



On-Site InSights



Featuring News on Training and Use of Innovative Site Characterization and Monitoring Technologies

"New" Field-Based Site Assessment and Monitoring Training Program

The high cost of characterization and long-term monitoring associated with site clean-up is widely recognized. Until recently, clean-up professionals have had few technology alternatives to the conventional sampling and contaminant analysis approach. Over the last ten years, innovators have been developing field portable analytical technologies to meet site characterization and monitoring needs. The Northeast Hazardous Substance Research Center (NHSRC) and EPA's Technology Innovation Office (TIO) have teamed up to provide state and local officials and consulting engineers training on new field-based technologies for characterizing and monitoring site clean-ups.

The program will include a detailed discussion of field-based assessment technologies, present survey results

from state quality assurance and quality control officials on criterion for acceptable data, and allow participants to experiment with technologies to illustrate the ease of data collection and interpretation.

The program, funded by TIO, will engage and educate technology users, manufacturers and regulators, federal, state and city, on state of the art technologies that are currently commercially available around the country. This program will utilize the five Hazardous Substance Research Centers (HSRCs) which represent pairs of EPA regions and the states that comprise each region pair. Developments in environmental assessment technologies, methodology, monitoring and remediation will be showcased during breaks and following the training allowing participants to become more familiar with the HSRC's mission and research program.

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About HSRC/S&SW



This Hazardous Substance Research Center represents EPA Regions 4 and 6 under the leadership of Louisiana State University. Its

activities focus on the management of hazardous substances in contaminated sediments and dredged materials with more than half of the Center's research, development and transfer efforts relating to these problems. Specific topics of research projects within the contaminated sediments/dredge materials focus area include:

- *in situ* chemical mobilization processes in beds and confined disposal facilities
- *in situ* remediation
- *in situ* detection

Participating Universities:

Georgia Institute of Technology, Louisiana State University and Rice University.

For more Information on Center Activities, Research and Programs contact: Dr. Danny Reible, Director
504-388-6770.

Catch the Technology Wave

The "Wave of the Future" hit Long Beach California on August 18th of this year, when 139 officials from 39 states, 21 corporate representatives, and US EPA regional and headquarters officials met for a conference on innovative technologies that apply to CERCLA assessment and remediation. The Association of State and Territorial Solid Waste Management Officials, or ASTSWMO, hosted the two day conference in Long Beach, California. The goal was to train CERCLA managers, both state and federal, on innovative technologies that can aid in characterization and remediation.

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Faster, Better, Cheaper Analysis of Organic Compounds in Soil

by Dr. Albert Robbat, Jr.

The Problem/Challenge

From the initial site investigation to design and completion of remedial actions, sampling and analysis programs play a key role in the nation's environmental restoration business. In contrast to the phased engineering approach, where samples are collected and shipped off-site for chemical analysis, adaptive sampling and analysis programs are based on a dynamic work plan where the program itself relies on field data to determine the nature and extent of contamination at the site.

Hanscom Air Force Base (HAFB) is in the process of conducting Human Health and Ecological Risk Assessments and Feasibility Studies for the airfield. In addition, the effectiveness of the 1987/88 drum and soil removal actions and five-year operation of the ground water collection, recharge and treatment systems must also be assessed.

The challenge was to demonstrate that field analytical technologies can produce data fast enough to support the on-site decision making process at costs equal to or less than that of off-site chemical analysis without sacrificing data quality.

Approach

Staff from HAFB, EPA Region I, their respective contractors, CH2MHill and Camp Dresser & McKee, the Massachusetts Department of Environmental Protection and Tufts University developed and carried out a dynamic site investigation at the airfield. The project was funded by the U.S. EPA, in part, through President Clinton's Environmental Technology Initiative. The adaptive sampling and analysis strategy involved relying on data produced in the field to make decision as to the location of samples to be collected and the types of analysis to be performed. Field instruments and methods were developed at Tufts University in cooperation with several analytical instrument companies and service providers. The premise being that if analytical data can be produced in the field with known quality to meet the stated Data Quality Objectives (DQO's), then the perceived and/or institutional barriers impeding their usage in the laboratory or field should be greatly reduced.

The team's primary goal was to show that the technologies and methods can be used to support a dynamic work plan/adaptive sampling analysis program.

