October 17 – 20, 2016
University of Massachusetts
Amherst, MA

140 Presenters + 60 Posters + 9 Workshops + 50 Exhibitors

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Assessment, Remediation, Regulation and the Energy Environmental Interface

presented by
The Association for Environmental Health & Sciences Foundation, Inc.

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### Exhibit Hall Hours

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The AEHS Foundation attributes the success of this conference, in large part, to a very dedicated and hardworking Scientific Advisory Board (SAB). The SAB evaluates abstract submissions, recommends invited papers and presenters, with regard to session topics, and serves as conference ambassadors. The SAB is crucial to the conference development. Care is taken to create a board that represents philosophical, scientific, regulatory, and geographical balance.

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- **James Tarr, CPG, CG, NAVFAC MIDLANT**
Workshop 1  1:00pm – 5:00pm, Room 808

Measuring Biological Exposure to Environmental Chemicals
Meg Blanchet, Julie Cosio, Jill Clemmer, Rachel Wilson, Andrea DiPerna and Marc A. Nascarella, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

This workshop will cover approaches for the measurement of chemicals (or their metabolites) in an individual’s body fluids or tissues. These biomonitoring measurements provide valuable information on actual levels of exposure to environmental chemicals from all sources (e.g., air, dust, water, food). This information can be essential when addressing site-related concerns about environmental measurements and the probability of adverse health effects in potentially exposed individuals. This workshop will include a general overview of biomonitoring as well as specific case studies of when and how it has been used effectively in Massachusetts. The workshop will describe opportunities to use biomonitoring to better understand the magnitude of exposure at hazardous materials sites in Massachusetts and nationwide. The presentation will cover how MDPH is conducting a statewide study to identify participants with a high risk of potential exposure to select metals (e.g., lead, mercury, manganese, and cadmium) as well as establishing a statewide baseline level of exposure to these and other analytes including: PCBs, antimony, arsenic, barium, cesium, cobalt, molybdenum, thallium, tungsten, and uranium. Topics covered during the workshop will include an overview of National and State-Based Biomonitoring Programs; Case study of how biomonitoring was used to understand chronic exposure to naturally-occurring metals; Best practices for measuring and interpreting acute biological exposure to chemicals; Best practices when responding to elemental mercury spills; and best practices for risk communication and reporting back biomonitoring results.

Continuing Education Credit/CEU Info: This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

Workshop 2  1:00pm – 5:00pm, Room 164

Vapor Intrusion Assessment and Mitigation in Massachusetts: Status of Sites, Findings from the Field, and Guidance for Practitioners
Paul Locke, Waste Site Cleanup Assistant Commissioner, MassDEP, Boston, MA
Gerard Martin, Deputy Regional Director, MassDEP, Lakeville, MA
John Fitzgerald, Regional Engineer, MassDEP, Wilmington, MA

This course will provide attendees with an up-to-date picture of how vapor intrusion is being addressed at sites regulated under the Massachusetts Contingency Plan. MassDEP will present: an overview of the number and type of sites where vapor intrusion has been confirmed or identified as a potential concern; its approach to expediting assessment and mitigation of vapor intrusion sites, particularly where trichloroethylene (TCE) is an indoor air contaminant of concern (given the evidence of fetal heart defects related to short-term TCE exposure during gestation); the results and lessons learned from vapor intrusion investigations and mitigation conducted by MassDEP; and the key elements of MassDEP’s Vapor Intrusion Guidance document.

Continuing Education Credit/CEU Info: Workshop 2 is not approved for NJ LSRP credit. Workshop 2 is approved for 4.0 LSP DEP/Regulatory continuing education credits (MassDEP LSP course #1580). Workshop 2 is also approved for technical credit for CT LEPs, NY PEs, FL PEs, and Certificate of Attendance (applies to NH PEs). Must sign up to receive credit and follow all procedures regarding CEUs.

Workshop 3  1:00pm – 5:00pm, Room 165

Building a Better Background Data Set
Karen Thorbjornsen, P.G., CB&I Federal Services, Knoxville, TN
Jonathan Myers, Ph.D., CB&I Federal Services, Albuquerque, NM

Objective: Provide practical approaches for establishing background distributions of constituents in soil, sediment, groundwater, and surface water.

This workshop provides practical approaches for characterizing background distributions of constituents in soil, sediment, groundwater, and surface water. These methods are applicable to naturally occurring elements and radionuclides, as well as anthropogenic compounds such as polycyclic aromatic hydrocarbons. The workshop expands on existing regulatory background guidance by including tools for dealing with real-world (non-ideal) analytical data — e.g., handling nondetects; evaluating outliers; how and when to combine subgroups of data; and extracting background data from existing data sets when new samples are not an option. The importance of considering geochemistry is emphasized. Incorporating geochemical evaluations of the data, in addition to the purely statistical methods provided in guidance documents, results in more representative background data sets and enhances their utility in site-to-background comparisons. Geochemical evaluations are also key when deciding how to handle concentrations identified as outliers using statistical outlier tests.

The concepts are illustrated with case studies from the instructors’ work on over 75 background studies across the United States and Puerto Rico. Prior knowledge of statistics is not required. The course is recommended for regulatory personnel as well as consultants, site managers, and others with an interest in improving their background studies.

Continuing Education Credit/CEU Info: This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.
All workshops are FREE to municipal, state, and federal REGULATORY personnel registered for the conference. Registration is required. See Registration Desk.

**Workshop 4** 1:00pm – 5:00pm, Room 168

**Sustainable Remediation Principles & Practice**

Dick Raymond, Terra Systems, Claymont, DE
Andrew Irwin, PE, LSP, IRVIN Engineers, Inc., Natick, MA
Fritz Hostrop, Wilcox & Barton, Marblehead, MA
Rich Cartwright, PE, CHMM CPIM, Cartwright Consulting, East Amherst, NY

This workshop is a unique opportunity to provide sustainable remediation training for environmental program and project managers including: Licensed Site Professionals (LSP’s), Licensed Environmental Professionals (LEP’s), Licensed Site Remediation Professionals (LSRP’s), Professional Engineers (PE’s), Certified Hazardous Materials Managers (CHMM’s) and Professional Geologists (PG’s).

The workshop will begin with a summary overview of the principles and practice of sustainable remediation, followed by a comparison of existing international and domestic green and sustainable remediation guidelines. Immediately afterwards, specific Massachusetts Contingency Plan (MCP) regulations applicable to sustainable remediation will be presented. This will be followed by a case study illustrating how to evaluate green and sustainable remediation (GSR) alternatives using SiteWiseTM. Next, a presentation on synergistic and green and sustainable remediation (GSR) alternatives using SiteWiseTM. Finally, a case study illustrating how to evaluate green and sustainable remediation (GSR) alternatives using SiteWiseTM. This introduces the possibility of a 3D isotope approach for both source correlations and attenuation studies. There are many examples that have been published where GCIRMS has been used to both differentiate sources of PCE/TCE as well as study natural attenuation at the contaminated sites.

