great benefit to the On-Scene Coordinator (OSC) response community. CMAT is aware of the practical needs in the field of homeland security response and can provide feedback to NHSRC on the field applicability of their projects. In return, NHSRC is able to provide CMAT with very useful and advanced state-of-the-science information in support of their work.

Some examples of collaboration from FY 2012 are listed below, but outlined in greater detail in other sections of this Annual Report:

- Development of the Centers for Disease Control (CDC)-U.S. Environmental Protection Agency (EPA) *Interim Clearance Guidance for Environments Contaminated with Bacillus anthracis*
- Feedback on NHSRC Products/ Projects
  - Decontamination Decision Support Tool
  - Incident Waste and Tonnage Estimator (I-WASTE)
  - Prioritization Analysis Tool for All Hazards/Analyzer for Wide Area Restoration Effectiveness (PATH/AWARE)
  - Scientific Program on Reaerosolization and Exposure (SPORE)
  - Automated Floor Sampling Device
- The DHS WARRP
  - *Development of the Interim Clearance Guidance for Environments Contaminated with Hazardous Chemicals* and the *Interim Clearance Guidance for Environments Contaminated with Cesium-137*
  - Review of WARRP products developed by Lawrence Livermore National Laboratories, Pacific Northwest National Laboratories, and Sandia National Laboratories
  - Aggressive Air Sampling Project
- Project Teams: CMAT and NHSRC partner to work with OSCs to ensure the customer focus is maintained throughout the planning, execution, and application of results on projects
- Partnerships: Provide formal input on how to prioritize research to meet NHSRC customer needs through Program to Align Research and Technology Needs with Emergency Response (PARTNER) program
- NHSRC Contractor Support Technical Evaluation Panel (TEP)
- Briefings to Outside and Internal Groups (e.g., State of Florida, Florida Carcass Management Working Group Meeting)
- Peer Reviews of NHSRC Documents
  - *Assessment of the Fate of RDD Contamination after Laundering of Soft Porous Materials*
  - *Assessment of Liquid and Physical Decontamination Methods for Environmental Surfaces Contaminated with Bacterial Spores: Part 4 - Evaluation of Spray Method Parameters and Impact of Surface Grime*
  - *Compatibility of Material and Electronic Equipment With Methyl Bromide and Chlorine Dioxide Fumigation*
  - *Decontamination of Concrete with Aged and Recent Cesium Contamination*
  - *Development of Rapid Viability Polymerase Chain Reaction (RV-PCR) Protocols for Bacillus anthracis: Further Optimization and Application to Vacuum Sock and Vacuum Filter Sample Types*
  - *Draft Final Report: Evaluation of Rapid Viability Polymerase Chain Reaction (RV-PCR) Method during the Bio-Response Operational Testing and Evaluation (BOTE) Phase-I*
  - *Enzymatic Decontamination of Chemical Warfare Agents*
  - *Evaluation of Hydrogen Peroxide Fumigation for HVAC Decontamination*
  - *Evaluation of the Reaerosolization of Bacillus Spores from a Sod Matrix*
  - *Expedient Approaches for Decontamination of Biologicals - Indoor Environment Task 1 - Evaluation of Field Test Plan for Application of Decontamination Technologies for Removal of Radiological Contamination from Urban Surfaces*
  - *Inactivation of Vegetative Bacterial Threat Agents on Environmental Surfaces*
  - *Method Development for Optimum Recovery of Yersinia pestis and Francisella tularensis from Transport Media and Swabs*
  - *Protocol for Detection of Bacillus anthracis in Environmental Samples During Remediation Phase of an Anthrax Event*
  - *Sample Collection Procedures for Radiochemical Analytes in Environmental Matrices*

- *Selected Analytical Methods (SAM) for Environmental Remediation and Recovery*
- *Use of Chlorine Dioxide Gas for Soil Decontamination*

