

The 19th Annual International Conference on

# Soils, Sediments and Water

**October 20-23, 2003**

University of Massachusetts at Amherst

Analysis, Site Assessment, Fate,  
Environmental and Human Risk Assessment,  
Remediation and Regulation



**Conference Co-Directors**

**Paul T. Kostecki, Ph.D.**  
**Edward J. Calabrese, Ph.D.**  
Environmental Health Sciences  
School of Public Health  
University of Massachusetts  
Amherst, MA

**Clifford Bruell, Ph.D.**  
Center for Environmental Engineering  
Science & Technology  
University of Massachusetts  
Lowell, MA

**Brian J. Rothschild, Ph.D.**  
Graduate School of  
Marine Sciences & Technology  
University of Massachusetts  
Dartmouth, MA

- **125 Presenters**
- **148 Posters**
- **12 Workshops**
- **44 Exhibitors**

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10:00 am - 5:00 pm  
10:00 am - 5:00 pm  
1:00 pm - 5:00 pm  
1:00 pm - 5:00 pm  
1:00 pm - 3:00 pm  
3:00 pm - 5:00 pm

- 1) **Theory and Use of Field Portable X-ray Fluorescence for Soil Analysis** (*Campus Center 904-08*)
- 2) **In-Situ Chemical Oxidation Workshops** (*Campus Center 1109*)
- 3) **TBA/MTBE Remediation Seminar** (*Campus Center 101*)
- 4) **A Practical Approach for Assessing Upward Vapor Intrusion Risk** (*Campus Center 917*)
- 5) **The Arsenic Nobody Wanted: Now What? A Panel Discussion on Arsenic in Communities** (*Campus Center 168C*)
- 6) **Implementing the Massachusetts DEP's New Data Enhancement Policy - PRACTICAL Data Quality Tips for LSPs and other Data Users** (*Campus Center Auditorium*)

## AM SESSIONS

### Session 1: ENVIRONMENTAL BIOTECHNOLOGY

*Campus Center Auditorium*

*Sponsored by*

**REGENESIS BIOREMEDIATION PRODUCTS**

**Moderator: Stephen Koenigsberg,**

*Regensis Bioremediation Products, San Clemente, CA*

**8:30 am**

**An Overview of Environmental Biotechnology**

*Dr. Terry Hazen, Lawrence Berkeley National Laboratory, Berkeley, CA*

**9:00 am**

**Metabolic Engineering to Reduce Toxicity Related to the Aerobic Degradation of Chlorinated Ethenes**

*Lingyun Rui, Young Man Kwon, Thomas K. Wood, University of Connecticut, Storrs, CT  
Valerie A. Pferdeort, Kenneth F. Reardon, Colorado State University, Fort Collins, CO*

**9:30 am**

**Cleaning Up with Genomics: Application of Molecular Biology to Bioremediation**

*Dr. Derek Lovely, University of Massachusetts, Amherst, MA*

**10:00 am Break**

**10:30 am**

**Specific Tools for Monitoring Perchlorate Bioremediation**

*Dr. John Coates, Susan M. O'Connor, University of California, Berkeley, Berkeley, CA  
Nora B. Sutton, Claremont McKenna College, Claremont, CA*

**11:00 am**

**Biostimulation or Bioaugmentation? Decision Making Based on Scientific Data: Remediation Decisions Guided by Real Time PCR Quantification of Reductively Dechlorinating Dehalococoides Populations**

*Dr. Kirsti Ritalahti, Frank E. Loeffler, Georgia Institute of Technology, Atlanta, GA  
Steven S. Koenigsberg, Regensis Bioremediation Products, San Clemente, CA*

**11:30 am**

**Let's Ask the Microbes What Matters? A Field Guide to the Biochemical Responses of Degradation Populations to Environmental Conditions**

*David C. White, Aaron D. Peacock, University of Tennessee, Knoxville, TN  
Edward Sobek, Greg A. Davis, Microbial Insights, Inc., Rockford, TN*

### Session 4: REMEDIATION I

*Bowker Auditorium, Stockbridge Hall*

**Moderator: Ernest B Ashley,**

*Camp, Dresser & McKee, Inc., Cambridge, MA*

**8:30 am**

**Carbon Dioxide Aeration and Zero Valence Iron Remediation of High pH and Hexavalent Chromium Groundwater at a Private Site in Niagara Falls, NY**

*Charles McLeod, EA Engineering, Science, and Technology, Newburgh, NY  
Mike Resh, The BOC Group, Murray Hill, NJ  
Steven Rival, Daniel Hinckley, EA Engineering, Science, and Technology, Sparks, MD*

**Noon - Lunch**

### Session 2: DEPARTMENT OF DEFENSE TRAINING RANGES AND MUNITIONS CONSTITUENTS: CHALLENGES AND SOLUTIONS

*101 Campus Center*

**Moderator: Brian D. Rogers,**

*Department of the Army, Arlington, VA*

**8:30 am**

**Department of Defense Range Preservation Initiative**

*David E. Bell, Associate Deputy General Counsel, U.S. Army*

**9:00 am**

**Distribution, Transport and Fate of Energetic Materials on Ranges**

*Tom Jenkins, Alan D. Hewitt, Marianne E. Walsh, U.S. Army ERDC-CRREL, Hanover, NH  
Sonia Thiboutot, Guy Ampleman, Defence R&D Canada, Val-Belair QC, Canada  
Thomas A. Ranney, Science and Technology Corporation, Hanover, NH  
Judith C. Pennington, U.S. Army ERDC-EL, Vicksburg, MS*

**9:30 am**

**Successful In Situ Bioremediation of Perchlorate in Soil & Groundwater at Multiple Sites**

*Evan E. Cox, Geosyntec Consultants, Guelph, Ontario, Canada  
Robert Borch, GeoSyntec Consultants, Bellingham, WA  
Scott Neville, Aerojet, Sacramento, CA*

**10:00 am Break**

**10:30 am**

**Passive In Situ Remediation of Explosives in Groundwater**

*Richard L. Johnson, Paul J. Tratnyek, Oregon Health & Science University, Beaverton, OR*

**11:00 am**

**Bioavailability and Soil Boundary Conditions for Ecological Soil Screening Levels: Benchmarks for Metal Toxicity to Soil Invertebrates**

*Ronald T. Checkai, Ph.D., Roman G. Kuperman, Ph.D., Michael Simini, Ph.D., Carlton T. Phillips, U.S. Army Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD  
Jason A. Speicher, David J. Barclift, U.S. Navy Engineering Field Activity Northeast, Lester, PA*

**11:30 am**

**Toward a Sustainable Range: Assessment of Source, Transport, and Fate of Munitions Constituents on Active Army Training Ranges**

*June E. Mirecki, U.S. Army Engineer Research and Development Center, Vicksburg MS*

**9:00 am**

**HRC Treatment of a PCE Impacted Unconsolidated Aquifer**

*Jonathan K. Child, Fuss & O'Neill, Inc., West Springfield, MA  
Timothy J. St. Germain, John B. Hankins, Fuss & O'Neill, Inc., Manchester, CT*

**9:30 am**

**Ex Situ Treatment of Dense Non-Aqueous Phase Liquids Using Calcium Oxide (Quick Lime)**

*Wm. Gordon Dean, WRS Infrastructure & Environment, Inc., Tallahassee, FL*

**10:00 am Break**

### Session 3: REGULATORY/ LEGAL ISSUES

*168C Campus Center*

**Moderator: Millie Garcia-Surette,**

*MA DEP, Southeast Region, Lakeville, MA*

**8:30 am**

**The Vapor Intrusion Pathway: An Environmental Snipe Hunt?**

*Thomas E. McHugh, John A. Connor, Groundwater Services, Inc., Houston, TX*

**9:00 am**

**State Regulation of Large, Area-wide Metals Contamination Problems**

*Loren R. Dunn, Attorney, Riddell Williams P.S., Seattle WA*

**9:30 am**

**An Overview of State Programs to Investigate and Remediate Contaminated Drycleaner Sites**

*Steve Goins, Tennessee Div. of Superfund, Nashville, TN  
Dale Trippier, Minnesota Pollution Control Agency, St Paul, MN*

**10:00 am Break**

**10:30 am**

**PCBs in the Delaware: A Thirty-one Year Technical and Legal Odyssey**

*Itzhak E. Kornfeld, Oaysey Environmental Systems, Philadelphia, PA*

**11:00 am**

**Water Resource Damages: The Down Side of Natural Attenuation as a Remedy**

*Rolf R. von Oppenfeld, The TESTLaw Practice Group, Phoenix, AZ  
Mark E. Freeze, The TESTLaw Practice Group, Columbia, SC*

**11:30 am**

**Expert Opinions in Environmental Litigation Gatekeeping 10 Years After Daubert**

*Robert L. Burns, Jr., Thorp Reed & Armstrong, Pittsburgh, PA  
David G. Ries, Thorp Reed & Armstrong, Pittsburgh, PA*

**10:30 am**

**NAPL Containment Using In Situ Stabilization**

*James R. Greacen, The RETEC Group, Inc., Concord, MA  
Edward J. Walsh, Lyme Properties, Cambridge, MA*

**11:00 am**

**A Case Study of Remedial Action and Closure at a Former Manufactured Gas Plant Site**

*Edward P. Van Doren, Dennis G. Tuttle, Shaw Environmental, Inc., Andover, MA*

**11:30 am**

**Case Study of Remediation of a Vinyl Chloride Impacted Drinking Water Aquifer**

*Gerald L. DeMers, Heidi W Yantz, GeoTrans, Inc., Brookfield, WI*

Luncheon Speaker, Tuesday, October 21, 2003

**Resolving Environmental Disputes in the 21st Century:  
How Did We Get Here, Where Are We Going and Is the System Broke?**

*Paul D. Phillips, partner, Hollard & Hart LLP, Denver, CO*

## Session 1: BIOAVAILABILITY

Campus Center Auditorium

**Moderators:** Mark Barnett,  
Auburn University, Auburn, AL

Michael V. Ruby, Exponent, Boulder, CO

### 1:30 pm

#### Lead Bioaccessibility in the Gastrointestinal Tract: Evaluation of Five In Vitro Digestion Models against In Vivo Data

Tom R. Van de Wiele, LabMET, Ghent University, Ghent, Belgium  
Agnes G. Oomen, National Institute of Public Health and the Environment, Bilthoven, The Netherlands

Joanna Wragg, Mark Cave, British Geological Survey, Nottingham, United Kingdom

Mans Minekus, TNO Nutrition, Zeist, The Netherlands  
Alfons Hack, Ruhr-Universität Bochum, Bochum, Germany  
Christa Cornelis, Vito, Mol, Belgium

Ben Klinck, British Geological Survey, Nottingham, United Kingdom

Cathy Rempelberg, Loeckie De Zwart, National Institute of Public Health and the Environment, Bilthoven, The Netherlands

Joop Van Wijnen, GG&GD, Amsterdam, The Netherlands  
Willy Verstraete, LabMET, Ghent University, Ghent, Belgium  
Adrienne J. Sips, National Institute of Public Health and the Environment, Bilthoven, The Netherlands