**Continuing Education Credit/CEU Info:** This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

**Workshop 5** 1:00pm – 4:00pm, Room 176

**Environmental Forensics – Integration of Established and Evolving Techniques to Evaluate Who Was Responsible for the Spill or Release**

Paul Philp, University of Oklahoma, Norman, OK

The concept of environmental forensics has evolved significantly over the years. Basically, it is concerned with establishing the relationship between a contaminant in the environment and its suspected source(s), or point of release. Such contaminants can cover a wide range of compounds or mixtures of compounds. They may be volatile compounds such as benzene or chlorinated solvents or complex crude oil mixtures, refined products, or complex mixtures of aromatic compounds. They may be present as free product, dissolved in water, adsorbed on soil particles, or present in the vapor phase. A wide variety of techniques exist to characterize and establish their potential relationship with possible sources. The standard EPA methods that many are familiar with are of little use in forensic studies since those methods are directed towards obtaining concentration data for specific contaminants.

Forensic investigations typically use a tiered approach in terms of fingerprinting tools. Preliminary characterization is undertaken by gas chromatography (GC) followed by more detailed gas chromatography-mass spectrometry (GCMS) analyses. The fingerprints, or chromatograms, obtained in this manner often provide sufficient information to determine possible relationships between contaminant and possible release points. However there are also many cases where the resulting GC and GCMS data are ambiguous and possibly misleading. In such cases it is possible to go to a more specialized tier of analyses and utilize the stable isotope composition of individual compounds in the contaminant. This is particularly valuable for single component contaminants, such as MTBE, BTEX, or PCE, where GC and GCMS are of virtually no use for correlation or source differentiation. There are many examples that have been published where GCIRMS has been used to both differentiate sources of PCE/TCE as well as study natural attenuation at the contaminated sites.

Early applications of stable isotopes to environmental problems were limited to carbon and hydrogen isotopes. Chlorine isotopes can now be routinely measured for most of the common chlorinated groundwater contaminants, and in the not too distant future, bromine isotopes will also be routinely available. This introduces the possibility of a 3D isotope approach for both source correlations and attenuation studies. Stable isotopes, including Cl, are well suited for use in the rapidly emerging area of vapor intrusion studies to differentiate indoor sources of contaminants vs. subsurface contaminants.

Finally, the use of the various fingerprinting techniques for monitoring attenuation at sites undergoing remediation will be discussed. The combined use of the stable isotopes, GC and GCMS can be extremely valuable tools for monitoring remediation as well as determining the onset of natural attenuation. Methods being developed for the incorporation of the isotope data into reactive transport models will also be discussed.

**Continuing Education Credit/CEU Info:** This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

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6. NH PEs (select certificate of attendance)
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**To receive credit you must:**

- Be registered to receive the CEU’s (pay the $50 administrative charge for CEUs on the registration form).
- If you are not registered, and would like to receive CEUs, please contact the office or visit the onsite registration desk at the conference.
- Sign in AND out at the session and workshop doors (exception: LSPs sign in and out at the conference desk for the conference and at the workshop doors for workshops)
- Show a picture ID when signing in and out
- Complete and return evaluation form, if required (ex. NY PEs).

**Credits are awarded as follows:**

- ½ credit per hour of session attendance (LSPs, LEPs, LSRPs)
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- 1 credit per hour of workshop attendance
- Some workshops may be approved for DEP regulatory credit (see individual workshop descriptions)
- Some workshops or sessions may be excluded from receiving credit (will be noted in workshop or session description in program)

**All certificates are mailed mid-November.**

**Questions? Contact the Conference Coordinator at 413-549-5170 or Brenna@aehsfoundation.org**
Session 1: 9:00am – 12:00pm, Room 176
Intersection of Transportation & the Environment*
Session Chairs: Matthew Burns, WSP Parsons Brinckerhoff, Woburn, MA
Jennifer Stroemten, Institute for Nuclear Host Communities, Greenfield, MA

9:00 Bridging the Gap from Environmental Permitting to Emergency Bridge Demolition
Amber Vail, GZA, Keene, NH; Michele Simoneaux, GZA, Norwood, MA

9:30 Combined Remedies Used to Remediate Transportation Related Spills
Maureen Dooley, Regenesis, Wakefield, MA

10:00 BREAK

10:30 Quieting the Impact of Transportation with Sound Acoustic Planning
Erich Thalheimer, WSP Parsons Brinckerhoff, Boston, MA

11:00 DOE’s Consent - Based Siting Initiative and Nuclear Waste Transportation
Erica Bickford, US Department of Energy, Washington, DC

11:30 Panel Discussion
*This session is not approved for CT LEP credit.

Session 2: 8:30am – 12:00pm, Room 164
Use of Decision Analysis and Probabilistic Tools to Manage Environmental Risk
Session Chairs: Russ Keenan, Ph.D., and Avram Frankel, PE, Integral Consulting, Inc.

Decision analysis (DA) is a systematic, quantitative and interactive approach for addressing and evaluating important choices. Both the private and public sectors have used DA and probabilistic evaluations to support project and portfolio level decision-making and risk management. By integrating the contributions of decision makers, stakeholders, subject matter experts and decision analysts, these techniques bring clarity to seemingly intractable challenges of managing environmental risk. DA and probabilistic evaluations have evolved considerably over the last 30+ years for uses including: remediation decision making, portfolio prioritization, restoration planning, property redevelopment, insurance underwriting, reserve setting, lifecycle cost estimating, human health and ecological risk assessments, and natural resource damages assessment. In many cases, these techniques have touched projects in ways stakeholders might not realize.

This session will discuss the current state of its practice in the environmental industry. What level of stakeholder understanding and acceptance exists? What are the most valuable lessons learned? And, in what new areas might DA and probabilistic evaluations best be applied?

8:30 Overview of Probabilistic Risk Assessment and Decision Analysis Tools for Evaluating Environmental Issues
Russ Keenan, Integral Consulting, Inc., Portland, ME; Avram Frankel, Integral Consulting, Inc., San Francisco, CA

9:00 Use of Probabilistic Modeling in Exposure and Dose-Response Portions of Chemical Risk Assessments – New Developments at EPA
Paul Price, National Exposure Research Laboratory, US EPA, Research Triangle Park, NC

9:30 Application of Probabilistic Risk Assessment Techniques at the State Regulatory Level: Principles and Practical Examples
Christopher Teaf, Center for Biomedical & Toxicological Research, Florida State University, Tallahassee, FL; Douglas Covert, HSW/IRM, Tallahassee, FL

10:00 BREAK

10:30 Multi-Criteria Decision Analysis for Environmental Projects – Increasing Acceptance and Application
Jeffrey Cegan, US Army Engineer Research and Development Center, Concord, MA

11:00 Increasing Use of MCDA and Probabilistic Analysis: Opportunities and Challenges
Kate Martin, Chevron Energy Technology Company, San Ramon, CA

11:30 Practical Methods for Applying Multi-Criteria Decision Analysis on Environmental Projects to Improve Stakeholder Communications
Timothy Havranek, Integral Consulting, Inc., Pittsburgh, PA

Session 3: 9:00am – 12:00pm, Room 168
New England’s Regulatory Perspective on Greener Cleanups*
Session Chair: Susan Fessenden, Massachusetts Department of Environmental Protection, Boston, MA

9:00 How is EPA - Region 1 “Greening” Our Programs?
Katherine Woodward, US EPA, Boston, MA

9:30 The State of Greener Cleanups in Massachusetts
Thomas Potter, MassDEP, Boston, MA

10:00 BREAK

10:30 The Value Proposition of Greener Cleanup of a RCRA Corrective Action Site: An Industry Perspective
Russell Downey, Pfizer, Inc., Peapack, NJ

11:00 Green and Sustainable Remediation in Connecticut
Camille Fontanelle, CT DEEP, Hartford, CT

