



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
OFFICE OF RESEARCH AND DEVELOPMENT  
NATIONAL EXPOSURE RESEARCH LABORATORY  
P.O. BOX 93478 • LAS VEGAS, NEVADA 89193-3478

Environmental Sciences Division

**April 2004**

Greetings!

Welcome to the first edition of *inSITE*, the newsletter of the U.S. Environmental Protection Agency's Superfund Innovative Technology Evaluation (SITE) Monitoring and Measurement Technology (MMT) Verification Program. Although this Program has been in existence for many years, interest in our activities has been growing and now appears to be the time for us to inform a wider audience about our Program and an upcoming demonstration. This demonstration involves the evaluation and performance verification of six measurement technologies that may be used for the determination of dioxin and dioxin-like compounds in soil and sediment samples. The enclosed newsletter provides additional background material relating to this activity. Future newsletters will include reporting our findings from a recent evaluation of mercury measurement technologies and describing a future demonstration on x-ray fluorescence technologies.

I hope you will find this newsletter to be useful and informative. If you have questions about the SITE Monitoring and Measurement Technology Verification Program or the upcoming dioxin demonstration, please feel free to contact me or visit our Web site (<http://www.epa.gov/ORD/SITE>).

A handwritten signature in cursive script that reads "Stephen Billets".

Stephen Billets, Ph.D.  
Research Chemist  
SITE MMT Program Manager  
Phone: (702) 798-2232  
Email: [billets.stephen@epa.gov](mailto:billets.stephen@epa.gov)



Volume 1, Number 1 April 2004

## What is the SITE MMT Program?

Performance verification of innovative field analytical technologies is an integral part of the regulatory and research mission of the U.S. Environmental Protection Agency (EPA). The Superfund Innovative Technology Evaluation (SITE) Program was established by the EPA to meet three primary objectives:

- identify and remove obstacles to the development and commercial use of innovative technologies;
- demonstrate promising innovative technologies and gather reliable performance and cost information to support site characterization and cleanup activities; and
- develop procedures and policies that encourage the use of innovative technologies at Superfund sites as well as other waste sites or commercial facilities.

The intent of a SITE demonstration is to

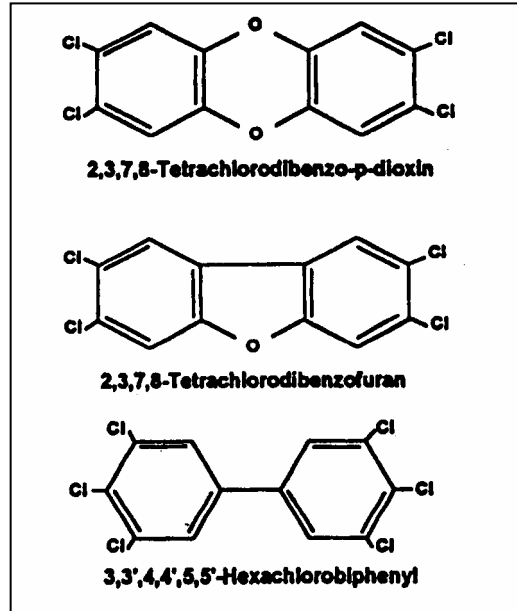


Figure 1. Structures of a representative dioxin, furan, and polychlorinated biphenyl

obtain representative, high-quality performance and cost data on innovative technologies so that potential users can assess a given technology's suitability for a specific application.



Figure 2. Environmental samples were collected from EPA Region 2 (Newark Bay, NJ; Raritan Bay, NJ), Region 3 (Nitro, WV), Region 4 (Warren County, NC; Brunswick, GA), Region 5 (Tittabawassee River, MI; Midland, MI; Saginaw Township, MI), and Region 7 (Winona, MO).

## What are dioxins?

Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, commonly referred to collectively as "dioxins," are of significant concern in site cleanup projects and human health assessments because dioxins are highly toxic. Dioxins and furans are halogenated aromatic hydrocarbons (shown in Figure 1) and have similar structural, chemical, and physical properties. Dioxins are extremely stable under most environmental

conditions making them persistent once released in the environment. The close toxicological and structural similarity of coplanar polychlorinated biphenyls (PCBs) to dioxins has led to the extension of risk assessments to include these dioxin-like compounds.

### ***Why conduct this demonstration?***

Conventional laboratory-based analytical methods for dioxins and PCBs are highly accurate and sensitive, but time-consuming and very costly. The use of simple, rapid, cost-effective measurement technologies enables field personnel to quickly assess the extent of contamination at a site and permit the development of a more focused sampling strategy for subsequent laboratory-based methods. However, users need to evaluate the performance of the technologies before adopting an alternative strategy to exclusive use of traditional laboratory-based methods. The participants in the demonstration are presented in Table 1.