### 2:00 pm

#### Bioavailability of Contaminants in Soils and Sediments: Processes, Tools, and Applications

Richard G. Luthy, Stanford University, Stanford, CA

Richelle M. Allen-King, Washington State University, Pullman, WA

Sally L. Brown, University of Washington, Seattle, WA

David A. Dzombak, Carnegie Mellon University, Pittsburgh, PA

Scott E. Fendorf, Stanford University, Stanford, CA

John P. Giesy, Michigan State University, East Lansing, MI

Joseph B. Hughes, Rice University, Houston, TX

Samuel N. Luoma, U.S. Geological Survey, Menlo Park, CA

Linda A. Malone, College of William & Mary, Williamsburg, VA

Charles A. Menzie, Menzie-Cura & Associates, Inc., Chelmsford, MA

Stephen M. Roberts, University of Florida, Gainesville, FL

Michael V. Ruby, Exponent, Boulder, CO

Terry W. Schultz, University of Tennessee, Knoxville, TN

Barth F. Smets, University of Connecticut, Storrs, CT

Laura J. Ehlers, National Research Council, Washington DC

### 2:30 pm

#### Bioavailability of Nickel from Port Colborne Soils: A Comparison of In Vivo and In Vitro Methodologies

Christopher A. Olson, Wai Chi Kwan, Cecile E. Willert,

Eric Veska, Jacques Whitford Environment Limited,

Markham, Ontario, Canada

Iris Koch, Kenneth J. Reimer, Royal Military College of

Canada, Kingston, Ontario, Canada

### 3:00 pm

#### Measurement of Arsenic Bioavailability from Soil

Michael V. Ruby, Exponent, Boulder, CO

Stephen M. Roberts, University of Florida, Gainesville, FL

Ronald C. Wester, University of California, San Francisco, CA

Rosalind A. Schoof, Integral Consulting, Inc., Bellevue, WA

Yvette W. Lowney, Exponent, Boulder, CO

### 3:30 pm Break

## Session 4: PHYTOREMEDIATION

Bowker Auditorium, Stockbridge Hall

**Moderators:** Lee Newman,

University of South Carolina, Columbia, SC

Jason C. White,

The Connecticut Agricultural Experiment, New Haven, CT

### 1:30 pm

#### Phytoremediation of Arsenic Contaminated Groundwater using an Arsenic Hyperaccumulating Fern *Pteris vittata* L

Lena Q. Ma, M.S. Tu, and A.O. Fayiga, University of

Florida, Gainesville, FL

Robert H. Stamps, University of Florida, Apopka, FL

Edward J. Zillioux, Florida Power & Light Company, Juno Beach, FL

### 3:00 pm

#### Field Evidence for Plant-Enhanced PAH Degradation and Implications for Monitoring

C.M. Reynolds, U.S. Army Engineer Research and Development Center

L. B. Perry, K. L. Foley, D. B. Ringelberg, ERDC-CRREL, Hanover, NH

K. J. McCarthy, Battelle, Duxbury, MA

## 5:30 pm - End

### 4:00 pm

#### Comparison of Five In Vitro Digestion Models to Study the Bioaccessibility of Soil Contaminants

Agnes G. Oomen, RIVM-SIR, Bilthoven, The Netherlands

Alfons Hack, Ruhr-Universität Bochum, Bochum, Germany

Mans Minekus, Evelijn Zeijdner, TNO Nutrition, Mol, Belgium

Christa Cornelis, Greet Schoeters, Vito, Mol, Belgium

Willy Verstraete, Tom Van de Wiele, Ghent University,

Ghent, Belgium

Joanna Wragg, British Geological Survey, Nottingham,

United Kingdom

Joop H. Van Wijnen, GG&GD Amsterdam, Amsterdam,

The Netherlands

### 4:30 pm

#### Human In Vitro Intestinal Cell Lines and Bioavailability

Desmond I. Bannon, Aberdeen Proving Ground, MD

### 5:00 pm

#### The Effect of Phosphate Treatment on the Bioavailability of Soil Lead in Humans

Nancy Lolocono, Steven Chillrud, Conrad Blum, Columbia

University, New York, NY

Mark Maddaloni, Environmental Protection Agency, New York, NY

Joseph Graziano, Columbia University, New York, NY

## Session 2: ENVIRONMENTAL FORENSICS

101 Campus Center

**Moderator:** Robert Morrison,

R. Morrison & Associates, Inc., Escondido, CA

### 1:30 pm

#### A Forensic Approach to Evaluation of Co-mingled Aircraft Deicing Fluids and Jet Fuel

Eric M. Cherry, Hull & Associates, Inc., Dublin, OH

Heidi Pruess, Cleveland Hopkins International Airport, Cleveland, OH

Loretta Snider, Hull & Associates, Inc., Solon, OH

Kevin C. Valentine, Parsons Corp., Cleveland, OH

### 2:00 pm

#### Surface Water Sheen Source Investigation at a Petroleum Product Terminal

Julie K. Sueker, Blasland, Bouck & Lee, Inc, Denver, CO

Caron Koll, Blasland, Bouck & Lee, Inc., Syracuse, NY

Rebecca Countway, Blasland, Bouck & Lee, Inc., Long Beach, CA

Pat Hughes, ChevronTexaco Energy Research and

Technology Company, Richmond, CA

Peter L. Kasbohm, ChevronTexaco Products Company, Atlanta, GA

Helder Costa, Blasland, Bouck & Lee, Inc., New Bedford, MA

Bill McCune, Blasland, Bouck & Lee, Inc., Syracuse, NY

### 2:30 pm

#### Forensic Electronic File Review

David R. Blye, Rock J. Vitale, Ruth L. Forman, Environmental

Standards, Inc., Valley Forge, PA

### 3:00 pm

#### Distinguishing PAH Background and MGP Residues in a Freshwater Creek

Helder J. Costa, Blasland, Bouck & Lee, Inc., New Bedford, MA

Keith A. White, Blasland, Bouck & Lee, Inc., Syracuse, NY

John J. Ruspantini, New York State Electric & Gas, Binghamton, NY

### 3:30 pm Break

#### 2:00 pm Fate of Volatile Compounds In Phytoremediation Applications

Joel G. Burken, Amanda W. Gilbertson, Garrett C. Struckhoff,

Xingmao Ma, University of Missouri Rolla, Rolla, MO

#### 2:30 pm Influence of Cultivation Conditions and Nutrient Stress on the Exudation of Organic Acid and Uptake of Weathered p,p'-DDE- by Zucchini and Cucumber

Xiaoping Wang, Jason C. White, Martin P.N. Gent, MaryJane

Incorvia Mattina, Lydia T. Wagner, The Connecticut

Agricultural Experiment Station, New Haven CT

#### 3:00 pm Field Evidence for Plant-Enhanced PAH Degradation and Implications for Monitoring

C.M. Reynolds, U.S. Army Engineer Research and Development Center

L. B. Perry, K. L. Foley, D. B. Ringelberg, ERDC-CRREL, Hanover, NH

K. J. McCarthy, Battelle, Duxbury, MA

### 4:00 pm

#### New Bedford Harbor Data Interpretation

John F. Ehret, PG., Tetra Tech FW, Inc., Boston, MA

Ronald J. Marnicio, Tetra Tech FW, Inc., Boston, MA

Douglas K. Stout, Foster Wheeler Inc., Clinton, NJ

### 4:30 pm

#### Diamondoid Hydrocarbons Application in the Chemical Fingerprinting of Gas Condensate and Gasoline

Scott A. Stout, Edward M. Healey, Gregory S. Douglas,

Battelle Memorial Institute, Duxbury, MA

### 5:00 pm

#### Chemical Characterization of Potential Pyrogenic Sources

Shan-Tan Lu, Robert I. Haddad, Issac R. Kaplan, ZymaX

Forensics, San Luis Obispo, CA

## Session 3: BIOREMEDIATION OF ACID MINE DRAINAGE AND REMOVAL OF METALS

168C Campus Center

Sponsored by CHICKADEE MINING Co.

**Moderator:** Henry Tabak, USEPA, Cincinnati, OH

### 1:30 pm

#### Advances in Biotreatment of Acid Mine Drainage and Biorecovery of Metals

Henry H. Tabak, USEPA, Cincinnati, OH

### 2:00 pm

#### Field Demonstration and Numerical Evaluation of In Situ Bioremediation of Paper Metals-Contaminated Groundwater

Ming-Kuo Lee, Auburn University, Auburn, AL

### 2:30 pm

#### Heavy Metal Toxicity to Sulfate Reducing Bacteria

Brent M. Peyton, Rajesh K. Sani, Washington State

University, Pullman, WA

### 3:00 pm

#### Metal Removal Efficiency and Speciation in Anaerobic Bioreactors

Dr. Eric D. Van Hullebusch, Ir. Marcel H. Zandvoort, Piet Lens,

Wageningen University, Wageningen, The Netherlands

### 3:30 pm Break

### 4:00 pm

#### Kinetic Parameter Determination in Dynamically Operated CST-reactors: Paper Ferrous Iron Oxidation by *Leptospirillum ferrooxidans*

Robbert Kleerebesem, Technical University of Delft, Delft,

The Netherlands

### 4:30 pm

#### Design Challenges for Large-Scale Sulfate Reducing Bioreactors

James J. Gusek, Golder Associates, Inc., Lakewood, CO

### 5:00 pm

#### Using Respirometry to Measure Hydrogen Utilization by Sulfate Reducing Bacteria in the Presence of Copper and Zinc

Edith L. Holder, University of Cincinnati, Cincinnati, OH

### 3:30 pm Break

#### 4:00 pm Phytoremediation of Petroleum Hydrocarbon Contaminated Soil: Results from RTDF Cooperative Field Tests

Peter A. Kulakow, Xiujuan Feng, Kansas State University,

Manhattan, KS

#### 4:30 pm Recent Advances in Arsenic Phytoremediation

Charissa Y. Poynton, Mark P. Elles, Michael J. Blaylock,

Edenspace Systems Corporation, Dulles, VA

#### 5:00 pm Phytoremediation of Lead and Zinc Contaminated Soils using *Mirabilis jalapa*

Prof. Alessandra Carucci, Alessia Cao, Giuseppe Fois, Prof. Aldo

Muntoni, University of Cagliari, Cagliari, Italy



**Session 1: CCA TREATED WOOD REGULATIONS, SCIENCE AND RISK ASSESSMENT, PART I**

Campus Center Auditorium

Sponsored by THE AMERICAN CHEMISTRY COUNCIL'S CCA TASK FORCE

**Moderators: Has Shah,**  
American Chemistry Council, Arlington, VA  
**Nicholas P. Skoulis,**  
Arch Chemicals, Inc., Norwalk, CT

**8:00 am**  
**CCA: Regulatory History and Current Status**  
Dr. Raj Sharma, Arch Chemicals, Inc., Norwalk, CT

**8:30 am**  
**EXAFS Investigation of Cr and As in CCA Treated Materials**  
Dr. Peter Nico, California State University, Stanislaus, Turlock, CA

**9:00 am**  
**Arsenic and Speciated Chromium Levels in Soil Surfaces Near Treated Wood Playscapes**  
John H. Butala, M.S., Toxicology Consultants, Inc., Gibsonia, PA

**9:30 am**  
**Does Disposed CCA-Treated Wood Influence Arsenic or Chromium Concentrations in Subsurface Drinking Water Supplies?**  
Dr. Jennifer K. Saxe, Gradient Corporation, Cambridge, MA

**10:00 am Break**

**10:30 am**  
**Hand-Wipe Sampling of CCA-Treated Wood with Comparison to CPSC Hand-Wipe Study**  
Dr. William F. Gutknecht, Research Triangle Institute, Research Triangle Park, NC

**11:00 am**  
**Relative Bioavailability of Arsenic from Soil Affected by CCA-treated Wood and Dislodgeable Arsenic from CCA-treated Wood Collected from Residential Structures**  
Stan W. Casteel, Tim J. Evans, Margaret A. Miller, Sue E. Turnquist, University of Missouri, Columbia, MO

**Session 4: PAY-FOR-PERFORMANCE REMEDIATION TECHNOLOGIES - METHODS & CASE STUDIES OF SCIENCE & ECONOMICS**

1109 Campus Center

Sponsored by ENVIRONMENTAL BUSINESS SOLUTIONS INTERNATIONAL, INC.

**Moderator: Ron Scudato,** EBSI, Oswego, NY

**8:30 am**  
**Application Theory & Practice of Pay-for-Performance Remediation**  
Mark Vigneri, EBSI, Wayne, NJ

**11:30 am**  
**Dermal Absorption of Arsenic from Residues on CCA-Treated Wood**  
Yvette Lowne, Exponent, Boulder, CO  
Mike Ruby,  
Ronald Wester, University of California, San Francisco, CA  
Stewart Holm, Xiaoying Hui, Georgia-Pacific, Atlanta, GA

**Session 2: PERCHLORATE**

101 Campus Center

Sponsored by ENSR INTERNATIONAL

**Moderator: Chris Mitchell,**  
ENSR International, Westford, MA

**8:30 am**  
**Characterization, Fate and Transport of Perchlorate and TCE in a Large Sandy Drinking Water Aquifer**  
Mike Flack, ENSR International, Camarillo, CA

**9:00 am**  
**An Overview of Perchlorate Cleanup Technologies Applied at DoD Facilities**  
Bryan Harre, NFESC, US Navy, Port Hueneme, CA

**9:30 am**  
**Selection of Remedial Technologies for Perchlorate Impacted Sites**  
Harry Van Den Berg, ENSR International, Camarillo, CA

**10:00 am Break**

**10:30 am**  
**Perchlorate: Groundwater Contamination and its Removal via Ion Exchange Technology**  
Peter Ritchey, Calgon Carbon Corporation, Pittsburgh, PA

**11:00 am**  
**Ex Situ Treatment of Perchlorate in Groundwater using Biological Reactors**  
Dr. Paul Hatzinger, Shaw Environmental, Lawrenceville, NJ

**11:30 am**  
**A State's Perspective on Perchlorate**  
Millie Garcia-Surette, MA DEP, Lakeville, MA  
Carol Rowan West, MA DEP, Boston, MA