11:30 A Case Study of Green Remediation and Reuse - Elizabeth Mine
Edward Hathaway, US EPA, Boston, MA

*LUNCHEON

Tuesday, October 18, 2016 Amherst Room, 10th Floor
NRDA - Past, Present, and Future

Robert Haddad, Ph.D., Corporate Vice President and Principal Scientist, Exponent, Menlo Park, CA

Dr. Robert Haddad will provide his perspective on the evolution of Natural Resource Damage Assessments over the past several decades and where they may be headed in the near future. He will begin by describing the underpinnings of our current NRDA paradigm, starting with the concept of pars pro toto and working through the common law aspects and the Beneficial Use Doctrine. He will then discuss the evolution of assessments themselves and some of the factors that have driven these changes. He will touch upon the evolution of the cooperative process in NRDA and provide some insights as to the strengths and weaknesses of this paradigm. He will finish up with an overview of the current state of affairs and provide some perspectives on where he sees the NRDA paradigm moving in the near future.
Session 1: 1:30pm – 5:30pm, Room 164

Building Resilience to Climate Impacts: Local Efforts to Implement Adaptation Plans*

Session Chairs: Margaret Round and Marc A. Nascarella,
Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

1:30 Introduction
Session Co-Chairs

1:40 Impact of Climate Change on Public Health: A Global Perspective
Elif Ath A.B. Eltahir, Professor and Associate Department Head, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA; Catherine Brown, State Public Health Laboratory, Massachusetts Department of Public Health, Boston, MA; Marc A. Nascarella, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

2:00 NOAA’s Regional Climate Services: Supporting Climate Understanding at Regional Scales
Ellen McCray, Regional Climate Services Director, Eastern Region, National Oceanic and Atmospheric Administration (NOAA), Taunton, MA

2:30 Investing in a Climate-Smart Commonwealth
Kathleen Theoharides, Director of Climate and Global Warming Solutions, Massachusetts Office of Energy and Environmental Affairs, Boston, MA

3:00 BREAK

3:30 Community Resilience and Chemical Safety
Tiffany Skogstrom, Policy and Outreach Coordinator, Massachusetts Office of Technical Assistance, Boston, MA

4:00 Tools and Methods for Evaluating Climate Health Impacts on Transportation Projects
Kate Adams, Margaret Round, and Marc A. Nascarella, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

4:20 Evaluating Climate-Related Waterborne Disease Using Recreational Water Quality Data in Massachusetts
Michael Celona, Margaret Round, Marc A. Nascarella, Gi Luo, Michael Beattie, and Irena Draksic, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

4:50 Asthma and Climate Change: Building Knowledge, Communication and Action
Kathleen McCabe, Director of Policy and Practice, Health Resources in Action, Boston, MA

5:10 Using Health Impact Assessment to Promote Regional Climate Action
Catherine Ratte, Principal Planner/Section Manager, Pioneer Valley Planning Commission, Springfield, MA; Ben Wood, Acting Director, Office of Community Health Planning and Engagement Division of Prevention and Wellness, Bureau of Community Health and Prevention, Massachusetts Department of Public Health, Northampton, MA; Margaret Round, Environmental Toxicology Program, Bureau of Environmental Health, Massachusetts Department of Public Health, Boston, MA

Funding for this session has been made possible (in part) by the Centers for Disease Control and Prevention. The views expressed in written conference materials or publications by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services, nor does the mention of trade names, commercial practices, or organizations imply endorsement by the US Government.

Session 2: 1:30pm – 5:30pm, Room 165

Risk Assessment

Session Chair: Christopher Teaf, Ph.D., Florida State University, Tallahassee, FL

1:30 Understanding and Communicating Data: PCB Concentrations in Ambient Air Around New Bedford Harbor, MA
Wendy Heiger-Bernays, Komal Basra, Kathryn Tomsho, and Madeleine Scammell, Boston University, School of Public Health, Boston, MA; Sylvia Brakou and Claire Miller, Toxics Action Center, Boston, MA; Andres Martinez and Keri Hornbuckle, University of Iowa, Iowa City, IA; Richard Juang, Alternatives for Community & Environment, Roxbury, MA; Karen Vilandry, Hands Across the River Coalition, Inc., New Bedford, MA

2:00 Risk Assessment of PCBs in Fish Tissue
Betsy Ruffel and Robert Kennedy, AECOM, Chelmsford, MA

2:30 Amines in the Environment: Sources, Chemistry, Behavior, and Toxicological Risk Considerations
Christopher Teaf, Florida State University, Tallahassee, FL; Douglas Covert, Bruce Tuovila, and Michele Garber, HSWMR, Tallahassee, FL

3:00 BREAK

3:30 A Novel Approach for Estimating Soil Exposure Point Concentrations in Ecological Risk Assessment
Bonner Anthony, Arcadis, Raleigh, NC; William Stittler, Arcadis, Syracuse, NY

4:00 Incremental Sampling Methodology and Metals Bioavailability
Jay Clausen, USACE ERDC-CRREL, Hanover, NH; Anthony Bednar, USACE ERDC-EL, Vicksburg, MS; Thomas Georgian, USACE EMCC, Omaha, NE; Brandon Swope, SPAWAR Systems Center Pacific, San Diego, CA

4:30 Assessing Wetlands: Stumbling Through the Woods... Professionally!
Conor Veeneinam and Michael Miller, CDM Smith, Boston, MA

5:00 Interaction Between Low Asbestos Levels and Inherited Genetic Susceptibility in Mesothelioma Risk
Tomaso Dragani, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

Session 3: 1:30pm – 5:00pm, Room 168

In-Situ Chemical Oxidation

Session Chair: Clifford Bruell, Ph.D., University of Massachusetts, Lowell, MA

1:30 Combining In-Situ Remediation Technologies to Achieve Site-Specific Standards
Stephanie Turkot and Will Moody, Geo-Cleanse International, Inc., Matawan, NJ

2:00 Challenges of Soil Mixing Using Catalyzed Hydrogen Peroxide with Rotating Dual Axis Blending Technology
Frederick Symmes, Vincent Dello Russo, and Erik Hall, Weston Solutions, Concord, NH; Prasad Kakarla, Michael Temple, and William Caldicott, In-Situ Oxidative Technologies, Inc., Lawrenceville, NJ; Andrew Hoffman, NHDES, Concord, NH

2:30 Slow Release Kloruz Persulfate for Enhanced Remediation Including in Permeable Reactive Barriers
Brant Smith, PeroxyChem, Philadelphia, PA; Brianna Desjardins, PeroxyChem, Tonawanda, NY

3:00 BREAK

3:30 Enabling NAPL Remediation Through Surfactants
David Kane, TetraTech, Newark, DE; Dan Socci and Geeta Dahal, EthicalChem, South Windsor, CT

4:00 Remediation of Perfluoralkyl Compounds (PFCs) with OxyZone®, a Multi-Oxidant Blend
Raymond Ball and Alan Moore, EnChem Engineering, Inc., Newton, MA

4:30 Alkaline Activated Persulfate to Treat Contamination Beneath Construction of Skyscraper
Mike Marley and Joseph Hickey, XDD Environmental, Stratham, NH; Steve Panter, Fleming Lee Shue, New York, NY
October 18, 2016  TUESDAY AFTERNOON/EVENING