### ***Why conduct a test in Michigan?***

The Michigan Department of Environmental Quality, EPA Region 5, and the U.S. Fish and Wildlife Service wanted to be on the leading edge of innovative analytical technology for the determination of dioxins and took advantage of this opportunity to share this information with their communities. The demonstration will begin on April 26 and interested observers are welcome to attend a Visitors Day on the morning of April 28 at the Green Point Environmental Learning Center in Saginaw, Michigan. The Visitors Day will allow observers to get a first-hand look at the technologies in

**Table 1. Participants in Dioxin Demonstration**

<i>Participant</i>	<i>Contact Information</i>	<i>Technology Name (analytical approach)</i>
Abraxis, L.L.C.	Fernando Rubio 215-357-3911	Coplanar PCB ELISA Kit (immunoassay)
Hybrizyme Corporation	Randy Allen 919-783-9595	AhRC PCR™ Kit (Ah-receptor/PCR)
Paracelsian, Inc.	Noriyoshi Inoue 914-472-5152	Ah-Immunoassay® (ELISA)
CAPE Technologies L.L.C.	Bob Harrison 207-741-2995	DF-1 Dioxin/Furan Immunoassay (immunoassay)
Xenobiotic Detection Systems, Inc.	John Gordon 919-688-4804	CALUX® (bioassay)
Wako Pure Chemicals Industries, LTD.	Emmy Leung 877-714-1920	Dioxin ELISA Kit (immunoassay)
AXYS Analytical Services, LTD.	Laurie Phillips 250-655-5800	High resolution mass spectrometry (commercial analytical lab)


operation.

### ***Demonstration design***

Soil and sediment samples were collected for use in this demonstration from a variety of dioxin-contaminated sites (see Figure 2). The samples represent unique environmental situations and vary greatly in concentration, interferences, and matrix composition. Each participant will be required to analyze over 200 samples, including quality control samples to ensure that a robust and scientifically defensible dataset is obtained.

### ***Outcomes***

Innovative Technology Verification Reports (ITVRs), which describe the performance of each technology, are planned for release in the fall of 2004. The reports will be posted on the Program's Web site (<http://www.epa.gov/ORD/SITE>).



For additional information about the U.S. EPA SITE MMT Program, contact Stephen Billets at 702-798-2232 or [billets.stephen@epa.gov](mailto:billets.stephen@epa.gov).



## VISITORS DAY ANNOUNCEMENT

### Technologies Detecting Dioxin in Soil, Sediment Samples Being Demonstrated

The performance of innovative dioxin monitoring technologies will be evaluated in a demonstration being conducted by the U.S. Environmental Protection Agency's (EPA) Superfund Innovative Technology Evaluation (SITE) Monitoring and Measurement Technology (MMT) Program at the Green Point Environmental Learning Center in Saginaw, MI. A Visitors Day will be held from 9:00 am to noon on Wednesday, April 28, for observers interested in learning more about the SITE Program and the participating technologies.

The SITE program was established by EPA in response to the 1986 Superfund Amendment Reauthorization Act. The program's goals are to provide a framework to conduct meaningful demonstrations; facilitate the exchange of information among regulators, users, and the public; and encourage the use of the new technologies. Conventional methods for measuring dioxin are time consuming and costly. The use of simple, rapid, and cost effective screening methods will enable personnel to rapidly assess the extent of dioxin contamination. During the demonstration, which begins at Green Point on April 26, commercially-available technologies will be field-tested using dioxin contaminated soils and sediment samples from several EPA Regions. Data collected during the field demonstration will be used to assess the performance of each technology. Remediation (i.e., cleanup) methods will not be evaluated in this demonstration. Reports on the performance of these technologies will be available in the fall of 2004 on the SITE Program's Web site (<http://www.epa.gov/ORD/SITE>).

The following technology developers will be demonstrating their technologies:

- **CAPE Technologies L.L.C. (DF-1 Dioxin/Furan Immunoassay Kit)**
- **Paracelsian, Inc. (Ah-IMMUNOASSAY®)**
- **Abraxis LLC (Coplanar PCB ELISA Kit)**
- **Xenobiotic Detection Systems, Inc. (CALUX®)**
- **Hybrizyme Corporation (AhRC PCR™ Kit)**
- **WAKO Pure Chemical Industries, LTD. (Dioxin ELISA Kit)**

Participants in the Visitors Day at Green Point are asked to assemble in the east side of the parking lot of Germania Town & Country Club, 1 Germania Platz, Saginaw (located at the end of South Wheeler Street), by 8:30 a.m. on April 28. Visitors will be shuttled to Green Point due to limited parking. The Visitors Day will include informational presentations by EPA. Visitors will also be given the opportunity to interact with the technology developers and observe the technologies in operation.

If you have questions about this SITE dioxin demonstration, please contact **Dr. Stephen Billets, EPA**, [billets.stephen@epa.gov](mailto:billets.stephen@epa.gov), 702-798-2232. If you plan to attend the Visitors Day, please register by contacting **Helen Latham, Battelle**, [lathamh@battelle.org](mailto:lathamh@battelle.org), 614-424-4062.