**9:00 am**  
**Pay-for-Performance Subcontract Stimulates Innovation and Reduces Cost During Remediation of a VOC Groundwater Plume at NAS North Island**  
Richard Wong, R.G., CHG, Shaw Environmental, Inc., San Diego, CA  
Mark Bonsavage, P.E., Southwest Division, Naval Facilities Engineering Command, South Bay, AFT, San Diego, CA  
Richard G. Mach Jr., P.E., Naval Facilities Engineering Command, Washington Navy Yard, Washington DC  
Ron Adams, P.E., EBSI, Inc., Ponte Vedra, FL 32082

**9:30 am**  
**Case Study: Economic Analysis & Technology for DOD Pay-for-Performance In Situ Oxidation**  
Richard Wong, Shaw E & I, San Diego, CA

**10:00 am Break**

**Session 3: BIOINDICATORS OF ENVIRONMENTAL HEALTH: CONCEPTS AND APPLICATION**

168C Campus Center

**Moderators: Edward J. Zillioux,**  
Florida Power & Light Co., Juno Beach, FL  
**James R. Newman,**  
Pandion Systems, Gainesville, FL

**8:30 am**  
**Bioindicators - Essential Tools for Realistic Site Assessment and Remediation Cost Control**  
E.J. Zillioux, Florida Power & Light Co., Juno Beach, FL  
J.R. Newman, Pandion Systems, Gainesville, FL

**9:00 am**  
**EPA-STAR Grants for Research on Environmental Bioindicators**  
Mitch Lasat, Ph.D., Hazardous Substances Research Centers, USEPA, Washington, DC

**9:30 am**  
**Serotonin-Modulating Protein Content as a Biomarker of Environmental Pollution**  
A.A. Mekhtiev, A.A. Gaisina, G.M. Palatnikov, R.Yu. Kasimov, National Academy of Sciences, Baku, Azerbaijan

**10:00 am Break**

**10:30 am**  
**The Effect of Mountain Forest Decline on Staphylinid Beetles in Central Europe**  
Jaroslav Bohac, Academy of Sciences of the Czech Republic, Ceske Budejovice, Czech Republic

**11:00 am**  
**Development and Use of Animals as Air Pollution Biomarkers and Bioindicators in Central Europe: History and Status**  
James R. Newman, Pandion Systems, Inc., Gainesville, FL

**11:30 am**  
**Neurological Effects of TCE in Groundwater and Soil in Lisle, Illinois**  
Alan R. Hirsch, M.D., Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL

**10:30 am**  
**Pay-for-Performance Contracting and Implementation of Embedded Technology Strategies**  
Frank Van Ryn, Reiss Remediation, Wichita, KS

**11:00 am**  
**Management of UST Remediation via Pay-for-Performance**  
Rich Werner, P.G., ECI, Norristown, PA  
Mark Vigneri, EBSI, Wayne, NJ

**11:30 am**  
**Pay-for-Performance Free Product Remediation Technologies**  
Vince Barlock, Pelorus Laboratories, Inc., Evergreen, CO

**Noon - Lunch**

Luncheon Speaker, Wednesday, October 22, 2003

**Risk Communications: When Sound Science is Not Enough**  
Steven C. Lewis, Ph.D., DABT, Distinguished Scientific Associate,  
ExxonMobil Biomedical Sciences, Inc., Annandale, NJ

7 pm - 10 pm

10) Detection and Quantitation Limits in Environmental Analysis (Campus Center 1109)

11) Aerobic and Anaerobic Bioremediation and Monitored Natural Attenuation of VOCs (Campus Center 101)

12) Environmental Fate of Hydrocarbons in Soils and Groundwater (Campus Center 168C)

## Session 1: CCA TREATED WOOD REGULATIONS, SCIENCE AND RISK ASSESSMENT, PART II

Campus Center Auditorium

Sponsored by THE AMERICAN CHEMISTRY COUNCIL'S CCA TASK FORCE

**Moderators:** Has Shah,  
American Chemistry Council, Arlington, VA  
Nicholas P. Skoullis,  
Arch Chemicals, Inc., Norwalk, CT

**1:30 pm**  
**In Vivo Relative Oral Bioavailability of Arsenic from CCA-Affected Soils in the Primate**  
Dr. Stephen M. Roberts, Raymond J. Bergeron, *University of Florida, Gainesville, FL*

**2:00 pm**  
**USEPA SHEDS Model: Methodology for Exposure Assessment for Wood Preservatives**  
Haluk Özkaynak, *U.S. EPA, Office of Research and Development, Washington, DC*  
Valerie Zartarian, Jianping Xue, *U.S. EPA, Office of Research and Development, Research Triangle Park, NC*

**2:30 pm**  
**Exposure and Risk Assessment for Arsenic from CCA-Treated Wood Playground Structures.**  
Dr. Kristina Hattelid, David Cobb, Dwayne Davis, Mark S. Levenson, Jonathan D. Midgett, Treye A. Thomas, Patricia M. Bittner, *U.S. Consumer Product Safety Commission, Washington, DC*

**3:00 pm**  
**Comparison of a Probabilistic/Mechanistic (SHEDS) Approach to a Deterministic/Empirical Approach for Evaluating Exposures to CCA-Treated Wood**  
Dr. Barbara D. Beck, *Gradient Corporation, Cambridge, MA*  
Catherine Petito Boyce, *Gradient Corporation, Seattle, WA*  
Eric M. Dube, *Gradient Corporation, Cambridge, MA*

**3:30 pm Break**

**4:00 pm**  
**Background Exposures to Inorganic As**  
Dr. Joyce S. Tsuji, *Exponent, Bellevue, WA*  
Leila Barraja, Ph.D., *Exponent, Washington, DC*

**4:30 pm**  
**Relationship Between Childhood Arsenic Exposures and Cancer Risks in the U.S. and Findings of an Ecological Arsenic Health Effects Study**  
Floyd Frost, Ph.D., *Lovelace Respiratory Research Institute, Albuquerque, NM*  
Kristine Tollestrup, Ph.D., *University of New Mexico, Dept. of Family Medicine*  
Lucy Harter, *Washington State Dept. of Health*  
Melissa Roberts, *Lovelace Respiratory Research Institute, Albuquerque, NM*

## Session 4: ANALYSIS / FATE

1109 Campus Center

**Moderator:** Robert I. Haddad,  
ZymaX Forensics, San Luis Obispo, CA

**1:30 pm**  
**An Automated Method for Analysis of Inorganic Arsenic Species in Sediments and Tissues by HGAA**  
Leonard C. Pitts, *Woods Hole Group Environmental Laboratories, Raynham, MA*

**2:00 pm**  
**Ultra-Fast Field Gas Chromatography for Site Characterization and Field Monitoring**  
Michael A. Marando, M.S., *GEI Consultants, Inc., Winchester, MA*

**5:00 pm**  
**Arsenic Epidemiology & Cancer Slope Factor**  
Dr. Steven H. Lamm, *Consultants in Epidemiology and Occupational Health, Inc., Washington, D.C.*

## Session 2: MTBE

101 Campus Center

**Moderator:** Richard Sloan,  
Chickadee Remediation Co., Crosby, TX

**1:30 pm**  
**Investigation and Remediation of a Three-Dimensional MTBE Plume in Groundwater**  
James A. Berndt, John A. Mundell, *Mundell & Associates, Inc., Indianapolis, IN*

**2:00 pm**  
**Two-Phase Extraction: A Comparative Evaluation of Two Case Histories for MTBE and TBA Removal**  
Mehmet Pehlivan, *Tait Environmental Management, Inc., Santa Ana, CA*

**2:30 pm**  
**Ozone, Oxygen, and Hydrogen Peroxide Injection for Aggressive In Situ Chemical Oxidation of MTBE and TBA**  
Charles B. Whisman, *Groundwater & Environmental Services, Inc., Exton, PA*  
Peter Herlihy, *Applied Process Technology, Inc., Pleasant Hill, CA*

**3:00 pm**  
**Enhanced Natural Attenuation of MTBE & Benzene at a Low Permeability Site Using iSOC Technology**  
Walter S. Mulica, *Global Technologies, Inc., Fort Collins, CO*  
Nick Mathis, *O&G Environmental, Inc., Englewood, CO*  
James F. Begley, *MT Environmental Restoration, Plymouth, MA*

**3:30 pm Break**

**4:00 pm**  
**Simulation of Effects on Ground Water from Small-Volume Releases of Gasohol in the Vadose Zone**  
Matthew A. Lahvis, *Shell Global Solutions (US) Inc., Houston, TX*

**4:30 pm**  
**HiPOx Advanced Oxidation of TBA and MTBE in Contaminated Groundwater**  
Reid H. Bowman, Ph.D., *Applied Process Technology, Inc., Pleasant Hill, CA*

**5:00 pm**  
**Pulsed Microbubble Air/Ozone Perfusion for Gasoline Releases and Continuing Noncatastrophic Spill Control at Retail Outlets**  
William B. Kerfoot, *K-V Associates, Inc., Mashpee, MA*  
Edward C. Ralston, *ConocoPhillips, Sacramento, CA*  
David J. Vossler, *Gettler-Ryan, Inc., Petaluma, CA*  
Christopher J. Watt, *Laco Associates, Eureka, CA*

**2:30 pm**  
**Is Method 1664A Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-Polar Materials) a Measure of Total Petroleum Hydrocarbons?**

Dr. Michael W. Miller, *New Jersey department of Environmental Protection, Trenton, NJ*  
Michael Wright, *TRC Omni Environmental Corporation, Princeton, NJ*  
Alexander M. Allen, *Boguslaw Dubek, Tosco Corporation Bayway Refinery, Linden, NJ*

**3:00 pm**  
**Solid Phase Microextraction: The Alternative to Purge and Trap**  
Michael Rossi, Seth Pitkin, Kim Watson, *Stone Environmental Inc., Montpelier, VT*

**3:30 pm Break**

## Session 3: BIOREMEDIATION

168C Campus Center

**Moderator:** Kevin T. Finneran,  
GeoSyntec Consultants, Boxborough, MA

**1:30 pm**  
**Stimulating Polychlorinated Biphenyl (PCB) Dechlorination by Controlling the Availability of Electron Donor**  
Tao Yan, *University of Minnesota, Minneapolis, MN*  
Paige J. Novak, Ph.D., *University of Minnesota, Minneapolis, MN*

**2:00 pm**  
**Bioremediation of Bedrock Groundwater Contaminated with Tetrachloroethene, Trichloroethene, Trichloroethane, Toluene and Hexane**  
Jonathan Aisner, William E. Baird, *Web Engineering Associates, Inc., Norwell, MA*

**2:30 pm**  
**Substrate Release Composition (SRC): An Innovative Tool for the Anaerobic Bioremediation of Chlorinated Organics**  
Eric C. Hince, *Geovation Technologies, Inc., Florida, NY*

**3:00 pm**  
**In Situ Bioremediation of a Chlorinated Solvent Residual Source in Unconsolidated Sediments and Bedrock Using Bioaugmentation**  
Stephen Finn, Allen Kane, *Golder Associates, Cherry Hill, NJ*  
John Vidumsky, E.I. DuPont de Nemours and Company, *Wilmington, DE*  
David W. Major, *GeoSyntec Consultants, Guelph, Ontario, Canada*  
Nicholas Bauer, *Saltire Industrial, Inc., Reston, VA*

**3:30 pm Break**

**4:00 pm**  
**Mulch Biowall for Enhanced Bioremediation of Chlorinated Solvents**  
Tom Dragon, Allison Love, Bruce M. Henry, Ted Hartfelder, *Parsons, Inc., Denver, CO*  
James R. Gonzales, *Air Force Center for Environmental Excellence, San Antonio, TX*  
Patrick E. Haas, *Mitretek Systems, San Antonio, TX*

**4:30 pm**  
**Ex Situ Bioremediation of Low Concentrations of Perchlorate and Explosives in Groundwater**  
Katherine R. Weeks, *AMEC Earth & Environmental, Inc., Westford, MA*  
David L. Hill, *National Guard Bureau, Camp Edwards, MA*  
Scott C. Veenstra, *AMEC Earth & Environmental, Inc., Greensboro, NC*

**5:00 pm**  
**Bioremediation of a Railroad Diesel Fuel Spill in Palmer, Massachusetts**  
Todd D. Kirton, Paul G. Beaulieu, *Tighe & Bond, Westfield, MA*

**4:00 pm**  
**Rapid Screening and Analysis of Hazardous Chemical Agents in Public Water Supplies and in-Coming Process Water**  
Robert Johnson, Stephen MacDonald, *Horizon Technology, Atkinson, NH*

**4:30 pm**  
**A Comparison of Commonly Used Cyanide Analytical Methodologies for MGP Site Applications**  
James F. Occhialini, James C. Todaro, Joseph Clements, Elena Dayne, *Alpha Analytical Labs, Westborough, MA*  
Michael Rostkowski, *Global Environmental Strategies, LLC*  
William R. Swanson, Tamara Burke, *Camp Dresser & McKee Inc.*

