



Federal Remediation Technology Roundtable Meeting

December 7, 2005

Arlington, VA

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EPA-Office of Superfund Remediation and Technology Innovation

How do I use...?

How is... applicable?

Improve Technology Awareness

- User's guides
- Technology demos and reports



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Measurement and Monitoring Technologies for the 21st Century (21M²)

Through the Measurement and Monitoring Technologies for the 21st Century initiative, EPA's Office of Solid Waste and Emergency Response (OSWER) will identify and deploy promising measurement and monitoring technologies in response to waste management and site cleanup program needs by matching existing and emerging technologies with OSWER program and client needs. **Need areas** include DNAPL characterization techniques; monitoring mining waste sites; sensor technology development; vapor intrusion monitoring methods; test methods for dioxin, cyanide, mercury, pesticide, perchlorate, MTBE, and emerging contaminants; and remote sensing for a variety of applications. The literature search database contains thousands of citations and abstracts on these and other topics.

In the Spotlight

17th Quarterly Literature Search
 Posted: October 17, 2005
 The 17th quarterly update of literature contains new citations related to the needs areas. A list of these citations and accompanying abstracts is found under [View New Entries](#). These citations are also part of the [searchable master database](#).
[View new entries \(460K/103pp/PDF\)](#)

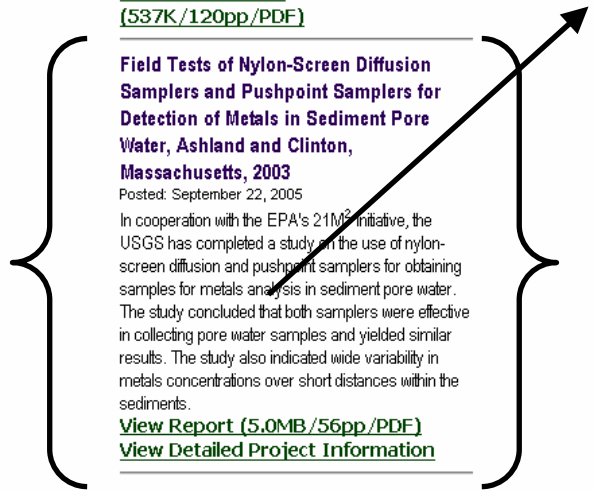
Focused Literature Search: Emerging Contaminants
 Posted: September 30, 2005
 This literature search was focused on measurement methods and characterization approaches for a group of "emerging" contaminants. By emerging it is meant that they have not, or have not until recently, been seen as chemicals of concern for the Agency remedial action programs. For many of them, analysis by standard Contract Laboratory Program or SW 846 methods is unlikely to detect them or to detect them at levels of concern.
[More Information \(537K/120pp/PDF\)](#)

Field Tests of Nylon-Screen Diffusion Samplers and Pushpoint Samplers for Detection of Metals in Sediment Pore Water, Ashland and Clinton, Massachusetts, 2003
 Posted: September 22, 2005
 In cooperation with the EPA's 21M² Initiative, the USGS has completed a study on the use of nylon-screen diffusion and pushpoint samplers for obtaining samples for metals analysis in sediment pore water. The study concluded that both samplers were effective in collecting pore water samples and yielded similar results. The study also indicated wide variability in metals concentrations over short distances within the sediments.
[View Report \(5.0MB/56pp/PDF\)](#)
[View Detailed Project Information](#)

Evaluation of a Former Landfill Site in Fort Collins, Colorado Using Ground-Based Optical Remote Sensing Technology
 Posted: September 1, 2005
 With support from the 21M² Initiative, the Office of Research and Development used a variety of remote sensing

Cluin.org/programs/21m2/

Field Tests of Nylon-Screen Diffusion Samplers and Pushpoint Samplers for Detection of Metals in Sediment Pore Water, Ashland and Clinton, Massachusetts, 2003
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[View Detailed Project Information](#)





Measurement and Monitoring Technologies for the 21st Century (21M²)

Literature Search

Last updated on October 27, 2005

Total Citations: 4604

Welcome to the Measurement and Monitoring Initiative Literature Search System. This system, which is updated quarterly, incorporates citations and descriptions from literature related to the identified OSWER needs areas and includes commercially available monitoring and measurement materials, plus government-sponsored small business awards (SBIRs) and other awards. If you know of a relevant Internet or literature source that would be useful in the 21M² Literature System, please [let us know](#).