➢ Reviews of Other Documents, Presentations, or Products

- *Aggressive Air Sampling for B. anthracis Spores, Poster*
- *Automated Floor Sampling Device for B. anthracis Spores, Poster*
- *Bio-Water Liquid Research and Response Plan*
- *Bio-response Operational Testing and Evaluation (BOTE) Project,* Charleston Presentation
- *CBR Disposal Workshop Report*
- *Community Engagement and Case Analysis: Methods for Developing Post-Incident Risk Communication Guidelines for an Intentional Biological Environmental Contamination, Exercise Press Release Documents* (as part of the NHSRC University of Kentucky CMAT project)
- *Development of Automated Floor Sampling Device for Bacillus anthracis Spores, Abstract*
- *Material Limits to Spray-Based Wetting Procedures* , Quality Assurance Project Plan (QAPP)
- RDD Waste Estimation Support Tool
- Sporicidal Wipe Evaluation Project, NHSRC/Office of Pesticide Programs (OPP) (17 April 2012)
- *Systematic Evaluation of Aggressive Air Sampling for Bacillus anthracis Spores,* Abstract
- *Transportable Gasifier for On-Farm Disposal of Animal Mortalities: Status Update*
- *Vehicle Decontamination Line Quick Reference Guide*
- WARRP Carpet Steam Cleaner Technology Transition Agreement, between DHS and EPA (31 July 2012)
- WARRP Waste Screening Project Documents
- Waste Estimation Support Tool – GIS Modules
- Waste Management Planning Aids

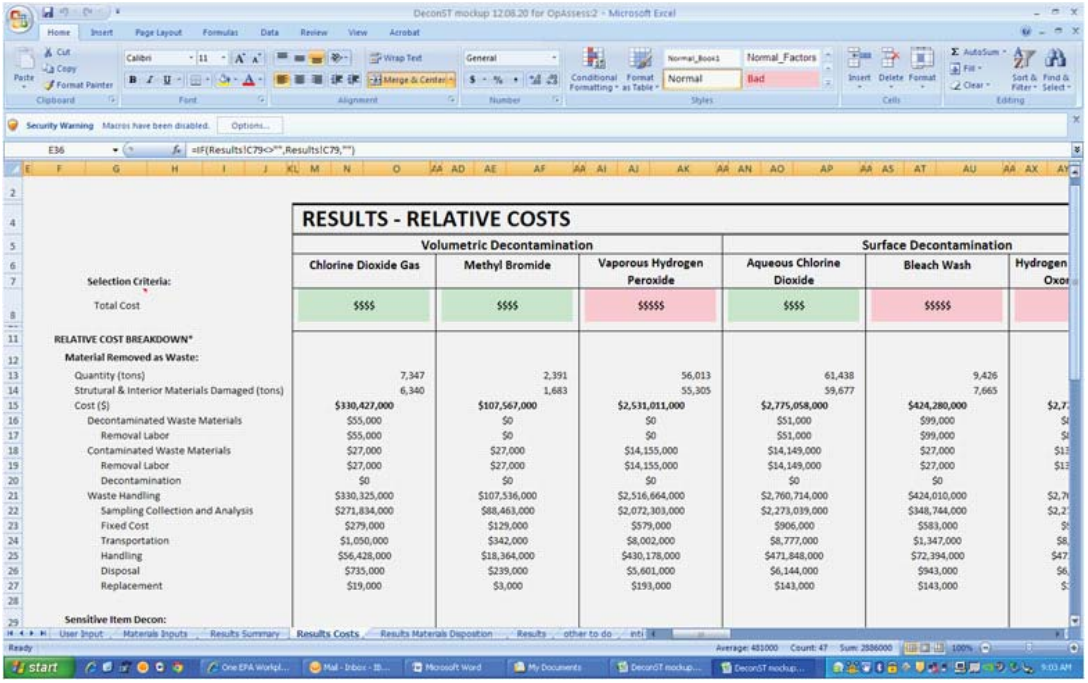
ASPECT: Partnering with Other Federal Agencies

The ASPECT Program and the DHS' Domestic Nuclear Detection Office (DNDO) have entered into a Memorandum of Understanding (MOU). This MOU establishes a framework between EPA and DHS by which to request that EPA collect and disseminate remotely-sensed data related to radiological incident training and/or response. Under this agreement, CMAT will provide DNDO with training and remote sensing data and products collected with the ASPECT aircraft during steady-state, as well as incidents as outlined in the MOU. Use of ASPECT data and products will further enable infrastructure protection planning, response, and recovery activities during and following natural and manmade disasters. Data and products will be provided based on available resources, as directed by EPA management. The DNDO Operations Support Directorate (OSD) will aid EPA by providing information, whenever available, concerning targeted facilities of mutual interest (e.g., Super Bowl stadiums, large conventions, critical infrastructure, etc.) to enhance efficient collection of data.