SESSION + WORKSHOPS

Session 4: 1:30pm – 5:00pm, Room 176
Sustainability and Sustainable Remediation
Session Chair: Michael E. Miller, Ph.D., CDM Smith, Boston, MA

1:30  Greener Cleanup Remedy Optimization Leads to Novel In-Situ Perchlorate Treatment
J. Andrew Irwin, IRWIN Engineers, Inc., Natick, MA

2:00  Quantitative Carbon Footprint and Sustainability Analysis of an ISS Remedy at a Former MGP Site
Geoffrey Schwartz, GZA, Norwood, MA; Jason Naiden, National Grid, Waltham, MA; Joseph Higgins, Innovative Engineering Solutions, Inc., Walpole, MA

2:30  Developing a Sustainable Remediation Approach for Portland, Oregon Sediment Site
Amanda McNally, AECOM, Pittsburgh, PA; Anne Fitzpatrick, AECOM, Seattle, WA; Deborah Edwards, ExxonMobil, Houston, TX

3:00  BREAK

3:30  The Implementation of “Green” Technology for Treating Chlorinated Contamination
Jay Romano, Redox Tech, Attleboro, MA

4:00  Renewable Energy to Offset Greenhouse Gas Emissions at Petroleum Release Sites
Benjamin McAlexander, Trihydro, Orono, ME

4:30  Imagining the Next 25 Years…Opportunities to Enhance Benefits and Reduce Costs of Waste Management
Paul Hauck, CDM Smith, Tampa, FL

Workshop 6  6:30pm – 9:30pm, Room 168
Incremental Sampling Methodology (ISM)
Jay Clausen, Ph.D., PG, USACE-CRREL, Hanover, NH
Philip Goodrum, Ph.D., DABT, Integral Consulting, Inc., Fayetteville, NY
Mark Bruce, TestAmerica, Inc., North Canton, OH

The Incremental Sampling Methodology (ISM) was developed to address the issue of heterogeneous contaminant distribution with the realization that the current discrete/grab sampling approach often yields data with a high degree of uncertainty and results that may not be representative of site conditions. Guidance on the use of ISM is currently available from numerous state and federal regulatory agencies (e.g., AK, FL, HI, USEPA), US Army Corps of Engineers, and the Interstate Technology and Regulatory Council. In addition, the case history of ISM methods and applications is continuing to grow in the published literature.

This workshop will provide a brief history leading to the development of ISM, ISM principles, current regulatory status, soil sampling and sample preparation methods, data analysis and statistics, and cost of implementation. The ISM background information will be followed by a number of case studies that illustrate how ISM has been applied at a variety of sites and exposure media with varying types of contamination. We’ll highlight how the sampling design is driven by specific data quality objectives, and address common questions that practitioners have had when considering ISM for their sites. This workshop may be of interest for risk assessors, site managers, and representatives from regulatory agencies who would like to learn more about ISM.

Continuing Education Credit/CEU Info: This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

Workshop 7  6:30pm – 9:30pm, Room 176
Remediation Tools for Challenging Geology – Cutting Edge Technology for Cleanups in Clay & Fractured Bedrock
William Slack, Ph.D., PE, FRx, Inc., Cincinnati, OH
Leah MacKinnon, P. Eng., Geosyntec Consultants, Inc., Waterloo, Ontario, Canada
Steffen Griebke, TerraTherm, Inc., Gardner, MA
James Wang, Ph.D., PE, Geosyntec Consultants, Inc., Columbia, MD
Chapman Ross, PE, Geosyntec Consultants, Inc., Acton, MA

This workshop will feature a panel of experts in remediation methods for challenging geologies. The session will begin with four presentations providing an overview of the best methods available for remediating sites with contamination in low-permeability zones (clays, silts, saprolite) or fractured bedrock. The second half of the workshop will include a panel discussion answering questions from attendees.

Each of the remediation methods presented in this workshop uses different mechanisms to distribute remediation amendments and/or directly treat contaminants in the matrix. Speakers will cover these mechanisms and present case studies that demonstrate the effective use of each remediation method at these challenging sites. William Slack of FRx will present on jet injection approaches and methods that can be used to emplace remedial additives into clay, saprolite, bedrock, and other challenging settings more effectively than traditional injection methods. The presentation will illustrate the uses of emplaced materials for chemical oxidation and reduction, enhanced bioremediation, hydraulic control, and other remediation approaches. Leah MacKinnon of Geosyntec will discuss design and implementation considerations specific to the use of enhanced bioremediation at low-permeability and fractured bedrock sites. Steffen Griebke of TerraTherm will provide an overview of in-situ thermal treatment technologies, including thermal conductive heating (TCH), steam-enhanced extraction (SEE), and Electrical Resistive Heating (ERH), and their applicability to treating low-permeability zones and bedrock. James Wang of Geosyntec will provide an overview of EK-BIO™ and EK-ISCO™ / EK-TAP™ (thermally activated persulfate), use electroosmosis, electromigration, and electrophoresis to uniformly distribute amendments throughout low-permeability formations.

The workshop will be moderated by Chapman Ross of Geosyntec. This session is intended to provide a comprehensive overview of proven remediation methods for sites with challenging geologies and an informative, interactive discussion with a cross-section of experts. Attendees are encouraged to bring questions for discussion about remediation in challenging geologies. The information presented will be helpful for any remediation site managers, regulators, and consultants facing the challenges presented by these sites.

Continuing Education Credit/CEU Info: This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

EVENING WELCOME & WINE RECEPTION
Tuesday 5:00pm – 7:00pm CCA (auditorium) and Concourse
Wine Bar (open), Refreshments, Light Hors d’Oeuvres
Free to all registered conference attendees
**Session 1:** 8:30am – 12:00pm, Room 176

**Innovative & Sustainable Soil, Sediment, Water & Energy Solutions**

**Session Chair:** Richard Cartwright, PE, Cartwright Consulting, East Amherst, NY

8:30 Optimizing EVO Formulations for Maximum Reductive Dechlorination
Richard Raymond and Michael Lee, Terra Systems, Claymont, DE

9:00 Managing Data for Dynamic Site Conceptual Models

9:30 FROG-4000: Expanding the Capabilities for Field Portable Gas Chromatography
Patrick Lewis, Defiant Technologies, Albuquerque, NM

10:00 BREAK

10:30 Use of Direct Push HRSC in Remedial Action Design and QA/QC
Eric Garcia, ASC Tech Services, Rancho Cordova, CA

11:00 Combined ISCO and ISCR Approach for DNAPL Brownfield Redevelopment
Will Moody, Geo-Cleanse International, Matawan, NJ

11:30 Synergistic and Sustainable Solutions for the Built and Natural Environments
Richard Cartwright, Cartwright Consulting, East Amherst, NY

**Session 2:** 9:00am – 12:00pm, Room 168

**Toward a Sustainable Energy Future**

**Session Chair:** Thomas M. Potter, MassDEP, Boston, MA

9:00 Clean Energy Policy and Markets in Massachusetts
Dwayne Breger, UMass Clean Energy Extension, Amherst, MA

9:30 The Triple Bottom Line of Renewable Energy Development on Contaminated Land in Massachusetts
Thomas M. Potter, MassDEP, Boston, MA

10:00 BREAK

10:30 Impacts of Alternative Energy Production on Forests
Ellen Moyer, Greenvironment, LLC, Monticello, MA

11:00 Opportunities for Sustainable Energy in Processing, Consumption, and Disposal of Food Using Anaerobic Digestion
Thomas Drake, Louis Perry Group, Wadsworth, OH

11:30 Happy Together: Enhancing Anaerobic Digestion with a New DIET
Derek Lovley, University of Massachusetts, Amherst, MA

*This session is not approved for CT LEP credit.