Innovative Technologies

Breakthrough productivity gains were obtained by two technologies, the Ion Fingerprint Detection™ (IFD) software and the thermal desorption gas chromatograph (TD/GC). The IDF software produced unmatched measurement selectivity without the need for extensive sample clean-up or long GC run times. It accomplishes this by using algorithms with "look through" non-target MS signals and unambiguously determine compound identity, minimizing masking of low concentration target compounds by high concentration matrix interferents. Target compounds, which are at low levels, are not lost due to complex matrix constituents or the need to dilute samples. IFD decreases the per samples analyzed per day per instrument over traditional analytical technologies.

A ballistically heated (ambient to 300°C in <8-sec) thermal desorption unit can be used to introduce solid or liquid extracts into a GC/MS. Because larger quantities (2-L to 200-L) of material can be put into the instrument, TD sample introduction yielded increased sensitivity to GC with electron capture detection (GC/ECD).

Purge and trap GC/MS with the IFD data analysis software provided the same data quality as EPA reference method SW846-8260A for VOCs. TDGC/MS with IFD data analysis software provided the same data quality as EPA reference method SW846 – 8260A for PCBs and PAHs without the need for sample clean-up or preconcentration.

Results

Six hundred and one soil samples were screened for volatile organic compounds (VOCs) using direct measuring thermal desorption gas chromatography/mass spectrometry (TDGC/MS). Based on these results, 158 soil samples were quantitatively analyzed by purge and trap GC/MS on-site.

VOC analysis times were 30-sec/sample and 15-min/sample, respectively. A 3-min/sample solvent extraction procedure was used to prepare 70 soil samples for quantitative analysis by TDGC/MS for semi-volatile organic

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Vacant Lots to Common Ground

by Warren Goldstein-Gelb

Tufts University together with several community-based organizations in New England is bringing together a diverse mix of organizations in some of the regions most economically and environmentally distressed areas to build the capacity of communities to revitalize vacant or abandoned contaminated properties (commonly called “brownfields”).

Tufts’ Environment and Community Development program has spearheaded an effort to match community-identified needs with university resources on issues related to brownfields and on other issues where environmental and community development concerns intersect. The program works principally with community development and other local stakeholders interested in revitalizing the environment and economy of some of the region’s hardest hit communities.

The Brownfields Education Project will begin with identifying community concerns. Initial funding from the Technical Outreach Services for Communities (TOSC) program administered by the Northeast Hazardous Substance Research Center (NHSRC) paired Tufts with the Dudley Street Neighborhood Initiative (DSNI) a Roxbury, Massachusetts-based community organization.

For DSNI, the 1300 vacant lots in Dudley area posed a daunting barrier to the community-driven vision of creating a revitalized ‘urban village’. In a neighborhood where disinvestment has left few locally owned small

“We are looking at strategies that will create businesses that are owned and operated by residents,”

—DSNI Executive Director, Greg Watson said in an interview for the TOSC-funded Dudley Neighborhood.

businesses, and where 32% of the residents live below the poverty line, brownfields revitalization also represented an opportunity that the community could not afford to overlook.

A “Teach in – Speak Out” held at a Roxbury community church in June, 1996 launched a series of workshops, discussions, and publications designed by the Brownfields

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A Regional Conference

Do the issues unearthed in Roxbury apply elsewhere in the region? In the summer of 1997, the Environment and Community Development Program interviewed community development corporations, municipal officials, small business intermediaries, and lenders, and environmental justice organizations to determine whether the small site brownfield issue was a widespread or local phenomenon, and what skills and tools these organizations would need to move the small site issue forward.

The resulting Needs Assessment, ‘The Challenge of Small Sites’, reported the results of more than 25 interviews with key stakeholders interested in small site brownfields revitalization. Questions focused on top issues of concern in efforts to revitalize brownfields’ availability of information and/or training, barriers to revitalization; and desired technical assistance. Results indicated the need for primers, case studies of successful project developments, policy dialogues and skill-building in a variety of areas. A key question involved strategies to finance site assessment and remediation.

This Needs Assessment framed the agenda for a conference at Tufts University held on November 14-15,

1997: Vacant Lots to Common Ground: Strategies for Community-based Brownfields Revitalization, sponsored by the EPA’s Northeast Hazardous Substance Research Center and the US EPA Office of Research and Development. Conference workshops introduced diverse stakeholders to site assessment and remediation, new technologies for assessment and cleanup, as well as financing, policy, and marketing strategies for brownfields revitalization.

A special Saturday session will bring multiple stakeholders together in an interactive simulation of a typical brownfields scenario. Robert Burdick, a faculty member from the Department of Urban and Environmental Policy, worked with program staff to design a simulation that would help participants build new skills, work collaboratively with diverse stakeholders, and strengthen local and regional strategies for community-based brownfields collaboration. ECD approach has been to effectively tap into these resources in ways that address community concerns. The ECD program is housed at the Lincoln Finely Center, a regional leader in training and resources for non-profit management, community service learning, research and training on citizen participation.