The ASPECT Program has also entered into a MOU with the DoD to formalize the relationship between the DoD Joint Programs Executive Office for Chemical Biological Defense (JPEO-CBD) and EPA. This MOU addresses interactions between DoD and EPA in the field of stand-off Chemical, Biolagical, Radiological and Nuclear (CBRN) detection, mapping, and response. This agreement documents a collaborative effort to advance the state of the art, share resources, and build capacity in the field. The MOU also defines missions, authorities, responsibilities, and operating principles for oversight of cooperative efforts between DoD and EPA. Each agency organization will coordinate their efforts to promote interoperability; leverage technology application, test, and evaluation efforts (T&E); reduce duplicative efforts; enhance operational procedures; and expand capabilities. This MOU will also enable EPA to work with other Offices within the DoD, such as the National Guard Bureau (specifically the Civil Support Teams) and a multitude of Offices based out of the Pentagon.

Decontamination Support Tool

One of the main objectives of CMAT is to provide technical assistance to OSCs on CBRN response, including decontamination technology guidance. During past responses, CMAT has provided technical support to OSCs, summarizing pros and cons of available decontamination options. CMAT recognized, however, that gathering and summarizing this type of information during an emergency response may not be the most effective approach and began working with NHSRC, the Office of Resource Conservation and Recovery (ORCR), OSCs, and OEM to develop a decision support tool.



RESULTS - RELATIVE COSTS

Selection Criteria:	Volumetric Decontamination			Surface Decontamination		
	Chlorine Dioxide Gas	Methyl Bromide	Vaporous Hydrogen Peroxide	Aqueous Chlorine Dioxide	Bleach Wash	Hydrogen Oxo
Total Cost	$$$$	$$$$	$$$$$	$$$$	$$$$$	
RELATIVE COST BREAKDOWN*						
Material Removed as Waste:						
Quantity (tons)	7,347	2,391	56,013	61,438	9,426	
Strutural & Interior Materials Damaged (tons)	6,340	1,683	55,305	59,677	7,665	
Cost ($)	$330,427,000	$107,567,000	$2,531,011,000	$2,775,058,000	$424,280,000	$2,7
Decontaminated Waste Materials	$55,000	$0	$0	$51,000	$99,000	$
Removal Labor	$55,000	$0	$0	$51,000	$99,000	$
Contaminated Waste Materials	$27,000	$27,000	$14,155,000	$14,149,000	$27,000	$13
Removal Labor	$27,000	$27,000	$14,155,000	$14,149,000	$27,000	$13
Decontamination	$0	$0	$0	$0	$0	
Waste Handling	$330,325,000	$107,536,000	$2,516,664,000	$2,760,714,000	$424,010,000	$2,7
Sampling Collection and Analysis	$271,834,000	$88,463,000	$2,072,303,000	$2,273,039,000	$348,744,000	$2,2
Fixed Cost	$279,000	$129,000	$579,000	$906,000	$583,000	$
Transportation	$1,050,000	$342,000	$8,002,000	$8,777,000	$1,347,000	$8
Handling	$56,428,000	$18,364,000	$430,178,000	$471,848,000	$72,394,000	$47
Disposal	$735,000	$239,000	$5,601,000	$6,144,000	$943,000	$6
Replacement	$19,000	$3,000	$193,000	$143,000	$143,000	$
Sensitive Item Decon:						

View of the Decontamination Support Tool

The Decontamination Support Tool developed through this collaboration allows users to input site-specific variables and uses assimilated decontamination technology efficacies, process variables, material compatibilities, costs, and the EPA's I-WASTE tool to produce the expected outcomes, costs, and wastes for each decontamination option.

CMAT led the planning and execution of the Tool's beta test conducted on August 22, 2012 by CMAT members, OSCs, and NHSRC representatives. Scenarios were used in the beta test that resulted in a data-driven selection of the best decontamination technology. The beta test was successful and additional improvements, based on feedback from the test, are scheduled to be implemented in early FY 13.