**Session 3:** 8:30am – 12:00pm, Room 164

**Advanced Analytical Tools for Management of Contaminated Sites**

**Session Chair:** Aaron Peacock, Ph.D., Pace Analytical Energy Services, Pittsburgh, PA

8:30 Conventional and Advanced Remediation Technology: an Evolutionary Review
Stephen Koenigsberg, Civil & Environmental Consultants, Inc., Irvine, CA

9:00 Using Advanced Microbiological Sequencing and Analysis for Remedial Design of a CVOC Contaminated Site
Elizabeth Bishop, Haley & Aldrich, Inc., Parsippany, NJ

9:30 Application of qPCR and Next-Generation Sequencing to Evaluate the Microbial Ecology of a BTEX Source Area Undergoing Anaerobic Bioremediation
Eric Hince, David Fullmer, and Donald Smith, EWMA, Parsippany, NJ

10:00 BREAK

10:30 Integrating CSIA in Forensic Investigations and Conceptual Site Models
Silvia Mancini, Geosyntec Consultants, Inc., Toronto, Ontario, Canada

11:00 Managing for Success: Integrating Technology & Innovation into Project Management
Matthew Burns, WSP Parsons Brinkerhoff, Woburn, MA

11:30 Near Real Time Site Performance Assessment Through Automated Integration of Heterogeneous Datasets
Roelof Versteeg, Subsurface Insights LLC, Hanover, NH; Aaron Peacock, Pace Analytical Energy Services, Pittsburgh, PA

**Session 4:** 9:00am – 12:00pm, Room 165

**Bioremediation**

**Session Chair:** Jay Clausen, Ph.D., USACE ERDC-CRREL, Hanover, NH

9:00 Groundwater Sulfate at Former Wastewater Treatment Facility Enhances Abiotic/Biotic Remedy
Karen Kinsella, GZA, Glastonbury, CT; Tanya P. Justham, Christopher B. Melby, and James M. Wieck, GZA, Bedford, NH

9:30 Sorption Coupled with Enhanced Biodegradation to Treat Petroleum and Chlorinated Contaminants in Groundwater
Maureen Dooley, Regenesis, Wakefield, MA; Kristen Thoresen, Regenesis, San Clemente, CA

10:00 BREAK

10:30 Enhanced Reductive Dechlorination of Chlorinated Solvents in a Low Permeability Subsurface Using 3-D Microemulsion
Frank Peduto, Spectra Environmental Group, Latham, NY

11:00 Combined Treatments for Complex Multi-Component Source Area Remediation – A Bench-Scale Evaluation
Jim Fenstermacher, AECOM, Conshohocken, PA

11:30 Substrate Utilization and Growth Kinetics of Organisms in a Constructed Consortium for Biodegradation
Harrison Atagana, University of South Africa, Pretoria, Gauteng, South Africa

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**Wednesday, October 19, 2016 Amherst Room, 10th Floor**

**LUNCHEON**

**Science and Policy in the Crucible: Exploring the Interface in Contentious, Uncertain and Complex Arenas**

David W. Cash, Ph.D., Dean, John W. McCormack Graduate School of Policy and Global Studies, University of Massachusetts Boston

Environmental, energy and sustainability policy is dependent, in some part, on scientific and technical inputs. When is science used, ignored, pressured or driven by the policy and political processes? What are the institutions and rules that create more effective systems for linking science and decision making? And what is the impact in situations when local, regional, national, and global issues interact. Lessons from energy, climate, waste, and natural resource management from the municipal to international level can help explore these themes.
Session 1: 1:30pm – 6:00pm, Room 164
PFAS (Poly & Perfluoroalkyl Substances): An Emerging Chemical Class with Major Implications
Session Chairs: Jennifer Griffith, Northeast Waste Management Officials' Association, Boston, MA; Ellen Moyer, Ph.D., Greenvironment, Montgomery, MA
1:30 Trends in PFAS Occurrence and Remediation
Eric Nichols, Substrata LLC, Newfields, NH
2:00 How Did We Get Here from There? State and Federal Regulatory Actions for PFAS
Janet Anderson, Integral Consulting, Inc., San Antonio, TX
2:30 Can We Generate Reliable Data on PFAS? Cross Contamination and Lab Reproducibility Issues
Paul Dombrowski, AECOM, Chelmsford, MA and Dora Chiang, AECOM, Atlanta, GA
3:00 BREAK
3:30 Empowering Citizens: Community Driven Research Around PFOA Groundwater Contamination in Hoosick Falls, NY and Bennington, VT
David Bond, Janet Foley, and Tim Schroeder, Bennington College, Bennington, VT
4:00 Assessment and Response to Perfluorinated Compounds in Groundwater and Soil in the Cape Cod Aquifer
Thomas Cambareri, Scott Michaud, and Monica Mejia, Cape Cod Commission, Barnstable, MA
4:30 Sustainable Removal of PFAS from Groundwater Using Synthetic Media
Steve Woodard, ECT, Portland, ME; Michael Nickelsen, ECT, Rochester, NY; Nathan Hagelin and Brandon Newman, Amec Foster Wheeler, Portland, ME
5:00 Activated Carbon - A PFAS Treatment Solution
Stephanie Carr, Calgon Carbon Corporation, Pittsburgh, PA
5:30 Panel Discussion

Session 2: 1:30pm – 5:00pm, Room 176
Environmental Forensics
Session Chair: Dallas Wait, Ph.D., Gradient Corporation, Cambridge, MA
1:30 Composition of Fresh and Partially-Combusted Bakken Crude Oil: Implications for Assessing Impact Following Train Derailment and Fire
Scott Stout, Newfields, Rockland, MA
2:00 Water Quality Signatures for CCR Management Sites
Bruce Hensel and Kenneth Ladwig, Electric Power Research Institute, New Berlin, WI
2:30 Two-Dimensional Compound Specific Isotope Analysis (2D-CSIA) Forensic Approach for Low ppb Level Emerging Contaminant 1,4-Dioxane
Yi Wang, Pace CSIA Center of Excellence, Pittsburgh, PA
3:00 BREAK
3:30 Application of LIBS for Environmental Forensics
Jay Clausen, USACE ERDC-CRREL, Hanover, NH
4:00 Hydraulic Fracturing Fluid Forensics: Potentials and Pitfalls
Jessie Kneeland, Gradient, Cambridge, MA
4:30 Laser-Induced Fluorescence: The Most Reliable Tool for Petroleum NAPL Delineation
Thomas Donn, EnviroSouth, Inc., Greenville, SC