Encouraging Innovative Technology for Small Sites

Regulatory and institutional barriers to technology innovation result in a loss of market opportunity, for both technology developers and users, and increased government expenditures to evaluate and approve new technologies. Finding solutions to overcome these barriers is crucial, because innovative technology (IT) has the potential to clean-up and protect the environment and public health in a more cost-effective and efficient manner.

The New England Interstate Regulatory Cooperation Project is an innovative federal/state partnership designed to promote the acceptance of new environmental technologies in New England and improve the competitiveness of regionally-based envirotech companies for marketing their technologies both Nationally and abroad.

Inadequate site characterization, as well as the lack of cost-effective treatment measures, can lead to unnecessarily expensive remedies.

Currently, in the Northeast States, state waste site clean-up programs are dealing more with smaller contaminated sites. Innovative clean-up and assessment technologies which have been used in the past on large Superfund sites, are not directly transferable to smaller sites. This creates a gap in the use of ITs which would improve quality and efficiency of assessment and remediation at smaller sites. These smaller sites are sometimes closed with insufficient data to ensure the adequacy of containment, treatment or removal measures. Inadequate site characterization, as well as the lack of cost-effective treatment measures, can lead to unnecessarily expensive remedies. The high cost of site characterization to address financial uncertainties can also discourage site redevelopment in "brownfields" areas.

The Program

In an effort to address this problem, the Northeast Waste Management Officials' Association (NEWMOA) has received a grant from the New England Environmental Protection Agency (EPA) to encourage the development and use of innovative technologies for the assessment and remediation of smaller contaminated sites in the Northeast states. The objectives of this effort are to:

- develop a framework for the gathering and sharing of cost and performance data for small site assessment and remediation

- hold a conference for state oversight officials, innovative technology developers and vendors to exchange information concerning: state regulatory and technical requirements,
- matching IT with problems found in small sites, and overcoming obstacles to the development and use of ITs
- evaluate and summarize the status and availability of IT for smaller sites
- draft an interstate MOU to endorse and support regional efforts to promote regulatory cooperation through a framework to share cost and performance data
- develop recommendations concerning the creation of a clearinghouse or other suitable mechanism for gathering and sharing information about assessment, remediation and monitoring technologies for smaller sites

Who is NEWMOA?

NEWMOA is a nonprofit association whose membership is composed of state environmental agency directors of the hazardous waste, solid waste, waste site cleanup, and pollution prevention programs in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. NEWMOA's mission is to help states articulate, promote, and implement economically sound regional programs for the enhancement of environmental protection.

A Recent Conference

In May of this year, the organization decided to focus on "small sites" such as petroleum and brownfields. In working toward this mission, NEWMOA and the US EPA collaborated to host their annual conference, which focused on Technology Training with an emphasis on small sites for greater implementation of innovative characterization and remediation technologies.

The conference goals:

- provide training and guidance on technical transfer regarding assessment and clean-up technologies that are available for small sites, such as petroleum and other contaminants often found at brownfield sites;

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- identify regulatory oversight program needs, define responsible party needs and obstacles to use of innovative technology and;
- provide a forum for information exchange with technology vendors.

There was also a panel discussion regarding assessment and cleanup technologies for small sites, moderated by Frank Ciavattieri of EPA Region I. On this panel, topics included innovative technology for brownfield sites, Massachusetts STEP Program, the Interstate Technology and Regulatory Cooperative (ITRC) Workgroup, and the collaboration of NEWMOA states and EPA Region I to encourage development and use of innovative technologies.

NEWMOA's Role

EPA Region I and NEWMOA are involved in an effort to facilitate the development and use of innovative technology in order to improve the efficiency and effectiveness of private and public clean up. As William Cass, Executive Director of NEWMOA, explains, smaller states do not have the resources to participate in multi-day activities such as ITRC or others that require national travel. The smaller states can, however, participate in one-day events that are centrally located in their region. (Two NEWMOA member states, Massachusetts and New York, participate in ITRC. Through NEWMOA, the smaller New England states can benefit from the information that is disseminated by NEWMOA. This is a great asset to some NEWMOA members who do not have the resources to participate in ITRC directly.)