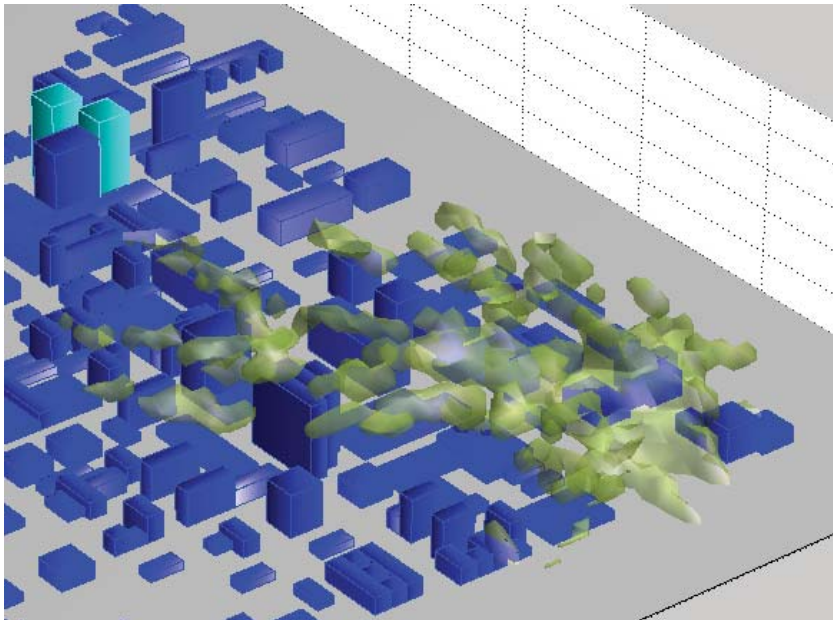
QUIC Emergency Response Tool

Researchers at Los Alamos National Laboratory (LANL) developed the Quick Urban & Industrial Complex (QUIC) Dispersion Modeling System—a fast response urban dispersion model that runs on a laptop. QUIC is comprised of a 3-D wind field model, a transport and dispersion model, a pressure solver, and a graphical user interface. CBR agent dispersion can be computed on a building-to neighborhood-scale in tens of seconds to tens of minutes.

The dispersion of a CBR agent in an urban area is difficult to predict due to the presence of buildings, and most emergency response dispersion models currently in use have little or no building "awareness" (i.e., they are unable to take buildings into account when predicting dispersion). The QUIC Dispersion Modeling System, however, is able to compute the three-dimensional wind patterns and dispersion of airborne contaminants around clusters of buildings. Although not as accurate as computational fluid dynamics modeling, it captures the major flow features for a fraction of the computational cost. QUIC provides credible agent dispersal patterns in an urban environment, while still achieving very quick turnaround and ease-of-use.

One major hurdle that had to be overcome before the QUIC Modeling System could be used in an emergency response situation was the speed at which virtual construction of the buildings and neighborhoods were made. Originally, the virtual neighborhood had to be built one building at a time. However, a CMAT member embedded with NHSRC researchers

in Research Triangle Park (RTP), North Carolina got the attention of NHSRC's Tim Boe , a geographic information system (GIS) expert, who was able to develop a method that allows the entire neighborhood to be constructed at once. In this method, remote sensing data, known as Light Detection and Ranging (LiDAR) data, is imported into the Modeling System using shapefiles—a geospatial data format utilized in GIS. Additional collaborative work between LANL, CMAT, and NHSRC is underway to streamline this process and make the QUIC Dispersion Modeling System more emergency response-friendly.



QUIC-PLUME simulation of CBR agent transport and dispersion in a downtown area. The agent cloud is quickly lofted into the air due to the presence of tall buildings, not predicted using conventional dispersion models

ASPECT Supports Local and State Governments in SEAR Level Events

The support of the ASPECT Program was requested for the 2011 Albuquerque, New Mexico International Balloon Fiesta and the 2011 Tournament of Roses Parade and Game (Rose Bowl) in Pasadena, California by Region 6 and Region 9, respectively. Both events generate crowds in excess of 500,000 people and have a DHS Special Event Assessment Rating (SEAR) of 3. The SEAR System attempts to quantify several threat, vulnerability, and risk factors for special events to determine the event's potential attractiveness as a terrorist target. Each event is assigned a SEAR rating of 1–4, with 1 having the greatest potential to be targeted. Chemical, radiological, and situational awareness data was collected for each event and provided to the incident command system (ICS).