Session 3: 1:30pm – 5:00pm, Room 168
Innovative Remedial Approaches
Session Chair: Geoffrey Brown, Ph.D., National Response Corporation, Salisbury, MA
1:30 Heat Enhanced Plume Attenuation
Mark Kluger, Dajak, Wilmington, DE
2:00 The Utilization of Different Graphite Cathodes for Trichloroethylene Removal from Aqueous Solution
Ljiljana Rajic, Noushin Fallahpor, and Akram Alshawabkeh, Northeastern University, Boston, MA
2:30 Dermal Absorption of PAHs from Coal Tar/Coal Tar Pitch in Target Fragments from Range Sites
Norman Forsberg and Brian Magee, Arcadis, Chelmsford, MA; Glenn Hoeger, Arcadis, Tuscon, AZ
3:00 BREAK
3:30 Combined Treatment of In-Situ Solidification (ISS) and In-Situ Chemical Oxidation (ISCO) in a Single Application at Multi-Contaminant Sites
Vipul Srivastava, EcoLogic & Sustainable Strategies, Inc., Chicago, IL
4:00 Contribution to MNA of Abiotic Transformation at a Complex CVOC-Impacted Fractured Bedrock Site in the Northeastern U.S.
Art Taddeo, Dan Folan, and Scott Olson, AECOM, Chelmsford, MA; Matthew Zenker, AECOM, Raleigh, NC
4:30 Retrospective Assessment of Environmental and Occupational Exposure to Asbestos Fibers in a Petrochemical Plant
Domenico Cavallo, Insubria University, Como, Italy; John Cherrie, Heriot-Watt University - School of Life Sciences, Edinburgh, United Kingdom

POSTER SESSIONS
Authors will be available for individual discussion at their posters on both Tuesday & Wednesday from 3:00pm – 6:00pm
CCA and Room 162

PLATFORM SESSIONS

October 19, 2016
WEDNESDAY AFTERNOON

1:30pm – 6:00pm, Room 164
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POSTER SESSIONS
Authors will be available for individual discussion at their posters on both Tuesday & Wednesday from 3:00pm – 6:00pm
CCA and Room 162
**Workshop 8** 6:30pm – 9:30pm, Room 176  
**Vapor Intrusion – Reducing Uncertainty in Investigations, Mitigation and Transactions – Tools for the Toolbox**  
Kate Velasquez-Heller, PE, Esq., Goulston & Storrs, Boston, MA  
Jessica Yeager, PE, Geosyntec Consultants, Inc., Brookline, MA  
Russell Abell, CG, PG, Geosyntec Consultants, Inc., Portsmouth, NH  
Eric Lovenduski, Geosyntec Consultants, Inc., Latham, NY  
Andy Rezendes, Alpha Analytical, Westborough, MA  

Understanding the current state of the practice, the newest and most innovative solutions available, and the legal and transactional implications of vapor intrusion are imperative to developing effective and cost efficient solutions to your vapor intrusion problems. Two common trends have emerged from vapor intrusion site assessments that complicate evaluation of this exposure pathway and mitigation system effectiveness and undermine confidence among stakeholders that evaluations are sufficient: (1) a high degree of temporal and spatial data variability and (2) uncertainty in distinguishing vapor intrusion from background sources.

Despite the industry’s heavy reliance on discrete, whole-gas sampling using stainless steel canisters, a diverse suite of complimentary tools akin to those available for groundwater is now available to vapor intrusion investigators to manage key variables including temporal and spatial variability, short assessment timelines, and areas of buildings that are difficult to access. Instructors will review innovative techniques targeting these needs.

When developing mitigation designs and testing system effectiveness, the industry has moved beyond up-scaling radon-style systems for commercial applications. Instructors will discuss modern techniques to reduce installation cost, improve operating efficiency, and support system shut-down decisions.

Instructors will review laboratory methods for quantifying volatile organic compound (VOC) concentrations in air-phase samples, common communication pitfalls between field and lab, sampling media, and a review of well-known and some surprising background sources of VOCs.

Instructors will present case studies to illustrate the applications of cutting-edge tools and techniques for vapor intrusion investigation, sampling, and mitigation, and to provide an attorney’s perspective on property transactions.

Participants will leave with several new tools and techniques to employ at their vapor intrusion sites for investigation and mitigation as well as tips for property transaction dos and don’ts. Attendees are encouraged to bring questions related to vapor intrusion at their sites. This session is intended for remedial site managers, regulators, attorneys, consultants, and other stakeholders involved in assessment, mitigation, and property transaction of contaminated sites.

**Continuing Education Credit/CEU Info:** This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

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**Workshop 9** 7:00pm – 9:00pm, Room 168  
**The Urban Background Dilemma: A Regional Study and Global Perspective**  
Sheri Adkins and Christoph Uhlenbruch, Kentucky Department for Environmental Protection, Frankfort, KY  

Around the globe, regulators and environmental professionals struggle with making sound, science-based decisions at sites that are located in urban areas. These areas are often impacted by long-term anthropogenic deposition of common industrial and urban contaminants such as lead, arsenic, and Polycyclic Aromatic Hydrocarbons (PAHs), that accumulate over time to form a non-point source blanket of contamination.

Increasingly, studies are being conducted regarding the so-called “urban background” issue, and it is becoming widely recognized that anthropogenic sources can have a potential impact on the constituent levels at sites that are considered contaminated by regulatory standards, yet these sources are not related to a release or on-site activity. Too often the only way to address urban background at a site is to do a costly study which may be impractical. Regulators and environmental professionals are left with remediating or managing sites to standards that may be unwarranted.

In an attempt to address this issue, the Kentucky Department for Environmental Protection Superfund Branch has been working with EPA Region 4 and its member states. With funding and support from EPA’s Office of Research and Development (ORD), EPA Region 4 offices, and EPA’s Nevada and Georgia regional labs, a grant-funded project has been implemented to conduct a regional urban background study with sample sets from one to two cities from each Region 4 state.

In this workshop we discuss the collaborative efforts and outcomes of this ground-breaking regional study, and how it can be of benefit to municipalities, states, and stakeholders. We also consider how other entities are approaching urban background and its role in site decisions, which may allow for insight into new and innovative ways to address the global urban background dilemma.

**Continuing Education Credit/CEU Info:** This workshop is approved for technical credit for all types offered through AEHS Foundation (MA LSP, CT LEP, NJ LSRP, NY PE, FL PE, and Certificate of Attendance). Workshops are calculated using a 1:1 ratio (1 hour = 1 credit). Must attend full workshop. Partial credit not allowed. Must sign up to receive credit and follow all procedures regarding CEUs.

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**EVENING SOCIAL**  
**Wednesday** 5:00pm – 7:00pm  
**CCA (auditorium) and Concourse**  
Host Bar (limited duration)  
Refreshments & Light Hors d’Oeuvres  
Free to all registered conference attendees
Session 1: 8:30am – 12:00pm, Room 164
Advancing the Practice of In-Situ Remediation
Session Chair: Paul Dombrowski, PE, AECOM, Wakefield, MA

8:30 Utilization of Column Studies for Design Optimization of Field Pilot and Full Scale Denitrifying Permeable Reactive Barriers
Michael Lee, Terra Systems, Inc., Claymont, DE

9:00 Impacts of Low-Temperature Thermal Treatment on a Tetrachloroethene-to-Ethane Dechlorinating Consortium
Tyler Marcit, Natalie Caprio, and Kurt Pennell, Tufts University, Medford, MA; Yi Yang and Frank Löfler, University of Tennessee, Knoxville, TN

9:30 In-Situ Air Sparging Optimization Using Multi-Parameter Sondes
A. Curtis Weeden, Jr., AECOM, Amherst, NH

10:00 BREAK

10:30 Overcoming Key Design and Implementation Issues for In-Situ Chemical Oxidation
Bridget Cavanagh and Mike Marley, XDD Environmental, Stratham, NH