**5:00 pm**  
**Measuring Groundwater, Soil Vapor and Indoor Air to Evaluate Fate and Transport: A Case Study**  
Denise A. Kmetzo, Lisa J. Campe, *Woodard & Curran, Dedham, MA*

**Session 1: REMEDIATION II***Campus Center Auditorium***Moderator: Ralph S. Baker,**  
TerraTherm, Inc., Fitchburg, MA**8:30 am****Hydraulic Containment Using Horizontal Wells**Christopher J. Mattair, Steven D. Buser, *Gannett Fleming, Inc., Jacksonville, FL*W. Patrick Harrison, *CSX Transportation, Inc., Social Circle, GA***9:00 am****Dispersion v. Biodegradation Processes: Tools to Assist in the Evaluation of Natural Attenuation in Groundwater Systems**Joseph E. Odencrantz, *Tri-S Environmental, Costa Mesa, CA*Richard A. Vogl, *HydroGeo Consultants, Costa Mesa, CA*Anthony Silva, *Brownfield Redevelopment Group Co., Costa Mesa, CA***9:30 am****Optimization of Ex Situ Groundwater Treatment System and Long-Term Monitoring Activities at Allegany Ballistics Laboratory (ABL)**Dominic O'Connor, *MSCE, PE, LANTNAVFACENGCOM, Norfolk, VA*Steven Glennie, *MS GEO, CH2M HILL, Herndon, VA***10:00 am Break****10:30 am****Multi-Site, Single-Task Approach to Managing Multiple Remediation Sites.**Laura A. Kelmar, Rita M. Bauer, *The RETEC Group, Inc., Concord, MA***11:00 am****Biotreatability Study as an Operational Optimizing Tool for the Treatment of PCP and Creosote-Contaminated Soil on a Former Wood Treatment Superfund Site**Nicolas Moreau, Michel Pouliot, *Biogenie Corporation, Spring Mount, PA***11:30 am****Full-Scale ISTD Treatment at Former Alhambra, California Wood Treatment Site**John M. Bierschenk, Ralph S. Baker, Robert J. Bukowski, *TerraTherm, Inc., Fitchburg, MA*Jenny King, Tony Landler, *Southern California Edison Company, Rosemead, CA***Session 2: RISK ASSESSMENT AND RISK BASED CLEANUP***101 Campus Center***Moderator: Mohamed S. Abdel-Rahman,**

New Jersey Medical School, Newark, NJ

**8:30 am****Dermal Bioavailability of Heavy Metals in Soil**Mohamed S. Abdel-Rahman, Gloria A. Skowronski, Rita M. Turkall, *New Jersey Medical School, Newark, NJ***9:00 am****A Comparison of State Ecological Risk Assessment Programs**Loren R. Dunn, Attorney, *Riddell Williams P.S., Seattle WA***9:30 am****Environmental and Ecological Risk Assessment of Large Scale Everglades Restoration Properties**Bob Sorvillo, *BEM Systems, Inc., Orlando, FL*Bob Kukleski, *South Florida Water Management District, North Palm Beach, FL*Robert Frakes, *United States Fish and Wildlife Service, Vero Beach, FL***10:00 am Break****10:30 am****Fuzzy-Rule Based Systems for Risk-Based Decision Making**Venki Uddameri, M. Kuchanur, *Texas A&M University-Kingsville, Kingsville, TX***11:00 am****Approaches to Calculating Media Concentrations for the Assessment of "Bright-Line" Compliance**John H. Samuelian, *AMEC Earth & Environmental, Portland, ME*William R Alsop, *AMEC Earth & Environmental, Westford, MA***11:30 am****Risk-Based Design of Engineered Barrier at the New Bedford Intermodal Center, New Bedford, MA**Kevin J. Scully, *EA Engineering, Science, & Technology, Inc., Southborough, MA*Scott Alfonse, *City of New Bedford, MA***Session 3: CHEMICAL OXIDATION***168C Campus Center***Moderator: Clifford Bruell,**  
University of Massachusetts, Lowell, MA**8:30 am****LNAPL Delineation and Remediation Utilizing UV Fluorescence/Hydrophobic Dye Field Screening and In Situ Chemical Oxidation**James F. Spicer, *ATOFINA Petrochemicals, Inc., Houston, TX*Montgomery S. Bennett, *Groundwater & Environmental Services, Inc., Richmond, VA*Eric M. Kovich, *Groundwater & Environmental Services, Inc., Exton, PA***9:00 am****A Cost Effective Decision: Accelerated Cleanup Using Permanganate**Elizabeth Rasmussen, *Raytheon Company, Sudbury, MA*Richard W. Lewis, *ERM, Sharon, MA*Robert Luhrs, *Raytheon Company, Lexington, MA*Timothy Pac, *ERM, Sharon, MA*Ronald C. Slager, *Raytheon Company, Sudbury, MA***9:30 am****Application of In Situ Oxidation (ISCO) at a Site with Multiple Diverse Hydrogeologic Settings**Raymond Cadorette, David Walker, Lawrence Nesbitt, *Shaw Environmental, Hopkinton, MA***10:00 am Break****10:30 am****Chemical Oxidation Delivery by EK**Christopher Athmer, *Terran Corporation, Beavercreek, OH*Bernard Woody, *United Technologies Corporation, Hartford, CT***11:00 am****Degradation of Volatile Organic Compounds with Thermally Activated Persulfate Oxidation**Dr. Kun-Chang Huang, Zhiqiang Zhao, Dr. George Hoag, Amine Dahmani, *University of Connecticut, Storrs, CT*Dr. Philip Block, *FMC Corp, Princeton, NJ***11:30 am****An Evaluation of In Situ Chemical Oxidation (ISCO) for MGP Impacted Soils and Ground Water**Michael C. Marley, Bruce L. Cliff, Kenneth L. Sperry, Jaydeep M. Parikh, *Xpert Design and Diagnostics, LLC, Stratham, NH***Session 4: MODELING AND SITE ASSESSMENT***1109 Campus Center***Moderator: James Dragun,**  
The Dragun Corp., Farmington Hills, MI**8:30 am****Optimization of Groundwater Pump and Treat Systems Using Numerical Modeling and the Monte Carlo Approach**Manu Sharma, Andrew B. Bittner, Tarek Saba, *Gradient Corporation, Cambridge, MA***9:00 am****Environmental Data Quality and the Search for Representativeness**Deana M. Crumbling, *U.S. Environmental Protection Agency, Washington DC***9:30 am****A Simple Phase Equilibrium Model for Predicting the Historical Presence of NAPL: a Case Study**John D. Moss and Daniel D. Titus, *HRP Associates, Inc., Plainville, CT***10:00 am Break****10:30 am****Groundwater Effects from Highway Tire Shred Use**Mary O. Brophy, *NYS DOT/SUNY School of Public Health, Binghamton, NY*Joseph Graney, *Binghamton University, Dept of Geological Sciences and Environmental Studies, Binghamton, NY***11:00 am****Passive Diffusion Bag Sampler Results From Multiple DoD Installations**John Tunks, John Hicks, *Parsons, Denver, CO*Javier Santillan, Raphael Vazquez, *AFCEE/ERT, Brooks City-Base, TX***11:30 am****Chlorinated Solvent DNAPL Extent Characterization at the East Gate Disposal Yard (Egdy), Fort Lewis, Washington**Kira P. Lynch, *Environmental Scientist, U.S. Army Corps of Engineers, Seattle, WA***Noon - Lunch**

Luncheon Speaker, Thursday, October 23, 2003  
**Environmental Challenges Facing Kuwait**  
Mohammed A. Al-Sarawi  
*Environmental Public Authority, Safat, Kuwait*



## Session 1: SEDIMENTS

Campus Center Auditorium

**Moderators: Henry Tabak,**

US EPA, ORD, Cincinnati, OH

**Ash Jain,**

EPRI (Electric Power Research Institute), Bridgewater, NJ

### 1:30 pm

#### Technology Transfer for Bioremediation of Complex Environmental Systems

Peter Adriaens, *The University of Michigan, Ann Arbor, MI*

### 2:00 pm

#### Confirmatory Sampling Approach for New Bedford Harbor

Ronald J. Marnicio, *Foster Wheeler Environmental Corporation, Boston, MA*

### 2:30 pm

#### The Role of Risk Management Decisions in the Development of Sediment Quality Guidelines

Julie A. Rothrock, Paul D. Anderson, *AMEC Earth and Environmental, Westford, MA*

### 3:00 pm

#### Modeling and Mapping of Sediment Contaminant Distribution: A Univariate Geostatistical Perspective

Kandiah Ramanitharan, Dr. Laura J. Steinberg, *Tulane University, New Orleans, LA*

### 3:30 pm Break

### 4:00 pm

#### Compositional Changes in Nearfield and Farfield Massachusetts Coastal Sediments Attributed to the MWRA Wastewater Treatment Plant: A Comprehensive Comparison of Pre- and Post-Discharge Periods

Stephen Emsbo-Mattingly, Deirdre Dahlen, Carlton Hunt, *Battelle Memorial Institute, Duxbury, MA*

Ken Keay, Ph.D., *Massachusetts Water Resources Authority, Boston, MA*

### 4:30 pm

#### Diffusion Approach to Model Desorption Resistance of Organic Contaminants in Soils/Sediments

Yunzhou Chai, Danny Reible, Alexander Kochetkov, *Louisiana State University, Baton Rouge, LA*

### 5:00 pm

#### Challenges Overcome During a Vacuum Dredging Sediment Remediation Project

Jody Perwak, Ed Van Doren, Olaf Westphalen, *Shaw Environmental, Andover, MA*

**5:30 pm - End**

## Session 2: HEAVY METALS

101 Campus Center

**Moderators: Akram N. Alshwabkeh,**

Northeastern University, Boston, MA

**Gopal Pathak,**

Birla Institute of Technology, Bihar, India

### 1:30 pm

#### Overview of the Nature, Extent, Health Risks, and Treatment of Arsenic-Affected Drinking Water in Bangladesh

Seth H. Frisbie, *Better Life Laboratories, Inc., East Calais, VT*

Donald M. Maynard, *The Johnson Company, Inc., Montpelier, VT*

Erika J. Mitchell, *Better Life Laboratories, Inc., East Calais, VT*

Richard Ortega, *Université de Bordeaux, Gradignan, France*

Bibudhendra Sarkar, *University of Toronto, Ontario Canada*

### 2:00 pm

#### Effect of Tungsten on Leaching of Lead from Contaminated Soils

Washington Braida, Christos Christodoulatos, Dimitris Dermatas, *Stevens Institute of Technology, Hoboken, NJ*

Michael Los, *US Army Heavy Metals Office, Picatinny, NJ*

Steven L. Larson, *US Army Corps of Engineers, Vicksburg, MS*

### 2:30 pm

#### Sorption, Desorption and Leaching Transport of Heavy Metals in Soils Common to New England

Alton Day Stone, *Alton Engineer, Sterling, MA*

James C. O'Shaughnessy, *Worcester Polytechnic Institute, Worcester, MA*

### 3:00 pm

#### Passive Diffusion Sampling for Metals

John Tunks, John Hicks, *Parsons, Denver, CO*

Raphael Vazquez, *AFCEE/ERT, Brooks City-Base, TX*

### 3:30 pm Break

### 4:00 pm

#### Innovative Continuous On-Line Monitoring of Mercury and Arsenic

Hakan Gürleyük, Carl Hensman, Phil Kilner, *Frontier Geosciences, Seattle, WA*

William T. Dietze, Ph.D., *TraceDetect, Seattle, WA*

### 4:30 pm

#### Environmental Legacy of Arsenical Herbicide Application to Lakes and Ponds in Massachusetts

Valerie Monastra, *Department of Urban and Environmental Policy and Planning, Medford, MA*

John Durant, *Department of Civil and Environmental Engineering, Medford, MA*

Sheldon Krinsky, *Department of Urban and Environmental Policy and Planning, Medford, MA*

### 5:00 pm

#### Stabilization of Metals in Soils by Xanthan and Chitosan, With or Without Cross-Linking

Omid Etemadi, Ioana G. Petrisor, Victor Chen, Teh Fu Yen, *University of Southern California, Los Angeles, CA*