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Literature Search

Search Term:

Inclusions: [SBIR](#) [Commercial](#) [Grants](#)

Show Only: [SBIR](#) [Commercial](#) [Grants](#)

Needs Area:

Focused Literature Searches

Several focused literature searches are also available:

- [Emerging Contaminants](#) (01/03/2001)
- [Nanotubes, Nanopores, Nanoclusters and Other Foundations for Nanosensors](#) (10/05/2004)
- [Geophysical Methods for Locating and/or Monitoring DNAPLs](#) (08/03/2004)
- [Open-Path Monitoring Techniques](#) (02/28/2002)
- [Landfill and Containment Leak Detection in the Vadose Zone](#) (03/23/2001)
- [Perchlorate Analysis](#) (01/03/2001)

- [Emerging Contaminants](#) (09/30/2005)
- [Nanotubes, Nanopores, Nanoclusters and Other Foundations for Nanosensors](#) (10/05/2004)
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- [Perchlorate Analysis](#) (01/03/2001)

Search Tips

A search using only a word or phrase will return all citations. If grants, SBIR awards, or other awards are desired, use the Inclusions box(es). Checking Show Only boxes excludes literature citations. To see all items connected with a Needs Area, leave the Search Term blank, check all the Inclusions, select the Needs Area, and hit Submit Query. It is not necessary to select a Needs Area if you wish to search the database for an author or a specific term.

- Abstracts from literature:
 - Commercially Available Material
 - Government-Sponsored
 - SBIR
 - Grants
- Search by Keyword or Needs Area



Measurement and Monitoring Technologies for the 21st Century (21M²)

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Active 21M² Projects

Project Title	Point of Contact	Project Details
...ole Measurement of ...de, and Nitrate in	James Ursic U.S. EPA, Region 5	View
CZE Method(s) for Polar Organic Compounds (FY 1999)	Barry Lesnik U.S. EPA, Office of Solid Waste	View
Dioxin Emission Monitoring System (FY 2004)	Brian Gullet EPA ORD-RTP	View
Electrospray High Performance Liquid Chromatography/Mass Spectrometry (HPLC/ES/MS) Method (FY 1999)	Barry Lesnik U.S. EPA, Office of Solid Waste	View
Evaluation of Open-Path Spectroscopy Technologies for Determining Fugitive Gaseous Emissions at Landfills (FY 2003)	Susan Thorneloe Research Triangle Park	View
Field Analytic Technologies Encyclopedia (FATE) (FY 2001)	Ann Eleanor U.S. EPA, Technology Innovation Office	View
FIELDS Software Online Tutorial (FY 2000)	Brian Cooper U.S. EPA, Region 5	View
Geolectric Surface for Organics (FY 2001)	Anna Krasko U.S. EPA, Region 1	View
Radon Deficit Technique for DNAPL Characterization (FY 2004)	Dick Goehler EPA Region 1	View
Sensor Technologies Interfaced with In Situ Probe (FY 2001)	Jerry Keefe U.S. EPA, Region 1	View
Use of Radon as a Tracer and Other Technologies to Characterize Vapor Intrusion (FY 2004)	Ray Cody EPA Region 1	View

Completed 21M² Projects

Project Title	Point of Contact	Project Details
Field Method for Detecting Perchlorate (FY 2001)	Joseph Eidelberg U.S. EPA, Region 9	View
Field Tests of Nylon Screen Diffusion		

What are the selection criteria?