11:00 Planned and Unplanned Strategies Using Combined Technologies to Remediate Petroleum Hydrocarbon Sites
Richard McGregor, InSitu Remediation Services Ltd., St. George, Ontario, Canada

11:30 Reactive Transport Modeling: A New Paradigm in Design of In Situ Treatment Systems
Richard Carbonaro and Robert Mutch, Mutch Associates, LLC, Ramsey, NJ

Session 2: 9:00am – 12:00pm, Room 176
Sediments
Session Chairs: Tim Iannuzzi, Arcadis, Annapolis, MD
Alan Fowler, Ramboll Environ, Westford, MA

9:00 Forensic Sediment Evaluation - Differentiating Basin Derived Media from Anthropogenic Sources Using Multivariate Statistics
Eric Cherry and Gina Groom, Hexagon Environmental Solutions LLC, Westerville, OH

9:30 Evaluation of CSO and Stormwater Discharge Impacts on Sediment Sites – A Case Study
Tarek Saba, Paul Boehm, and Jaana Pietari, Exponent, Maynard, MA

10:00 BREAK

10:30 Sediments as Sinks of Antimicrobials in Rivers
Sheree Pagsuyoin, UMass Lowell, Lowell, MA

11:00 Assessing Measurable Adverse Changes to Benthic Invertebrate Communities Based on Site-Specific Sediment Toxicity Testing and Community Data at the Anniston, Alabama PCB Site
Timothy Iannuzzi and Jacqueline Iannuzzi, Arcadis, Annapolis, MD; Bonner Anthony, Arcadis, Raleigh, NC; Alan Fowler and Derek Pelletier, Ramboll Environ, Portland, ME

11:30 Risk-Based Sediment Corrective Action and Restoration of a Fresh Water Pond
David Heislein, Amec Foster Wheeler Environment & Infrastructure, Inc., Melrose, MA; Michael Murphy and Melinda Ferullo, Amec Foster Wheeler Environment & Infrastructure, Inc., Chelmsford, MA

Session 3: 8:30am – 12:00pm, Room 168
Vapor Intrusion
Session Chair: Janine Commerford, LSP, Haley & Aldrich, Boston, MA

8:30 Predicted Effects of Indoor Pressure Variation and Controlled Pressure Methods on Indoor Air Contaminant Vapor Concentrations in Vapor Intrusion
Eric Suuberg and Rui Shen, Brown University, Pawtucket, RI

9:00 High-Volume Sampling: Characterizing Two Large Buildings in One Week
Chris Martin, Geosyntec Consultants, Acton, MA; Jessica Yeager and Julianna Connolly, Geosyntec Consultants, Brookline, MA

9:30 Active Vapor Intrusion Mitigation at Pharmaceutical Manufacturer with Horizontal Directional Drilling (HDD) Technology
Glenn Issue and Michael Sequino, Directional Technologies, Inc., Wallingford, CT

10:00 BREAK

10:30 Assessing the Age, Location, and Vapor Intrusion Potential of VOC Sources Beneath Buildings
Craig Cox, Cox-Colvin & Associates, Inc., Plain City, OH

11:00 Trichloroethylene in Indoor Air: TO-15 Summa Data vs HAPSITE Data
Amy Quintin and Michael Murphy, Amec Foster Wheeler, Chelmsford, MA; Darrell Murphy and Lawrence Cain, US Army Corps of Engineers, Concord, MA

11:30 Use of Mass Flux Characterization to Reduce Uncertainty in Vapor Intrusion Assessments

Enter to win a free registration to one of our next two conferences! Entry and drawing will take place during each of the Thursday morning sessions.

ONE WINNER IN EACH SESSION!

Must be present to win. Second place winners will receive free 2017 AEHS Foundation Membership. Members receive reduced registration! Drawings will take place at the conclusion of each session.
THE FOLLOWING POSTERS ARE LOCATED IN THE CAMPUS CENTER AUDITORIUM (CCA):

Successful Injection Projects Utilizing the Kinetically Adjustable Pore Space Dilation Injection System (KAPSDIDS)
Jaime Allen, Environmental Assessment & Remediations/Badger Injection Solutions, Patchogue, NY

Abiotic and Biotic Treatment Using ZVI and Organic Substrates
Ed Alperin, Robert Borden, and Bilgen Yuncu, Solutions-IES, Inc., Raleigh, NC; Charles Newell, GSI Environmental Inc., Houston, TX; Rula Deeb, Geosyntec Consultants, Oakland, CA

Environmental Restoration Wiki - Tech Transfer in the 21st Century
Ed Alperin, Robert Borden, and Allison Stenger, Solutions-IES, Inc., Raleigh, NC; Charles Newell, GSI Environmental Inc., Houston, TX; Rula Deeb, Geosyntec Consultants, Oakland, CA

Relationship Between Urbanization and Baseflow in Southern New England
Kirk Barrett, Samantha Corrado, and Theodore Lyons, Manhattan College, Dept. of Civil and Environmental Engineering, South Orange, NJ

Comparison of Infiltration Capacity as Measured by the Cornell Sprinkle Infiltrometer and a Double-Ring Infiltrometer
Kirk Barrett, Manhattan College, Dept. of Civil and Environmental Engineering, South Orange, NJ; Danielli Rodgers, Montclair State University, South Orange, NJ

Prevalence and Magnitude of Trends on Flows of Different Return Periods in the Northeastern United States
Kirk Barrett and Wesley Salis, Manhattan College, Dept. of Civil and Environmental Engineering, South Orange, NJ

Getting a Lay of the Land: Fishing Activity, Signage and Advisory Awareness at a Marine Superfund Site
Komal Basra, Madeleine Scammell, and M. Patricia Fabian, Boston University, School of Public Health, Boston, MA

Recycling of Fly Ash in Construction Projects Using Modifiers for Trace Metal Attenuation
Matthew Bernacki*, John Duggan, Cody Barnes, Brandon Goold, and Kevin Fitzgerald, Wentworth Institute of Technology, Boston, MA

Use of Monte-Carlo Analysis to Estimate Cost to Closure
Jim Berndt and Christopher Abel, August Mack Environmental, Indianapolis, IN

Risk-Based Approach for Brownfield Redevelopment Using Targeted Remedial Strategies
Alice Blayney, Julianna Connolly, and Jessica Yeager, Geosyntec Consultants, Brookline, MA

Investigations into the Possible Use of Ground Steel Slag as a Partial Replacement of Cement
Felix Bofo, Hofai University, Nanjing, Jiangsu, China; Seth Doe-Puplampu, International School, Prince of Songkla University, Kathu, Phuket, Thailand; Emmanuel Amankwa, Kwame Nkrumah University of Science and Technology, Kumasi, Ashanti Region, Ghana

Treatment of TCE Using a Permeable Reactive Barrier
Christa Bucior, Donald Pope, Alan Weston, Sophia Dore, and Ryan Thomas, GHD, Brookline, MA

Case Study: A Harmonized Approach to Investigation and Remediation of a CVOC Spill
David Carstens, David Bouchard, Jim Sobieraj, Jessica Hinchliffe, and Ademola Bakken, WSP Parsons Brinckerhoff, Woburn, MA

The Use of Three-Dimensional Conceptual Site Modeling to Improve Data Gap Analysis and Focus Remedial Investigation and Feasibility Studies
David Carstens, Colleen Myers, and Eric Johnson, WSP Parsons Brinckerhoff, Woburn, MA