## List of Exhibitors

Booth	Affiliation
B1	Microbial Insights, Inc.
B2	Waterloo Barrier, Inc.
B3	Microseeps, Inc.
B4	Applied Process Technology, Inc.
B5	TIGG Corporation
B6	EA Engineering, Science and Technology
B7	Maxymillian Technologies, Inc.
B8	Alpha Analytical Labs
B9	DEXSIL Corporation
B10	ENSR International
B11 & B12	Naval Facilities Engineering Service Center
B13	AMEC Earth & Environmental
B14	Geovation Technologies, Inc.
B15	Regenesis Bioremediation
B16	SiREM
B17	Columbus Instruments
B18	Current Environmental Solutions
B19	In-Situ, Inc
B20	Stone Environmental, Inc.
B21	Dewind Dewatering
B22	Thermo Electron Corporation formerly known as Thermo Elemental
B23	K-V Associates, Inc.
B24	Solinst Canada Ltd
B25	LSPA (Licensed Site Professional Association)
B26	W.L. Gore & Associates, Inc.
B27	RETEC
B28	Columbia Analytical Services
B29	Taylor and Francis Group CRC Press
B30	Creamer Environmental, Inc.
B31	Rusmar Incorporated
B32	Environmental Business Solutions International, Inc.
B33	TerraTherm, Inc.
B34	Niton LLC
B35	Zymax Forensics
B36	Prosonic Corporation
B37	inVentures Tehcnologies, Inc.
B38	Earthline Technologies, Inc.
B39	Eastern Analytical, Inc.
T1	EnviroDirectory, Inc.
T2	ATC Associates
T3	BioAug LLC
T4	TestAmerica Analytical Testing Corporation
T5	Milestone, Inc.
T6	US EPA - Technology Innovation Office

**TUESDAY,  
OCTOBER 21, 2003**

## ANALYSIS

### 1. Dust Buckets and Passive Samplers-Simple Nuisance Dust Collection Methods to Address Complex Problems

Steven Schlaegle, April Snyder, David Williams, Stephen Kennedy, *RJ Lee Group, Inc., Monroeville, PA*

### 2. New Strategies for the Development of Environmental Biosensors

Lance G. Laing, Ph.D., *Regenesis, Belmont, MA*  
Stephen S. Koenigsberg, Ph.D., *Regenesis, San Clemente, CA*

### 3. Direct Mercury Analysis of Soil, Sediments and Waste Waters using Method 7473

Mikhail Mensh, *Milestone, Inc., Monroe, CT*

### 4. The Massachusetts Contingency Plan (MCP) Data Quality Enhancement Program - Implementation Overview and Lessons Learned from a Laboratory Perspective

James F. Occhialini, *Alpha Analytical Labs, Westborough, MA*

### 5. Flame Spectrometry in Environmental Analysis

Evgeniy D. Prudnikov, Yunona S. Shapkina, *Earth Crust Institute, St. Petersburg State University, Russia*

### 6. Project Play-Safe: A Survey of City of Boston Tot-lots Using a Field-Portable XRF

Leah Ross, *Environmental Studies Program, UMass-Boston, Boston, MA*

Daniel Brabander, *Environmental Studies Program, Environmental, Coastal, and Ocean Sciences, UMass-Boston, Boston, MA*

Robert Beattie, *Environmental Studies Program, UMass-Boston, Boston, MA*

## BIOAVAILABILITY

### 7. Measurement of the Bioaccessibility of Arsenic in UK Soils

Mark R. Cave, Jo Wragg, Barbara Palumbo, Ben A. Klinck, *British Geological Survey, Nottingham, UK*

### 8. Bioaccessibility: Human Physiologically Based In Vitro Digestion Models Simulating Fasting and Fed Conditions

A. Oomen, C. Versantvoort, A. Sips, RIVM, *National Institute of Public Health and the Environment, Bilthoven, The Netherlands*

### 9. Arsenic Bioavailability: Consequences for Ecological and Human Health Risk Assessment in Yellowknife, Northwest Territories

Kenneth J. Reimer, *Environmental Sciences Group, The Royal Military College of Canada, Kingston, Ontario, Canada*

Iris Koch, *Environmental Sciences Group, The Royal Military College of Canada, Kingston, Ontario, Canada*  
Christopher A. Ollson, *Jacques Whitford Environment Limited, Ottawa, Ontario, Canada*

### 10. Quantifying the Bioaccessibility of Cr and Cd in Soil

Melanie A. Stewart, *Oak Ridge National Lab, Oak Ridge, TN*  
P. Jardine, *Oak Ridge National Lab, Oak Ridge, TN*  
T. Mehlhorn, *Oak Ridge National Lab, Oak Ridge, TN*  
M. Barnett, *Dept. of Civil Engineering, Auburn University, Auburn, AL*  
S.E. Fendorf, *Stanford University, Auburn, AL*

### 11. A Study of the Geochemical Controls of Arsenic, Cadmium, Lead and Zinc Bioaccessibility from Mine Waste using a Respiratory Uptake Model

Joanna Wragg, *British Geological Survey, Nottingham, UK*  
Mark R. Cave, *British Geological Survey, Nottingham, UK*  
Barbara Palumbo, *British Geological Survey, Nottingham, UK*  
Ben A. Klinck, *British Geological Survey, Nottingham, UK*

## BIOREMEDIATION OF ACID MINE DRAINAGE AND REMOVAL OF METALS

### 12. Mitigation of Acid Mine Drainage and Other Contamination in the Prince William Forest National Park in Northern Virginia

Michael Komelaslky, Douglas Mose, George Mushrush, *Chemistry Department, George Mason University, Fairfax, VA*

### 13. Monitoring Changes in Microbial Ecology during Sulfate Amendment of a BTEX-Contaminated Aquifer using Bio-Sep Traps

Kerry Sublette, *University of Tulsa, Tulsa, OK*  
Aaron Peacock, *University of Tennessee, Knoxville, TN*  
Ravi Kolhatkar, *Group Environmental Management Co. (BP), La Palma, CA*  
Dennis Beckman, *Group Environmental Management Co. (BP), Tulsa, OK*  
David Cook, *GeoEngineers, Seattle, WA*  
David White, *University of Tennessee, Knoxville, TN*  
Thomas Mathew, Chintan Mehta, *University of Tulsa, Tulsa, OK*  
Greg Davis, *Microbial Insights, Inc., Rockford, TN*

## BROWNFIELDS

### 14. Site Assessment and Successes of the EPA-Targeted Brownfields Assessment Program

Neil Thurber, Barbara Weir, *Metcalf & Eddy, Wakefield, MA*  
Jim Byrne, James Chow, *Brownfields Team, U.S. EPA, Boston, MA*

## DATABASE / DATA MANAGEMENT

### 15. An Integrated Model for Environmental Data Management

Andrew M. Adinolfi, P.E., Jamie D. Vallee, *GEI Consultants, Inc., Winchester, MA*

### 16. Development of Environmental Process Screening Model Software

Raymond G. Ball, Ph.D., P.E., L.S.P., *ECSMarin Inc., Auburn, MA*

### 17. Massachusetts Military Reservation (MMR) Environmental Web-Based Data Management System

Ann Bernhard, *AMEC Earth & Environmental, Westford, MA*  
Heather Sullivan, Matt Walsh, *U.S. Army Corps of Engineers, Concord, MA*

### 18. Various Applications of Soil Contaminant Database Developed for Central Artery/Tunnel Project

Ken S. Chin, P.E., *Bechtel/Parsons Brinckerhoff, Boston, MA*  
Richard G. Christian, P.E., L.S.P., Andrea E. Sewall, L.S.P., *Camp Dresser & McKee Inc., Cambridge, MA*

## ECOLOGY

### 19. Stability of Contaminants on an Aged Petroleum Refinery Land Treatment Unit Undergoing Ecological Restoration

Heather F. Henry and Jodi R. Shann, *Department of Biological Sciences, University of Cincinnati, Cincinnati, OH*

### 20. Effects of Contaminants on Cover of Crops and Weeds in Long-term Field Trial

Prof. László Radics, *Szent István University, Budapest, Hungary*  
Dr. Imre Kádár, *Research Institute for Soil Science and Agricultural Chemistry, Budapest, Hungary*

## ENVIRONMENTAL FATE

### 21. Sorption Kinetics of Phenanthrene and Naphthalene on Loess Soils

Hui Chen, Huiying Zhan, *Northwest Normal University, Lanzhou, 730070, PR China*  
Kun Zhu, *Lanzhou Railway University, Lanzhou, 730070, PR China*  
Mei Jiang, Jianmei Yuan and Wenjun Zhou, *Northwest Normal University, Lanzhou, 730070, PR China*

## ENVIRONMENTAL FORENSICS

### 22. Identifying Ash-Derived PAH in Soil and Sediment

Stephen Emsbo-Mattingly, M.S., Allen Uhler, Ph.D., Scott Stout, Ph.D., Kevin McCarthy, *Battelle Memorial Institute, Duxbury MA*

### 23. Identifying and Dating Creosote Releases in the Environment

Stephen Emsbo-Mattingly, Scott Stout, Allen Uhler, Kevin McCarthy, *Battelle Memorial Institute, Duxbury MA*

### 24. Experience in Dust Emissions Modeling of a Contaminated Soil Recycling Facility

Albert P. Free, *Soil and Land Use Technology, Inc., Beltsville, MD*  
William Roberts, *Soil Safe Incorporated, Wayne, PA*  
James L.W. Grant, *Soil Safe Incorporated, Baltimore, MD*

### 25. Speciation as an Important Tool for Environmental Scientists

Hakan Gürleyük, *Frontier Geosciences, Seattle, WA*

### 26. Characterization of Soot Carbon and PAH Bioavailability in Aquatic Sediments at MGP Sites

Edward F. Neuhauser, *Niagara Mohawk Power Corporation, Syracuse, NY*  
Joseph P. Kreitinger, *The RETEC Group, Inc., Ithaca, NY*  
David V. Nakles, *The RETEC Group, Inc., Monroeville, PA*  
Steven B. Hawthorne, *University of North Dakota, Grand Forks, ND*  
Francis G. Doherty, *AquaTOX Research, Inc., Syracuse, NY*  
Charles A. Menzie, *Menzie Cura & Associates, Inc., Chelmsford, MA*

### 27. Comparative Evaluation of Background Hydrocarbons in Sediments from Multiple Urban Waterway

Scott A. Stout, Allen D. Uhler, Stephen Emsbo-Mattingly, *Battelle Memorial Institute, Duxbury MA*

### 28. Molecular Characterization of Biogenic Hydrocarbons in Terrestrial Soils

Richard M. Uhler, Lyle G. Roberts, Bryan Murphy, Scott A. Stout, *Battelle Memorial Institute, Duxbury MA*

## MISCELLANEOUS

### 29. A Case Study of Camp Edwards, Massachusetts Determines Probable Chemicals Present at Other Military Ranges

Diane Curry, Jay Clausen, Joseph Robb, *AMEC Earth & Environmental, Westford, MA*  
Ben Gregson, *Army Impact Area Groundwater Study Program, Camp Edwards, MA*

### 30. Investigation of Bombing Impact on Quantity of Soil Organic Matter in Lithuanias Firing Grounds

Pranas Baltrėnas, Saulius Vasarevicius, Kristina Greiciute, *Vilnius Gediminas Technical University, Vilnius, Lithuania*

## PESTICIDES

### 31. Organic Amendments to Enhance Atrazine and Metamitron Degradation in Two Contaminated Soils with Contrasting Textures

Gholam Hosain Haghnia, Mohsen Forouzangohar, *Ferdowsi University, Mashhad, Iran*

## PHYTOREMEDIATION

### 32. The Uptake of Lead and the Effects of EDTA on Lead-Tissue Concentration in Mesquite (*Prosopis spp.*)

Mary V. Aldrich, J.L. Gardea-Torresdey, J.R. Peralta-Videa, J. H. Gonzalez, *University of Texas at El Paso, El Paso, TX*

### 33. Dewatering and the Enumeration of Bacteria Populations of Dredged River Sediments

Paul Biery, Lee Newman, *University of South Carolina, Columbia, SC*

### 34. Phytoremediation of Mercury and TNT in our Oceans

Donald Cheney, Paula Bernasconi, Brian Curtis, *Biology Department, Northeastern University, Boston, MA*  
Gregory Rorrer, *Dept. of Chemical Engineering, Oregon State University, Corvallis, OR*  
Neil Bruce, *University of York, UK*

### 35. Polycyclic Aromatic Hydrocarbon Stress Responses in *Arabidopsis thaliana*

Tomoko Tabuchi, Annika Marschall, Shirley Micallef, Adán Colón-Carmona, Xuchen Wang, Robert Chen, *University of Massachusetts Boston, Boston, MA*

### 36. Chlorophenol Phytoremediation with *L. minor*: Glycosidation and Storage of Nucleophilic Contaminants

James A. Day, *Georgia Institute of Technology, Marietta, GA*  
F. Michael Saunders, *Georgia Institute of Technology, Atlanta, GA*