The mission profile for the Balloon Fiesta was initiated by flying an early morning (0500) radiological survey over the balloon event field at an altitude of 300 feet. This data was processed while the aircraft was in flight and provided to the ICS team in less than 5 minutes; products generated included a total gamma ray count plot and a manmade isotope sigma plot. A chemical flight was later run (during the afternoon) at an altitude of 2,800 feet. As with the radiological survey, chemical data was processed while the aircraft was in-flight and the results provided to the ICS after each pass of the aircraft. Photographic data was also collected during each chemical pass and this data was processed at the termination of the flight and included both geo-rectified visible imagery and an event mosaic plot.

Flight activities for the Rose Bowl were structured in a similar fashion to those of the Albuquerque International Balloon Fiesta. For this event, the mission was initiated by flying a morning (0600) radiological survey over the parade route at an altitude of 500 feet. A hard requirement for all radiological collection mandated that the data had to be provided to the ICS no later than 0700. Data was processed in the aircraft as each section of the parade route was flown, and the radiological results provided to the ICS in less than 5 minutes. All five miles of the parade route were surveyed in 35 minutes. The mission was then adjusted to provide chemical and situational awareness data over the parade and subsequent game every 20 minutes. Chemical data and limited photographic data were processed in the air and the results posted to the ICS status system.

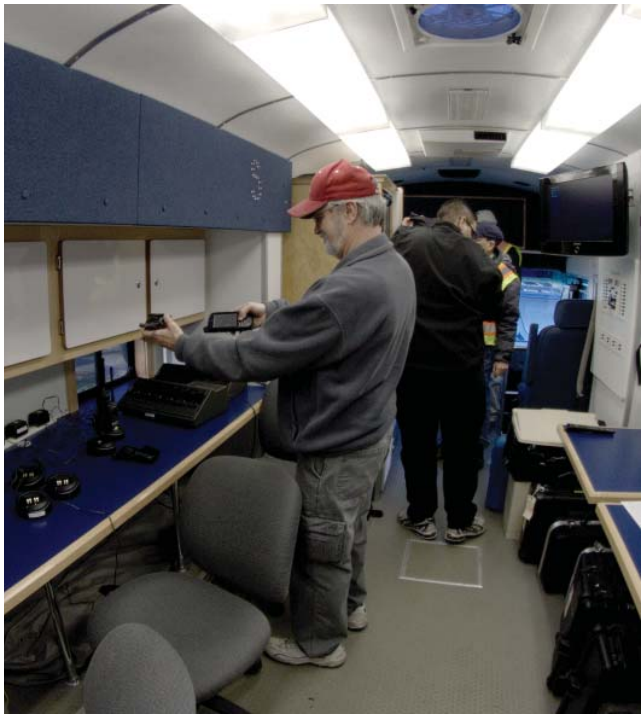
Formal invitations have been received to support both of these events in FY 2013.

Improving Response Through National Consistency: Equipment Tracking Module

Major domestic and international events, including terrorist attacks, chemical and biological incidents, significant hurricanes, and other natural catastrophes, have occurred since September 11, 2001, requiring prompt, organized, and effective response and recovery efforts. In order to respond in a timely and organized manner, EPA initiated an Equipment Tracking Module (ETM), under the direction of CMAT. The ETM is a national database of EPA's emergency response equipment organized by Regions and warehouses. The ETM has been in use for several years now and is a valuable tool when responding to an incident. The ETM was used to manage response equipment in several temporary field warehouses during the Deep Water Horizon Oil Spill, and lessons learned from this event led to several important improvements in the functionality of the ETM, including the ability to upload equipment data in bulk and the implementation of barcode scanners.

The ETM continues to be an important component of responses. Region 5 developed plans for utilizing the ETM to manage equipment deployed to the field for the North Atlantic Treaty Organization (NATO) meeting in Chicago. The equipment used for the deployment was gathered from the Region's different warehouses and then assembled in a temporary field warehouse in Chicago, where the equipment was assigned to field personnel for use during the deployment.