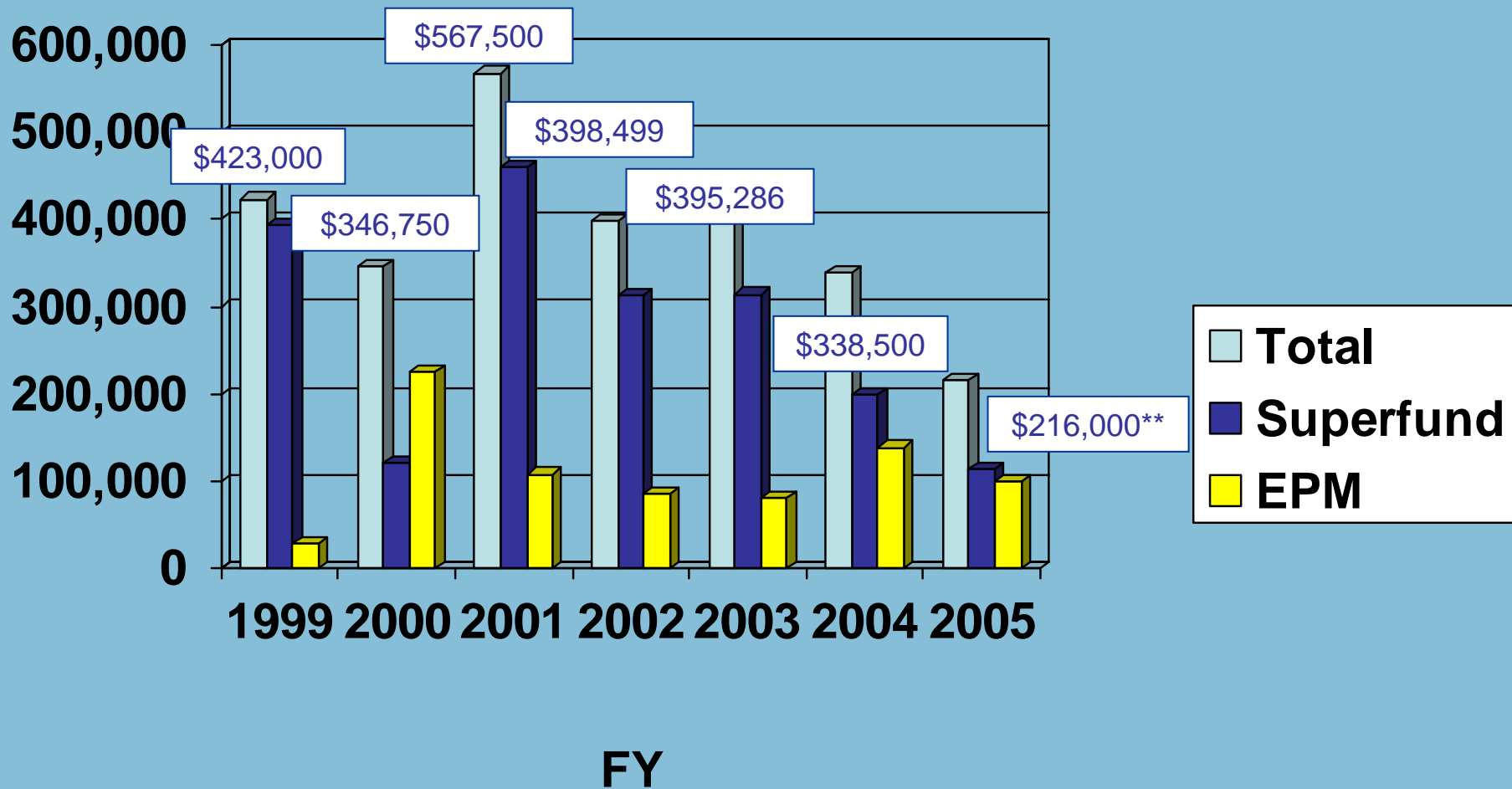
Funding?

Needs?

EPA requirements?



21M² Expenditures



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Measurement and Monitoring Technologies for the 21st Century (21M²)

EPA Office of Solid Waste and Emergency Response (OSWER) Needs Areas

Solid Waste and Emergency Response (OSWER) has undertaken an extensive review of current monitoring and characterization technologies for hazardous waste sites. OSWER believes that there have been significant technological advances in recent years in the areas of chemical constituent identification and quantification, geophysical analysis, and information management. These advances could dramatically improve capabilities to characterize sites, monitor remedial activities and provide long term monitoring for closed sites.

OSWER has identified 18 areas where significant technology needs or gaps exist and, thus, require research to help address these needs. These areas are:

Air Emissions Monitoring

Continuous Emissions Monitors for Use with Thermal Hazardous Waste Treatment Systems

Compliance with air emission standards or limitations has traditionally been determined by initial and periodic "stack tests" and establishment of operating parameters with the goal of ensuring day-to-day compliance. The main concerns with this approach are 1) the time intervals between tests is long (3 to 10 years); 2) lack of certainty that the operating parameter specification is effective in ensuring that day-to-day emissions are within acceptable limits; and 3) even an expensive stack test does not measure all of the potential "products of incomplete combustion" (PICs).

OSWER is seeking technologies or techniques which allow real-time/near real-time ability to measure stack emissions for toxic organic and heavy metals. According to EPA's combustion strategy (November 1994), the proposed new performance standard for Municipal Waste Combustors is 0.2 ng TEC/dscm. A complicating factor for dioxin and furan monitoring is that these contaminants can occur in both gaseous and particulate phases attached to particulate matter.