### 37. Revegetation of a Coal Reject Ash Basin in South Carolina

Jaclyn A. DuRant, Lee Newman, *University of South Carolina, Columbia, SC*

Meghan R. Langley, *Centre College, Danville, KY*

### 38. Aging and Weathering Effects on the Phytoremediation of Petroleum Hydrocarbon Contamination in Different Soils

Robert H. Kim, *Purdue University, West Lafayette, IN and Savannah River Ecology Laboratory, Aiken, SC*  
Lee A. Newman, Ph.D., *University of South Carolina, Columbia, SC and Savannah River Ecology Laboratory, Aiken, SC*  
A. Paul Schwab, Ph.D., M. Katherine Banks, Ph.D., *Purdue University, West Lafayette, IN*

### 39. Remediation of VOC-Contaminated Groundwater at the Savannah River Site by Phyto-Irrigation

Robert H. Kim, *Purdue University, West Lafayette, IN and Savannah River Ecology Laboratory, Aiken, SC*  
Cassandra L. Bayer, *Bechtel Savannah River, Inc., Aiken, SC*  
Daniel R. Hitchcock, Ph.D., *USDA Forest Service, Savannah River, Aiken, SC*  
Lee A. Newman, Ph.D., *University of South Carolina, Columbia, SC and Savannah River Ecology Laboratory, Aiken, SC*

### 40. Phytoremediation of Weathered Hydrocarbon-Contaminated Soil, and Bioavailability and Toxicity of Contaminants

Marja Palmroth, *Tampere University of Technology, Tampere, Finland*  
John Pachtel, *Ball State University, Muncie, IN*  
Kati Vajasaari, *Pirkanmaa Regional Environmental Centre*  
Anneli Joutti, *Finnish Environment Institute, Tampere, Finland*  
Tuula Tuhanen, *Tampere University of Technology, Tampere, Finland*



**41. Metabolic Response of *Arabidopsis thaliana* to Trichloroethylene**Sarah Strycharz, *University of South Carolina, Columbia, SC***42. Metabolic Response of Native Southeastern Plants to Trichloroethylene**Sarah Strycharz, *University of South Carolina, Columbia, SC*  
Mark Coleman, *United States Forestry Service, Aiken, SC*  
Lee Newman, *University of South Carolina, Columbia, SC*,  
and *Savannah River Ecology Lab, Aiken, SC***43. Accumulation of Heavy Metals by Japanese Weeds and their Seasonal Movement**Ryuji Takeda, Noriyoshi Yoshimura, Sadayoshi Matsumoto,  
Sadao Komemushi, Akiyoshi Sawabe, *Kinki University, Nara, Japan***44. Potential for Cobalt and Palladium Phytoextraction**Trevor L. Woodard, *University of Massachusetts, Amherst, MA*  
Dula Amarasingwardena, *Hampshire College, Amherst, MA*  
Baoshan Xing, *University of Massachusetts, Amherst, MA***RADIONUCLIDES****45. Laboratory Simulations of Groundwater Depth Changes and Soil Radon Emanation**Paul Merolla, Douglas Mose, George Mushrush, *George Mason University, Fairfax, VA***46. Radioecology of Lake Sevan Basin, Armenia**Armen Stepanyan, Anna Nalbandyan, Armen Kyureghyan,  
Viktoria Ananyan, *National Academy of Sciences (NAS), Yerevan, Armenia***47. Correlation Test Between Indoor Radon and Surficial Gamma Radiation in Northern Virginia**George Saiway, George Mushrush, Douglas Mose, *George Mason University, Fairfax, VA***48. Reduction of Radon in Municipal Wells in Virginia and Maryland**Fiorella Simoni, George Mushrush, Douglas Mose, *George Mason University, Fairfax, VA***REGULATORY****49. Power Engineering and Environmental Policy in Czech Republic**Prof. Dr-Ing. Milos Beran, Ass.Prof. Dr-Ing. Jan Mühlbacher, *University of West Bohemia in Pilsen*  
Sady Petatricatniku, *Czech Republic***REMEDIATION****50. Capacity of Organoclay for Heavy Metals**George R. Alther, *Biomim, Inc., Ferndale, MI***51. Solubilization of Chlorinated Solvents by Ionic Surfactants**Kitae Baek, Jae-Young Lee, Ji-Won Yang, *Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea***52. Anaerobic Biodegradation and Biotransformation Using Emulsified Edible Oils**Gary M. Birk, *EOS Remediation, Inc., Raleigh, NC*  
M. Tony Lieberman, *Solutions Industrial & Environmental Services, Inc., Raleigh, NC***53. An Innovative Water Purification Method and Devices**Victor S. Gevod, Iryna L. Reshetnyak, Sergey V. Gevod,  
Iryna G. Shklyarova, A.S. Khokhlov, *Ukrainian State Chemical Technology University, Dnepropetrovsk, Ukraine***54. O2Tubes Vertical Re-circulation and Oxygen Generation Cell Delivers Dissolved Oxygen in Tight Midwest Soils**Jerry Kellgren, *O2Tube Technologies, Inc., Batavia, IL***55. Using High Organic Matter Compost in Wetlands Restoration**W. Robert Kelly, *Seacoast Farms Compost Products, Inc., Exeter, NH***56. The Use of Natural Attenuation Modeling as a Risk Based Cleanup Alternative**James A. Berndt, John A. Mundell, *Mundell & Associates, Inc., Indianapolis, IN***57. Factors Influencing the Plugging Effect of Xanthan Solutions in Porous Media**Robert A. Khachatourian, Ioana G. Petrisor, Teh Fu Ye, *University of Southern California, Los Angeles, CA***58. Six-Phase Heating™ Rapidly Remediate Brownfields Properties For Redevelopment**Joseph A. Pezzullo, *Current Environmental Solutions, Langhorne, PA*  
William O. Heath, Benaiah M. Jorgensen, *Current Environmental Solutions, Richland, WA*  
Christopher J. Thomas, *Current Environmental Solutions, Des Plaines, IL***59. Constructed Wetlands for Wastewater Treatment**Paul A. Pier, Leslie L. Behrends, *Tennessee Valley Authority, Muscle Shoals, AL***60. Fast Track Design and Construction of an Enhanced LNAPL Recovery Trench**Cindy DiSante, *CH2M HILL, Boston, MA*  
Jessica Raphael, *CH2M HILL, Detroit, MI*  
James F. Strunk, Jr., *CH2M HILL, Parsippany, NJ***61. A Man-Made Ecosystem and Polluted Soils Detoxification**R.Revazyan, E.Safrazbekian, A.Sakoyan, *The Center for Ecological-Noosphere Studies of NAS RA, Yerevan, RA***62. Remedial Actions in Response to a Kerosene Release Impacting a Wetland**Steven W. Rumba, William E. Baird, *Web Engineering Associates, Inc. Norwell, MA***63. Adaptive Use of a Medical Oxygen Generator for Remediation of a Petroleum Release Site**Brian Connaughton, Irwin Silverstein, *Hydro-Environmental Technologies, Inc., Acton, MA***64. An Overview of Continuous and Amorphous Pores Surfaces (CAPS) Ceramic as a Pollution Treatment Technology**Ismail Tabtabai, *Filton International Co., Saitama, Japan*  
Marzouq I. Buarki, *Kuwait Petroleum Corp., Safat, Kuwait***65. The Role of Turning for Effective Inactivation and Optimal Composting**L.D.Trung, *Osaka University, Osaka, Japan*  
M. Tateda, *Toyama Prefectural University, Toyama, Japan*  
M. Ike, M. Fujita, *Osaka University, Osaka, Japan***66. Crude Oil Remediation in Tropical Forests**Dr. Flip van Keulen, Dr. Philip van Diest, *Fugro Ingenieursbureau B.V., Leidschendam, Netherlands*  
Dr. William Veerkamp, Ing Wim Vrieling, *Shell Global Solutions, The Hague, Netherlands*  
Dr. Arno F. Peekel, *Royal Haskoning, Rotterdam, Netherlands*  
Ir. H.M.C. Satijn (Bert), *Centre for Soil Quality Management and Knowledge Transfer, Gouda, Netherlands***67. Remediation of Diesel Oil-contaminated Soil using a Two-liquid Phase System**Jae-Young Lee, Kitae Baek, Hyun-Jeong Cho, Ji-Won Yang, *National Research Laboratory for Environmental Remediation, Daejeon, Republic of Korea***68. Free Product Removal Active Skimming System, Naval Station San Diego**Kent Weingardt, Corey Young, *Foster Wheeler Environmental Corporation, San Diego, CA*  
Michael Corry, *Naval Facilities Engineering Command, San Diego, CA*  
Theresa Morley, *Navy Region Southwest, San Diego, CA***69. Treatment of Groundwater by Nanofiltration to Provide Drinking Water for Small Communities**Darwish I. Yousef, Benjamin I. Yousef, Robin I. Yousef, *Yousef Office for Science and Engineering, Aleppo, Syria***70. Study on Washing up Diesel Residue from Contaminants Loess Soil Using Anionic and Cationic Surfactant Solutions**Kun Zhu, Jiantao Yang, *Lanzhou Railway University, Gansu, PR China***WEDNESDAY, OCTOBER 22, 2002****ARSENIC****71. Arsenic Risk to Residents: An Understanding for Spring Valley, DC**Steven H. Lamm, MD *Consultants in Epidemiology and Occupational Health, Inc. Washington DC***72. Arsenic: A Potential Toxic Metal in Urban Soils Under High Traffic Pressure**Gebhard B. Luilo, Othman C. Othman, Faustin N. Ngassapa, *University of Dar es Salaam, Department of Chemistry, Dar es Salaam, Tanzania***73. Arsenic in Soil and CCA Treated Wood by Field Portable X-ray Fluorescence**David Mercurio, Debbie Schatzlein, Volker Thomsen, *NITON LLC, Billerica, MA***74. Removal of Arsenic from Contaminated Water Using Alkali Fly Ash Permeable Barrier (AFAPRB) Material**Hossein Rostami, William Brendley, *Philadelphia University, Philadelphia, PA***75. Arsenic Speciation in the Tailings Impoundment of a Gold Recovery Plant in Siberia**Olga V. Shuvaeva, *Institute of Inorganic Chemistry, Novosibirsk, Russia*  
Elena V. Lazareva *United Institute of Geology, Novosibirsk, Russia***76. Background Study of Elevated Arsenic in Soil at a Rhode Island Site**Stephen Zemba, Edmund Crouch, Shailesh Sahay, *Cambridge Environmental Inc., Cambridge, MA*  
Eirlys Vanderhoff, Ambrose Donovan, *McPhail Associates, Cambridge, MA***BIOINDICATORS OF ENVIRONMENTAL HEALTH: CONCEPTS AND APPLICATION****77. Lignolytic Enzymes and Phytotoxic Effects Following Growth of Strains of *Pleurotus* in MWI Fly Ash Contaminated With PCDD/Fs**M. F. Dos Reis Gorny, L.R. Durrant, *Campinas State University, Campinas-SP, Brazil***78. Using Microarrays to Determine Genetic Biomarkers in Largemouth Bass Exposed to Environmental Contaminants**Patrick Larkin, *EcoArray, Alachua, FL*  
Tara Sabo-Attwood, *Interdisciplinary Program in Pharmacology and Therapeutics, University of Florida, Gainesville, FL*Kevin J. Kroll, *Biotechnology Program, University of Florida, Gainesville, FL*Nancy D. Denslow, *Biotechnology Program, University of Florida, Gainesville, FL* and *Department of Biochemistry and Molecular Biology, University of Florida, Gainesville, FL***79. Hazard Assessment of Pesticides and Metals in Sediment from South Florida Canals**G. M. Rand, *Florida International University, N. Miami, FL*  
J.F. Carriger, *Southeast Environmental Research Center, Florida International University, North Miami, FL***80. Reliability of Numerical Sediment Quality Benchmarks Compared to Sediment Characterization Data as Indicators of Suitability for Dredged Material Disposal**Ann B. Shortelle, *MACTEC Engineering and Consulting, Inc., Gainesville FL*  
Glenn Schuster, *USACE - Jacksonville District, Jacksonville FL*  
Bryan Cotter, *PPB Laboratories, Gainesville FL***BIOREMEDIATION****81. Biodegradation of Recalcitrant Aliphatic, PAHs and PAS Compounds in Liquid Culture**J.M. Arce-Ortega, N. Rojas-Avelizapa, R. Rodriguez-Vazquez, *National Polytechnic Institute, Mexico City, Mexico***82. Comparison of Dinitrotoluene Degradation by a Mixed Culture in Aqueous Batch System**Jan Paca, Jiri Barta, *Department of Fermentation Chemistry and Bioengineering, Institute of Chemical Technology, Prague, Czech Republic*  
Professor Rakesh Bajpai, *University of Missouri, Columbia, MO***83. The Effect of Aggregate and Initial Contaminant Concentration on the Biodegradation Rate of Total Petroleum Hydrocarbons**Ramona Boodoosingh, *Tufts University, Medford, MA*  
Dr. Denise Beckles, *The University of the West Indies, St. Augustine, Trinidad, W.I.*  
Anne-Marie Desmarais, Dr. Christopher Swan, *Tufts University, Medford, MA***84. Anaerobic Bioremediation of Mixed Chlorinated Solvent-Hydrocarbon NAPL in a Glacial Sand Aquifer Using SRC**Tamara S. Buitendorp, *Earth Tech, Inc., Grand Rapids, MI*  
James R. Dickson, *Earth Tech, Inc., Sheboygan, WI*  
Eric C. Hince, *Geovation, Florida, NY***85. Effect of Bacteria Augmentation on Aromatic and Asphaltic Fraction Removal in Solid Culture**E. Cervantes-Gonzalez, L.I. Rojas-Avelizapa, R. Cruz-Camarillo, *National School of Biological Sciences, Mexico City, Mexico*  
N.G. Rojas-Avelizapa, *Instituto Mexicano del Petróleo, Mexico City, Mexico***86. Biodegradation of Diuron and Staple by White-Rot and Soil Fungi**R. M. A. Gondim-Tomaz, T. T. Franco, L.R. Durrant, *Campinas State University, Mexico City, Mexico*