Handheld barcode scanners were used for tracking the equipment as it was checked out and back into the field warehouse. As equipment was readied for deployment, the barcode labels were be scanned and then assigned to the appropriate personnel and field location. Periodically during the day, reports of checked-out equipment were produced and then uploaded into the ETM so that resource staff at the Incident Command Post were able to assess the equipment deployment and determine any additional equipment needs.



Equipment check-out and check-in is tracked using handheld barcode scanners.

Upon completion of the field work, the equipment was scanned for check-in purposes and the ETM updated with information from the handheld barcode scanners, so that both the resource unit staff and the field warehouse staff could accurately assess equipment status.

Currently, all ten EPA Regions and three Special Teams—the Environmental Response Team (ERT), CMAT, and the Radiological Emergency Response Team (RERT)—have their equipment data migrated into the ETM and can use the system to manage their emergency response equipment. The ETM can provide a detailed inventory of emergency response equipment that is available in any warehouse across the country, including the condition and readiness of the equipment. This information can be used with the Emergency Management Business Intelligence (EMBI) reporting system, which can generate detailed, customizable reports on the availability of equipment.

Handheld barcode scanner

The ETM is part of EPA's Emergency Management portal and can be accessed at http://portal.epa.gov/EMP

National Equipment Strategy Working Group

OEM leadership charged CMAT with developing and leading a workgroup to evaluate the storage, management, maintenance, and deployment of EPA response equipment and determine whether there were any opportunities for increased efficiencies. Removal managers from each Region nominated an OSC to participate on this workgroup. The group was instructed to consider all options—from changing absolutely nothing to a complete overhaul of the system, without concern for the requirements of other OEM initiatives, as any proposals from this group could potentially override other mandates.

CMAT initiated this workgroup in May 2012 and has led bi-weekly teleconference calls to discuss any and all options. Feedback on various options has been requested from the OSCs to ensure their regional perspectives and experiences with response are appropriately considered. OSCs have also been given opportunities to provide suggestions and their own proposals for discussion during each call. CMAT has been recording the proceedings of the group in preparation for developing a summary of its findings.

CMAT will present the results of this effort to OEM leadership as a proposal to manage response equipment across the EPA before the end of FY 2012.

CMAT Updates

New Name - Refined Mission

On April 16, 2012, the OEM announced that EPA's National Decontamination Team (NDT) officially changed its name. The NDT is now known as the CBRN (Chemical, Biological, Radiological, and Nuclear) Consequence Management Advisory Team (CMAT) or CMAT for short. This change was made to more accurately reflect the team's mission. The principle mission of CMAT is to provide scientific and technical support and advice, as it relates to the phases of consequence management in a CBRN incident—specifically, characterization, decontamination, and clearance. CMAT is engaged in developing operational plans and procedures that can be quickly tailored to the site-specific conditions of a CBRN incident and facilitating transition of the latest science and technology to support CBRN field response, enabling a more efficient and effective response.

CMAT will continue to operate the Airborne Spectrophotometric Environmental Collection Technology (ASPECT) and Portable High Throughput Integrated Laboratory Identification System (PHILIS) programs, which are both available in support of routine, special event, and non-routine site responses.

Extending Agency Field and Technical Capabilities Through Continuing Contractor Support

CMAT and EPA will continue to have access to technical expertise and field support via the Decontamination, Analytical, Technical Support (DATS) II contract awarded to Dynamac Corporation (a subsidiary of Consolidated Safety Services, Inc.) on July 17, 2012. This contract provides for scientific, technical, and operational support, such as technical information/data gathering and analysis; field and response support (e.g., pre-deploying for special security events; delivering scientific, engineering, and health and safety field support at terrorist events or other large scale natural or man-made disaster events; etc.); as well as other tasks included in the statement of work.

New CMAT Website to be Launched in Fall 2012

To provide better customer service and a more thorough understanding of CMAT's capabilities, CMAT and EPA's Evaluation and Communication Division (ECD) have been working together to develop a new CMAT website. The website will highlight the team's field and technical capabilities and products, as well as information on how to access team resources.

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