Characterizing and Monitoring Mining Sites

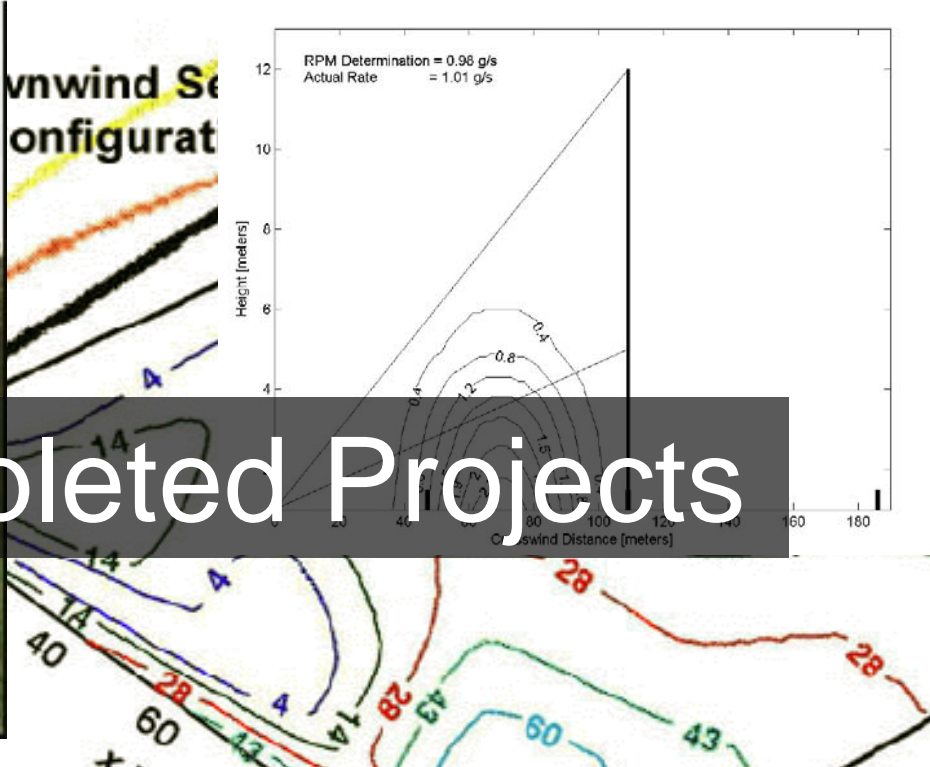
Monitoring Technologies for Mining Waste Sites

The presence of very large mining sites, particularly in the western states, presents a significant health and environmental threat with no cost-effective solution. Superfund mining sites pose a unique and significant challenge because they often cover a large geographic area and include a very large volume of contaminated media resulting from mining operations. The ability to characterize and monitor releases from these sites is vital to understanding the risks and developing appropriate remedial approaches.

OSWER is seeking low-cost, low maintenance monitors and advanced remote-sensing based tools (i.e., air and space borne) for characterizing the extent of contamination at very large mining waste sites, monitoring releases, assessing risks, and planning and implementing remediation measures. These tools should provide information on the

Current OSWER Needs:

- Air Emissions Monitoring
- Char & Mon Mining Sites
- Sediment Characterization
- Field Methods
- Indoor Air / Vapor Intrusion
- In-situ Monitoring
- Laboratory Analytical Methods
- Monitoring In-situ Remedy Efficacy
- Non-invasive Subsurface Chemical Detection
- Underground Storage Tanks



Recently Completed Projects



- CH₃HgCl
- CH₃CH₂HgCl
- HgCl₂
- Hg(OH)₂
- Hg(NO₃)₂
- HgSO₄
- HgO
- Hg²⁺ complexes^s
- Hg⁰
- Hg⁰-M^d
- Hg²⁺ complexes^c
- Hg₂Cl₂ (minor)
- Hg₂Cl₂ (major)
- HgS
- HgSe

In cooperation with the
U.S. Environmental Protection Agency
Measurement and Monitoring for the 21st Century Initiative

**Pushpoint Sampling for Defining
Spatial and Temporal Variations in
Contaminant Concentrations in Sediment
Pore Water near the Ground-Water/
Surface-Water Interface**

Scientific Investigations Report 2005-5036

U.S. Department of the Interior
U.S. Geological Survey

Zaneman and others—Pushpoint Sampling for Defining Spatial and Temporal Variations in Contaminant Concentrations in Sediment Pore Water near the Ground-Water/Surface-Water Interface—SIR 2005-5036





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Recently Completed Projects

- Mercury Speciation analysis scheme using SW-846 Method 7473
- Open Path FTIR/TDL Surveys of Fugitive Emissions at R1 / R8 Landfills
- Pushpoint Sampling for Defining Spatial and Temporal Variations in Sediment Pore Water (USGS Report).
- Field Tests of Nylon Screen Diffusion Samplers and Push Point Samplers for Detection of Metals in Sediment Pore Water (USGS Report).

Reports Available at:

<http://clu-in.org/programs/21m2/projects/>



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2005 Projects

- Development of a User's Guide: Tree Coring to Examine Subsurface Volatile Organic Compounds (R1 w/ USGS).
- Demonstrate Electrical Resistivity Tomography and Induced Polarization Tomography Methods for Characterization of Fractured Bedrock DNAPL Sites (R1).
- Demonstrate an Innovative Fence-Line Metal Emissions Monitor at Hazardous Waste Sites (RTP-ORD).