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Up-Coming Training Events

Natural Attenuation '97

Date: December 8-9
Contact: IBC USA Conference, Inc.
508-481-6400

EPA to Host Technology Verification Conference

Date: December 9th, 1997
Contact: Center for Environmental Industry and Technology
1-800-575-CEIT

IBC's International Congress on Human Health: Bioavailability

Date: December 11-12
Contact: IBC USA
508-481-6400 x451

The Princeton Remediation Course

Date: December 15-19
Contact: Princeton University
813-855-6898

Hazardous Waste Management for Beginners

Date: December 15-16
Contact: Environmental Resource Center
800-537-2372 x222

On-Site Insights - Training on Innovative Characterization Technologies

Date: January 15, 1998 in Atlanta, Georgia
Contact: Andrea Kinney
508-358-3532

Remediation by Natural Attenuation

Date: January 26-28
Contact: Sherry Daly
800-462-0876

■ Technology Training, from page 1

Goals for Field-Based Training Program

The primary goal of the training program is to educate technology users in the following areas:

- the use and application of new field measurement and monitoring technologies, including "hands on" experience with some technologies,
- matching technologies with site-specific contaminants,
- practical considerations for implementation of technologies, and
- acceptable data standards for technologies.

The workshops are expected to address timely issues that affect all stakeholders, including:

- information on technology options,
- networking opportunities for developers, engineering contractors and site owners, as well as city, state and federal regulators,
- suggestions for reducing technology, as well as data acceptance, barriers at the local level, and
- national perspective on the technology use and data acceptance programs, at both the state and national level, that are developed by many states and several EPA regions including but not limited to the EPA headquarters.

Brownfields Need Cost-Effective Environmental Characterization

One example of the increasing need for innovation in environmental site assessment is the growing number of urban clean-up sites, or "Brownfields". Such sites need characterization methods that can be easily used on-site to determine "smaller" site conditions prior to development. According to the U.S. EPA, cost-effective characterization and monitoring technologies are the most important tools for effective management decisions for site remediation. Increased use of on-site technology will improve the precision and accuracy of site characterization, thereby protecting human health and ecology with much greater efficiency.

Workshop Schedule

Five workshops to be held between January 1998 to October 1998 are as follows:

January 1998

First Workshop hosted by Georgia Tech and the HSRC/ South & Southwest in Atlanta, Georgia

March 1998

Workshop hosted by the Northeast HSRC in Massachusetts

May 1998

Workshop hosted by Colorado State and the Great Plains/Rocky Mountain HSRC in Denver, Colorado

July 1998

Workshop hosted by the Western Region HSRC in California

October 1998

Workshop hosted by Great Lakes & Mid- Atlantic HSRC in Illinois

Following each workshop a newsletter will be produced that will feature the training session, research developments and technology training events occurring elsewhere in the nation.

For further information on attending or participating in this exciting effort please contact the project director:

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■ Faster, Better, Cheaper, from page 2

compounds. PCBs and PAHs were detected in the same mixture at the rate of 10-min/sample. Inductively coupled plasma with optical emission spectroscopy (ICP/OES) was used to analyze 120 samples for metal contamination on-site.

Site contamination maps were produced to facilitate the on-site decision making process, with the adaptive sampling analysis program reaching completion in ten days. The data produced was of sufficient quality to be used for risk assessment. The EPA conducted field and laboratory audits, reviewed SOPs, method detection limit (MDL) studies, and verified all data.

HAFB, as a result of this effort, has already modified the ground water collection system. VOC in fluent concentrations into the treatment plant have increased from 500-ppb (August 1996) to 900-ppb (August 1997).

The data produced in the field can support its use in the HAFB risk analysis and in assessing the effectiveness of past removal actions.

■ Catch the Wave, from page 1

Conference Overview

The introductory plenary session presented an overview of states and businesses that are currently addressing innovative technologies. Kent Gray moderated a panel with Dr. Walt Kovalick, speaking about EPA's Technology Innovation Office (TIO) and Nancy Worst of Texas spoke of the Interstate Technology Regulatory Cooperation (ITRC).

Dr. Steve Liedle, President of Bechtel Hanford, Inc. gave an industry perspective of the process of selecting innovative technologies followed by an overview of technologies and information resources by Jeff Heimerman of EPA's TIO.

Breakout Sessions included discussion on public participation and community acceptance issues, liability, risk when using innovative technologies, and barriers that need to be overcome for states to accept an innovative technology.