**87. Biodegradation of PAHs in Soil by Two Deuteromycete Fungi**

A.R. Clemente, L.R. Durrant, *Campinas State University, Mexico City, Mexico*

**88. In Situ Bioremediation of Pesticide Impacted Soil at the THAN Superfund Site, Montgomery, Alabama**

David Raymond, Steven Gable, Geoffrey Bell, Alan Seech, *Adventus Remediation Technologies, Mississauga, Ontario, Canada*  
Todd Slater, *ATOFINA Chemicals, Inc., Philadelphia, PA*

**89. Enhanced Aerobic Bioremediation of Petroleum Hydrocarbons using Permeox® Plus**

Scott M. Hulseapple, Stephen B. LeFevre, *URS Corporation, Clifton Park, NY*  
Chuck Elmendorf, Peter J. Palko, *Panther Technologies, Inc., Medford, NJ*

**90. Degradation of 4-Aminobenzene Sulphonate by a Newly Isolated Bacterial Culture**

Poonam Singh, Sami Sarfaraz, *Biotechnology Laboratory, Dept of Chemistry, I.I.T, Kanpur, India*  
L.C. Mishra, *C.S.J.M. University, Kanpur, India*  
Leela Iyengar, *Biotechnology Laboratory, Dept of Chemistry, I.I.T, Kanpur, India*

**91. Rapid Biological Treatment of Residual DNAPL with Slow Release Electron Donor HRC-X™**

Stephen S. Koenigsberg, Anna Willett, *Regenesis, San Clemente, CA*

**92. Enhanced Reductive Dechlorination: A Broader Perspective**

Suthan S. Suthersan, *ARCADIS G&M, Langhorne, PA*  
Frederick C. Payne, *ARCADIS G&M, Southfield, MI*  
Denice K. Nelson, *ARCADIS G&M, Minneapolis, MN*

**93. Aerobic Mononitrotoluene Biodegradations in Batch and Continuous Reactor Systems**

Jan Paca, Jiri Barta, *Institute of Chemical Technology, Prague, Czech Republic*  
Rakesh Bajpai, *University of Missouri, Columbia, MO*

**94. Effectively of Hydrocarbons Contaminated Soils Biodegradability Test Evaluated in Different Mexican Soils**

Martha E. Ramirez, Berenice Zapien, Luis C. Fernandez, *Instituto Mexicano del Petroleo, Mexico City, Mexico*

**95. Subsurface Microbial Adaptation to Chemical Stressors**

Rachelle R. Rhodes, *Virginia Polytechnic Institute and State University, Blacksburg, VA*  
Denise Gillam, *University of Cincinnati, Cincinnati, OH*  
Irina Chakraborty, Ann Stevens, *Virginia Polytechnic Institute and State University, Blacksburg, VA*  
Paul Bishop, *University of Cincinnati, Cincinnati, OH*  
Nancy G. Love, *Virginia Polytechnic Institute and State University, Blacksburg, VA*

**96. Estimulation of Hydrocarbon Removal in a Drilling Waste-Contaminated Soil**

Norma Rojas-Avelizapa, Erika Olvera-Barrera, Luis Fernandez-Linares, *Mexican Institute of Petroleum Mexico City, Mexico*

**97. Treatment of Azo Dyes Containing Simulated Wastewater in Aerobic Sequencing Batch Reactor**

S.Sandhya, S.Padmavthy, K.Swaminathan, Y.V.Subrahmanyam, S.N.Kaul, *National Environmental Engineering Research Institute, Chennai, India*

**98. Phytotoxicity and Degradation of Diesel Hydrocarbons in the Soil**

Dr Samina Siddiqui, *Centre for Environmental Research, Brunel University, London, UK*  
Bill Adams, *Soil Science Unit, Aberystwyth, Ceredigion, Aberystwyth, Wales, UK*

**99. Substrate Versatility Studies on the Aerobic Degradation of BTX Compounds**

Eldon R.Rene, Shihabuddeen M Maliyekkal, Ligy Philip, T.Swaminathan., *Indian Institute of Technology Madras, Chennai, India*

**100. The Efficacy of ORC® and HRC® for the Accelerated Natural Attenuation of Pentachlorophenol (PCP)**

Anna Willett, Stephen S. Koenigsberg, *Regenesis, San Clemente, CA*

**CHEMICAL OXIDATION****101. Innovative Safety Controls for Fenton's Remediation: A Case History**

R. Thomas Numbers, Richard T. Cartwright, *MECX, LLC, East Amherst, NY*

**102. Lessons Learned from the Application of In Situ Oxidation Technologies: Practical Evaluation of Seven Projects**

Michael Doherty, *Woodard & Curran, Inc., Andover, MA*  
Christopher Miller, *Woodard & Curran, Inc., Dedham, MA*

**103. In Situ Chlorinated Solvent Remediation using a Circum-Neutral pH Modified Fenton's Process**

Prasad K. Kakarla, Richard S. Greenberg, *In Situ Oxidative Technologies, Inc., West Windsor, NJ*

**104. Fuel Oil Spill Remediation with Nano to Microbubble Peroxide-Encapsulated Ozone Pulsed Perfusion**

William B. Kerfoot, *K-V Associates, Inc., Mashpee, MA*

**105. Nanno/Microbubble Ozone Perfusion for Brownfields Remediation**

William B. Kerfoot, *K-V Associates, Inc., Mashpee, MA*

**106. Chemical Oxidation of Groundwater Plumes**

Dale E. Markley, *Phillip Environmental Services Corporation (PESC), Columbia, IL*

**HEAVY METALS****107. Toxicity and Bioaccumulation Testing of Zinc from Weathered Substrates Using Plants and Worms**

E.P.H. Best, *U.S. Army Engineer Research and Development Center, Vicksburg, MS*  
K.N. Geter, *Analytical Services, Inc., Vicksburg, MS*  
H.E. Tatem, *U.S. Army Engineer Research and Development Center, Vicksburg, MS*

**108. Riverbank Stabilization of Lead Contaminated Soils using Native Plant Vegetative Caps**

JoAnn M. Camacho, B.S., CHMM, *U.S. EPA Environmental Response Team, Edison, NJ*  
Richard Fetzer, M.P.A., *U.S. EPA Region II, Bethlehem, PA*  
Mark Huston, M.S., *U.S. Fish and Wildlife Service, Edison, NJ*  
Christopher Gussman, M.S., *Lockheed Martin Co., Edison, NJ*  
Daniel G. Crouse, B.S., P.E., *EarthTech, Inc, Richmond, VA*  
Robert Helverson, B.S., *Tetra Tech EMI, Boothwyn, PA*

**109. Phosphate-Based Stabilization of Lead Impacted Soil**

Raveendra Damera, Dev Murali, *General Physics Corp., Elkridge, MD*  
Phillina Peete-Tookes, Phillip J. Nessler, *Goddard Space Flight Center, Greenbelt, MD*

**110. Heavy Metal Stabilization and Toxicity Reduction by Interstitial Mineral Solution Crystallization**

Keith E. Forrester, *FESI, Meredith, NH*

**111. Study on Leaching Hexavalent Chromium from Cement Treated Soil to the Surrounding Ground**

Kazushi Furumoto, Nobuyuki Tsuneoka, Hirotochi Mori, *Public Works Research Institute, Ibaraki, Japan*

**112. Heavy Metal Content of Soils on Karstic Area in North Hungary**

Ilona Kevei-Bárány, Rita Kaszala, *University of Szeged, Szeged, Hungary*

**113. Soil Pollution by Heavy Metals from Transport Systems in Lithuania**

Evelina Kliaugiene, Pranas Baltrenas, *Vilnius Gediminas Technical University, Vilnius, Lithuania*

**114. The Biosolids Digestion Treatment Reduces Potentially Toxic Elements Availability in Soils and Maize Uptake**

Raúl S. Lavado, Mónica Rodríguez, Miguel A. Taboada, *Universidad de Buenos Aires, Buenos Aires, Argentina*

**115. Study on Chromium Contaminated Soils and Waters around a Chromate Factory**

Yilian Li, *Wuhan University, Wuhan City, China*  
Yanxin Wang, *China University of Geosciences, Wuhan City, China*

**116. Modified In Vitro Method for the Determination of Lead and Arsenic Bioaccessibility**

James F. Occhialini, James C. Todaro, Joseph Clements, *Alpha Analytical Labs, Westborough, MA*

**117. Peculiarities of the Heavy Metals Speciation in the Background and Polluted Soils of Russian Plane**

Leonid V. Perelomov, *Tula State University, Tula, Russia*

**118. Health-ecological Investigation of Soil Pollution with Heavy Metals and Arsenic in a Metallurgical and Ore Output Region**

Al Spasov, M. Sidjimov, *National Center of Hygiene, Sofia, Bulgaria*

**119. Remediation of Lead Contaminated Soil Using Physicochemical and Phytoremediation Technique: Experience from South West Nigeria**

M. K. C. Sridhar, J. O. Etaghene, G. O. Adeoye, *University of Ibadan, Ibadan, Nigeria*

**120. Continuous Biosorption of Pb, Cu and Cd by *Phanerochaete chrysosporium* in a Packed Column Reactor**

K.Pakshirajan, T.Swaminathan, *Indian Institute of Technology Madra, Chennai, India*

**121. Sorption of Zinc in Bentonite, Illite and Kaolin Clay Using Column Leaching Tests**

Maria Antonia Tanchuling, Mohammad Ruhul Amin Khan, Osamu Kusakabe, *Tokyo Institute of Technology, Tokyo, Japan*

**122. Removal of Heavy Metals from Sewage Sludge used as Soil Fertilizer**

Marian Turek, Teofil Korolewicz, Jerzy Ciba, *Silesian University of Technology, Gilwice, Poland*

**123. A Bioprocess for the Removal of Heavy Metals and Other Inorganics from Various Waters**

Brad Wahlquist, Tim Pickett, D. Jack Adams, *Applied Biosciences Corporation, Salt Lake City, UT*

**124. Metals Remediation Compound (MRC): A New Slow-Release Product for In Situ Metals Remediation**

Anna Willett, Stephen S. Koenigsberg, Ph.D., *Regenesis, San Clemente, CA*

**MODELING****125. Modeling Trichloro-Benzene Desorption at the Eastern Woolen Mills Superfund Site**

Myron I. Kuhlman, *MK Tech Solutions, Inc., Houston, TX*  
Ian T. Osgerby, *US Army Corp of Engineers, Concord, MA*

**126. Application of Flow and Transport Optimization Codes to Groundwater Pump and Treat Systems**

Kathleen Yager, *U.S. EPA, Technology Innovation Office, North Chelmsford, MA*  
Dave Becker, *U.S. Army Corps of Engineers, Hazardous, Toxic, and Radioactive Waste Center of Expertise, Omaha, NE*  
Karla Harre, *U.S. Navy, Naval Facilities Engineering Service Center, Port Hueneme, CA*

**RISK ASSESSMENT****127. Assessing Alternate Approaches to Estimating Uptake of Compounds by Plants and Animals in Ecological Risk Assessments**

William R. Alsop, *AMEC Earth & Environmental, Westford, MA*  
John H. Samuelian, *AMEC Earth & Environmental, Portland, ME*  
Robert Davis, *US Army Corps of Engineers, Concord, MA*

**128. Assessment of Exposure to Arsenic and Manganese from Bangladesh's Drinking Water, Rice, and Soil**

Richard Ortega, Guillaume Devès, *Laboratoire de Chimie Nucléaire Analytique et Bioenvironnementale, Gradignan, France*  
Seth H. Frisbie, *Better Life Laboratories, Inc., East Calais, VT*  
Dorothea Alber, *Hahn-Meitner-Institut Berlin, Berlin, Germany*  
Donald M. Maynard, *The Johnson Company, Inc., Montpelier, VT*  
Bibudhendra Sarkar, *The Hospital for Sick Children, Toronto, Canada*

**129. Risk Evaluation of Volatile Organic Chemical Contamination of Groundwater/Soils in Support of Property Transfer**

Lee Ann Sinagoga, Robert Jupin, *Tetra Tech NUS, Inc., Pittsburgh, PA*

**RISK BASED CLEANUP****130. Risk-Based Management Strategies and Innovative Remedies For Surface Water Protection: A Case Study**

S. Grant Watkins, Kristen Wandland, Brian Ray, *ENSR Corporation, Raleigh, NC*

**SEDIMENTS****131. Velsicol/Pine River Sediment Remedial Action Case Study Work in Progress**

Stephanie Ball, *U.S. Environmental Protection Agency, Chicago, IL*  
Rob Stryker, Gina Bayer, *CH2M HILL, Neenah, WI*

**132. Sequestration of PAHs from Contaminated Sediments by Treatment with Nonpolar Resin**

Yunzhou Chai, Alexander Kochetkov, Danny Reible, *Louisiana State University, Baton Rouge, LA*

**133. Metal Speciation Assessment in Contaminated Sediments- a Case Study**

Sunil G. Bhand, *Birla Institute of Technology & Science, Pilani, India*  
Kamal K. Chaturvedi, *I.P.S. Academy, Indore, India*

**134. Alternative Dispute Resolution Techniques at Sediment Cleanup Mega-Sites**

Loren R. Dunn, *Riddell Williams P.S., Seattle, WA*



# Poster Sessions (cont.)

## 135. Evaluation of Toxicity in a South Carolina Marsh Sediment Containing PAH and Metals

Beth M. DuPlessie, AMEC Earth & Environmental, Westford, MA  
Paul Anderson, Ph.D., AMEC Earth & Environmental, Westford, MA  
Sue Matkoski, AMEC Earth & Environmental, Westford, MA  
Mike Slenska, Beazer East, Inc., Pittsburgh, PA

## 136. Risk-Based Remediation of Lead and Chromium Impacted Sediments in Lake Waban, Wellesley, MA: A Case Study

Russell Schuck, Deborah Gevalt, Jennifer Mullen, Haley & Aldrich, Inc., Boston, MA  
Charles Menzie, Katherine Fogarty, Menzie-Cura & Associates, Inc., Chelmsford, MA

## 137. Geotechnical/Hydrogeologic Factors in In Situ Contaminated Sediment Capping

Robert D. Mutch, Jr., P.Hg., P.E., HydroQual, Inc., Mahwah, NJ  
Daniel K. Kearney, Brown and Caldwell, Allendale, NJ

## 138. Setting Clean-up Objectives for Metals in Sediment

Joanne H. Perwak, Olaf Westphalen, Shaw Environmental, Inc., Andover, MA  
Arthur F. Eidson, Ph.D., Shaw Environmental, Inc., Houston, TX

## 139. Microbial Degradation of Atrazine in Coastal Sediments: Distribution of Metabolites into Aqueous and Basic Fractions

Kelly L. Smalling, C. Marjorie Aelion, University of South Carolina, Columbia, SC

## SITE ASSESSMENT

### 140. Integrated Assessment of Kuwait Bay: Identification of Sensitive and Hotspot Areas

Abdul Nabi Al-Ghadban, Amr el-Sammak, Kuwait Institute for Scientific Research, Safat, Kuwait

### 141. Does Low-Flow Sampling Produce Representative Groundwater Samples?

James D. Doherty, Pennoni Associates, Inc., Hopkinton MA

### 142. Passive Vapor Diffusion Sampling for Volatile Organic Compounds in a Bayou

Tom Dragoo, John Hicks, John Tunks, Parsons, Denver, CO  
Raphael Vazquez, AFCEE/ERT, Brooks City-Base, TX  
Joy Lozano, Booz, Allen & Hamilton, San Antonio, TX

### 143. Use of Innovative Packer Sampling and Geophysical Techniques for Groundwater and Bedrock Characterization

Roger E. Huddleston, CH2M HILL, Chicago, IL  
Dakon Brodmerkel, CH2M HILL, Philadelphia, PA  
Andrew Judd, CH2M HILL, Parsippany, NJ

### 144. Increasing the Accuracy of LNAPL Volume Determinations in the Subsurface

Andrew J. Kirkman, The RETEC Group, Inc., St. Paul, MN

### 145. A Practical Application of the Texas Risk Reduction Program at a DNAPL Contaminated Site

Kiran K. Srinivasan, Christina Robinson, ENTRIX, Inc., Houston, TX

### 146. Increased Accuracy of Site Assessment using Passive Soil Gas Technology

James E. Whetzel, W. L. Gore and Associates, Inc., Elkton, MD

## TRAINING RANGE

### 147. Design of a Lead Recovery System for Recreational Firing Ranges in New England

Luis Ferreira, Alvaro Rodriguez, John W. Duggan, Ph.D., P.E., Wentworth Institute of Technology, Boston, MA

### 148. Innovative RangeSafe Program Effectively Manages Lead at Small Arms Firing Ranges

Michael F. Warming, PE, AMEC Earth & Environmental, Inc., Somerset, NJ  
John Cefaloni, US ARMY TACOM/ARDEC, Picatinny Arsenal, NJ

## Scientific Advisory Boards

The tremendous success of past conferences has been the result of the dedication and hard work of our Scientific Advisory Board (SAB) members and this year's conference is no exception. The SAB evaluates abstract submissions, recommends invited papers and presenters, advises on special sessions and activities and generally serves as conference ambassadors encouraging colleagues to participate and attend. The creation of the SAB is the first crucial step in conference development, and care is taken to insure philosophical, scientific, regulatory and geographical balance.

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Mary Donohue, Environmental Forensics Journal

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Jack Duggan, Wentworth Institute of Technology

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Willard Murray, Ph.D., P.E., Harding ESE

Lee Newman, Ph.D., University of South Carolina

Gopal Pathak, Birla Institute of Technology

Tom A. Pedersen, Camp Dresser & McKee, Inc.

Frank Peduto, Soils, Sediment and Water Magazine

Ioana G. Petrisor, Ph.D., University of Southern California

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Brian D. Rogers, Department of the Army

Michael Sivak, US EPA, Region 2

Henry H. Tabak, US EPA, ORD



# Conference at a Glance

## Monday, October 20, 2003

### Workshops

- 10:00 am - 5:00 pm 1) **Theory and Use of Field Portable X-ray Fluorescence for Soil Analysis** (Campus Center 904-08)  
10:00 am - 5:00 pm 2) **In-Situ Chemical Oxidation Workshops** (Campus Center 1109)  
1:00 - 5:00 pm 3) **TBA/MTBE Remediation Seminar** (Campus Center 101)  
1:00 - 5:00 pm 4) **A Practical Approach for Assessing Upward Vapor Intrusion Risk** (Campus Center 917)  
1:00 - 3:00 pm 5) **The Arsenic Nobody Wanted: Now What? A Panel Discussion on Arsenic in Communities** (Campus Center 168C)  
3:00 - 5:00 pm 6) **Implementing the Massachusetts DEP's New Data Enhancement Policy - PRACTICAL Data Quality Tips for LSPs and other Data Users** (Campus Center Auditorium)

## Tuesday, October 21, 2003

### Platform Presentations

#### 8:30am-Noon

- Session 1: **Environmental Biotechnology** (Campus Center Auditorium)  
Session 2: **Department of Defense Training Ranges and Munitions Constituents: Challenges and Solutions** (101 Campus Center)  
Session 3: **Regulatory / Legal** (168C Campus Center)  
Session 4: **Remediation I** (Bowker Auditorium, Stockbridge Hall)

#### 1:30pm-5:30pm

- Session 1: **Bioavailability** (Campus Center Auditorium)  
Session 2: **Environmental Forensics** (101 Campus Center)  
Session 3: **Bioremediation of Acid Mine Drainage and Removal of Metals** (168C Campus Center)  
Session 4: **Phytoremediation** (Bowker Auditorium, Stockbridge Hall)

**Poster Session** 4:00pm - 6:00pm, Exhibit Area, First Floor, Campus Center

**Social** 4:30-6:00pm, Exhibit Area, First Floor Campus Center

### Workshops (Evening 7:00-10:00 pm)

- 7) **Simple Models for Estimating Contamination Impacts to Ground Water** (Campus Center 101)  
8) **Understanding the Role of Anaerobic Biodegradation Processes in Passive and Enhanced Natural Attenuations Programs** (Campus Center 1109)  
9) **Application and Challenges in Groundwater Modeling for Environmental Forensic Investigations** (Campus Center 168C)

## Wednesday, October 22, 2003

### Platform Presentations

#### 8:30am-Noon

- Session 1: **CCA Treated Wood Regulations, Science and Risk Assessment; Part I** (Campus Center Auditorium)  
Session 2: **Perchlorate** (101 Campus Center)  
Session 3: **Bioindicators of Environmental Health: Concepts and Application** (168C Campus Center)  
Session 4: **Pay-for-Performance Remediation Technologies - Methods & Case Studies of Science & Economics** (1109 Campus Center)

#### 1:30pm-5:30pm

- Session 1: **CCA Treated Wood Regulations, Science and Risk Assessment; Part II** (Campus Center Auditorium)  
Session 2: **MTBE** (101 Campus Center)  
Session 3: **Bioremediation** (168C Campus Center)  
Session 4: **Analysis / Fate** (1109 Campus Center)

**Poster Session** 4:00pm-6:00pm, Exhibit Area, First Floor, Campus Center

**Social** 4:30-6:00pm Exhibit Area, First Floor, Campus Center

### Workshops (Evening 7:00-10:00 pm)

- 10) **Detection and Quantitation Limits in Environmental Analysis** (Campus Center 1109)  
11) **Aerobic and Anaerobic Bioremediation and Monitored Natural Attenuation of VOCs** (Campus Center 101)  
12) **Environmental Fate of Hydrocarbons in Soils and Groundwater** (Campus Center 168C)

## Thursday, October 23, 2003

### Platform Presentations

#### 8:30am-Noon

- Session 1: **Remediation II** (Campus Center Auditorium)  
Session 2: **Risk Assessment and Risk Based Cleanup** (101 Campus Center)  
Session 3: **Chemical Oxidation** (168C Campus Center)  
Session 4: **Modeling and Site Assessment** (1109 Campus Center)

#### 1:30 5:30pm

- Session 1: **Sediments** (Campus Center Auditorium)  
Session 2: **Heavy Metals** (101 Campus Center)

### EXHIBITS

Throughout the First Floor Concourse.

### POSTER SESSION

Over 140 posters on display - Tuesday and Wednesday 4:00-6:00 pm, in back of Exhibit Area

### SOCIALS (CASH BAR)

Tuesday and Wednesday - 4:30-6:00 pm - Exhibit Rooms - interact with poster presenters, exhibitors and other conferees

### JOB LISTING/RESUME BOARD

Located outside the doors to the Campus Center Auditorium

### ADDITIONAL LISTINGS

See the Daily Activity Board beside the Registration Desk for additional listings of Breakfast Forums, Socials and other Special Events

### MESSAGES

Remember to check the Message Board just outside the doors to the Campus Center Auditorium. It's where you'll find your messages from other conferees, as well as those from home or home office.

**IF YOU NEED TO BE REACHED** during the conference, tell co-workers and family to call: (413) 545-2591 or fax (413) 545-0050

## CALL FOR PAPERS

### 20th Annual International Conference on Contaminated Soils, Sediments And Water

Analysis, Site Assessment, Fate, Environmental and Human Risk Assessment, Remediation and Regulation

**October 18-21, 2004**

University of Massachusetts at Amherst

#### For More Information Contact:

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**Deadline for submissions is February 9, 2004**

For either a paper or poster to be considered please submit a one-page abstract containing: presentation title; 300 word narrative; and for each author, name, degree, title, affiliation and complete address and phone number. Please indicate your choice of either oral presentation or poster.

Publication of manuscripts from both platform and poster presentations will be considered for either the general proceedings, to be published as a hard cover book, International Journal of Phytoremediation, Soil & Sediment Contamination: An International Journal, or Contaminated Soils, Sediments and Water Cleanup Magazine.