Other plenary sessions included:

- An overview of the Federal Remediation Roundtable by Todd Margrave, US Navy, and Greg Williams, from California, explained the formal acceptance process from the state perspective.
- Technology Communication and Acceptance by Dr. James Dearing, Dept. of Communications, Michigan State University, Opinion Leadership - Social Networks and Innovation Attributes.
- Financing of Remediation Technologies by Dag Syrrist, National Research Council, based upon NRC study entitled "Innovations in Groundwater and Soil Cleanup: From Concept to Commercialization"
- Cost Performance of Innovative Technologies
- Trends in Innovative Technologies and Voluntary Clean-up Programs

Concurrent with the presentations were a number of technology exhibits and demonstrations, including an innovative treatment technologies course and a field-based site characterization technologies course. The conference ended with an open forum on Superfund reauthorization and innovative technologies.

Conference Findings

Attendees concluded from breakout sessions on barriers to implementation of innovative remediation technologies were:

1. State regulators and engineering companies need more education and better awareness of innovative remediation and characterization technologies.

2. State officials and companies dealing with innovative technologies would benefit from real world cost and performance data generated by an unbiased party (not the technology vendor or site owner). This information would enhance the rate at which new technologies are implemented at sites across the country.
3. Risk, in the case of technology failure, must be reduced as it applies to all parties. States and EPA are risk adverse and companies do not want to implement a technology that has even the slightest chance of failing. Attendees recommended that a system be established that will not penalize the owner, state regulator, or contractor if the technology should fail.
4. Regulation inflexibility, conflicting authorities, and procurement protocols are a major source of confusion and a barrier. The only suggestions given for this to be overcome was for the vendor and site owner to be creative.

All parties agreed that the current state of remediation technologies are not sufficient at actually taking care of the problem. New legislation on performance based modeling, to be released soon by EPA is aimed at helping to overcome some current barriers to technology implementation.

For More Information or Formal Proceedings, Contact ASTSWMO at 202-624-5970

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Education Project to foster community involvement in brownfields programs, and to learn more about the community's major concerns. As residents and community development groups focused their interests on the desire to enhance locally owned business development, the project sharpened its research and outreach focus on brownfields and community economic development.

Together, Tufts and DSNi developed workshops, training, and publications to match brownfield revitalization to the priority concerns of residents and local businesses. Teams of Tufts graduate students in urban and environmental policy and civil and environmental engineering answered DSNi's need for information about alternative remediation strategies and financing small business development on brownfields with reports that were developed in semester-long capstone and field project classes.

In Roxbury and North Dorchester, small brownfield sites, former homes to diverse uses such as auto repair

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■ Vacant Lots, from page 7

shops, electroplaters, printers, and bakeries, don't always get the attention of the larger tracts of land in other cities and suburbs that can sometimes attract big developers and a large number of new jobs with a single project.

Many communities, however, see these smaller sites as a key to local community revitalization. In pockets and clusters, they litter the landscapes of entire neighborhoods. They raise hopes for renewed community economic vitality, but deliver despair in the reality of environmental, economic, political, and social forces that have kept them idle for so long. Residents, municipalities, and community organizations know that these sites are critical pieces of the puzzle of community revitalization, but they struggle to put the pieces together. For example, at a community meeting sponsored by the Brownfields Education Project in June, 1997, local business owners shared visions of a revitalized "urban village" that provided good jobs and local stores. They covered the walls of the meeting room with words, ideas, and resources that could fill vacant land with new community life.

In a discussion facilitated by the Tufts program, small groups identified available resources and barriers to successful development. Financial barriers, confusion, and site control problems were listed as key barriers. For the

small businesses and community development groups attending, the barriers weren't simply environmental. They included cost of land acquisition, a lack of access to capital for start-up and expanding businesses, and a perceived mismatch between lending criteria of local banks and the needs of the community. Participants also identified fear of crime by outside groups, and fear of outsiders by residents as factors that could discourage development.

Through Education Capacity is Limitless

Through education and training workshops, practical policy research and evaluation, publications and other communication vehicles, ECD works with its partners to build the capacity of multiple community stakeholders to integrate environmental issues into community development decisions and to work more effectively to develop solutions to multi-faceted problems. A primary goal of ECD programs is to contribute to a better understanding of how to practice environmentally sound development, to identify success stories, and share lessons learned for organizations struggling to build communities that are economically and environmentally sustainable.

For more information on ECD or the Brownfields Conference please call 617-627-5118.

On-Site *InSights* Newsletter and Program Information

Editor: Andrea Kinney

Co-Editor: Birgit Caliandro

This will be the first of five publications which will highlight training and assessment applications occurring around the country over the next year. We are interested in

your needs and ideas for future programs that could offer you benefit and increase your capacity to utilize these technologies in the future. Please contact us with your needs or for more information on existing EPA and HSRC programs, technology, and training tools related to innovative characterization technologies at 508-358-3532.

On-Site *InSights*

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