Successfully Integrating Surfactants into ChemOx Technologies
Geeta Dahal, EthicalChem, South Windsor, CT

Biotic and Abiotic Natural Attenuation of VOCs After Large-Scale ISCO
Paul Dombrowski, Barb Weir, William Abrahams-Dematte, and Richard Purdy, AECOM, Chelmsford, MA; James Brown, USEPA, Boston, MA

Burden of Disease from Lead Exposure at Toxic Waste Sites in Argentina, Mexico and Uruguay
Russell Dowling and Jack Caravan, Pure Earth, New York, NY

Synergistic Effects of Utilizing Abiotic and Biotic Degradation Pathways Simultaneously for Chlorinated Solvents Remediation
Samuel Gaeth and Natalie Caprio, Tufts University, Medford, MA

Multiphase Flow Modelling of DNAPL Pumping: Case Study of Hexachlorobutadiene in a Shallow Alluvial Aquifer
Quentin Giraud and Bénoît Paris, INTERA, Champagne au Mont d’Or, Rhone, France; Julio Gonçalves, Cerege, Aix-en-Provence, France; David Cazaux, Solvay, Tavaux, France; Antoine Joubert, Serpol, Vénissieux, France; Stéfan Colombano, BRGM, Orleans, France; Pierre-Yves Klein and Aurélien Triger, Sol Environment, Nanterre, France; Nicolas Fatin-Rouge and Julien Maire, UTINAM, Besançon, Doubs, France

Pilot-Scale Solar-Powered Remediation
Savannah Gregor, Noushin Fallahpour, Akram Alshawabkeh, and Liijiana Rajic, Northeastern University, Boston, MA

The Potential of Using an Electrokinetic Barrier to Control Saltwater Intrusion
Shadi Hamdan and Akram Alshawabkeh, Northeastern University, Boston, MA; Bart Van der Bruggen, KU Leuven, Herever, Belgium

Environmental Sample Holding Time Studies: Chemical Preservation of Volatile and Semivolatile Compounds at Ambient Temperature
Jeff Hardenstine and Gregg Douglas, NewFields, Rockland, MA; Deyuung Kong, Chevron Energy Technology Company, Richmond, CA; Raymond Arnold, Chevron Energy Technology, Houston, TX; William Gala, Chevron Energy Technology, San Ramon, CA

Heavy Metal Contamination of Bottom Sediments from Mining Operations at Cooks Pond, Madison, New Hampshire
Emma Harmsich and Robert Newton, Smith College, Northampton, MA

The Development of a Risk Communication Assessment Tool to Assist with Community Health Outreach
Marina Hogan, Emily Wanzer, Marc Nascarella, and Andrea DiPerna, Massachusetts Department of Public Health, Boston, MA

Fractionation Effects on C, H and Cl Stable Isotopes of Chlorinated Solvents During Dissolution, Adsorption and Evaporation
Hsin-Lan Hsu and Cha-Pei Li, Industrial Technology and Research Institute, Hsinchu City, Taiwan; I-Hsing Chen and Zhi-Sin Wang, Taiwan EPA, Taipei, Taiwan

Evaluation of Pb (II) Removal from Aqueous Matrix Using Muscovite
Raquel Hungaro Costa, Universidade Sagrado Coração, Bauru, São Paulo, Brazil
THE FOLLOWING POSTERS ARE LOCATED IN ROOM 162:

**Evaluating Lead Concentrations in Water Bubblers**
Patrick Journeay*, John Duggan, Tim Magalhaes, Nick Ottomaniello, and Dan Alik, Wentworth Institute of Technology, Boston, MA

**Precision Dredging of Heavy Metals Without Resuspension: A Case Study on the Yi River, China**
Thomas Kryzak, Air & Earth LLC, Altamont, NY

**Generator Compliance at Your Facility**
Timothy Kucab, Tighe & Bond, Westfield, MA

**Chemical Evidence for Exposure of Red Crabs (Chaceon quinquedens) to Macondo Oil After the Deep Water Horizon Oil Spill**
Eric Litman and Jeff Hardenstine, NewFields Environmental Forensics, LLC, Rockland, MA

**Identification of Source Relevance Using Isotopic Signatures of Multiple Contaminants**
Shih-Lin Lo and Ying-Ming Weng, EPA, Taoyuan, Taiwan; Hsin-Lan Hsu and Yu-Chin Chen, Industrial Technology and Research Institute, Hsinchu City, Taiwan

**Implications of EPA’s Proposed Dermal Slope Factor on Risks Posed by Dermal Contact with Grilled Meats**
Brian Magee and Norman Forsberg, Arcadis, Chelmsford, MA

**The Revised LNAPL Conceptual Site Model - A Case Study of How to Do It**
Rangaramanujan Muthu and J. Michael Hawthorne, GEI Consultants, Keller, TX

**Sono-electro-Fenton Degradation of 4-Chlorophenol in Aqueous Media**
Roya Nazari, Lilijana Rajic, and Akram Alshawabkeh, Northeastern University, Boston, MA

**Challenges and Options for the Analysis of 1,4-Dioxane**
Charles Neslund, Eurofins Lancaster Laboratories Environmental, LLC, Lancaster, PA

**Performance Based Equivalency of Extract Clean-Ups for Dioxin and PCB Coprogen Analysis**
Charles Neslund, Eurofins Lancaster Laboratories Environmental, LLC, Lancaster, PA

**The Analysis of Perfluorinated Compounds - Beyond UCMR3**
Charles Neslund, Eurofins Lancaster Laboratories Environmental, LLC, Lancaster, PA

**1, 4-Dioxane – A Review and Evaluation of the Available Analytical Methodologies Used in Support of the Latest State and Federal Standards**
James Occhipinti, Alpha Analytical, Inc., Westborough, MA

**A Multi Criteria Evaluation Approach to Landfill Site Selection in the Western Region of Ghana**
Theresa Oteng Apreku, Hohai University, Nanjing, Jiangsu, China

**Advantages of Field Laboratory Analysis for Characterizing Mercury Contaminated Soils at a Historic Chlor-Alkali Facility**
Regina Rancatti, Geosyntec Consultants, Acton, MA; Christopher Greene and Rhiannon Scott, Geosyntec Consultants, Acton, MA
LIFETIME ACHIEVEMENT AWARDS

The Annual International Conference on Soils, Sediments, Water, and Energy is pleased to announce the recipients of the Lifetime Achievement Award. This award is presented to individuals who have shown significant contributions to the field as well as outstanding environmental stewardship. This year’s winners are Haim B. Gunner, LidoChem, Inc. and Richard L. Raymond, Sr., DuPont Environmental Remediation Services, Inc. (retired).

Haim B. Gunner has a B.S.A. from the Ontario Agricultural College and M.Sc. from the University of Manitoba in Soil Microbiology. He was a founding member of Kibbutz Saasa on the Lebanese border of Israel, and became Coordinator of Agricultural and Biological Research at the Research Council of Israel. He completed his doctoral work at Cornell in 1961, then was a research scientist at the Microbiology Research Institute in Ottawa, Canada. Dr. Gunner joined UMass Amherst in 1963. His research work reflecting his concerns with the environmental impact of pesticides led to the establishment of the Department of Environmental Sciences.

In the early 80’s, he established his own company, EcoScience, to commercialize effective biological agents. Eventually, venture capital infusion, an IPO and listing on NASDAQ were achieved. Professor Gunner has published and lectured widely on biological control and ecosystem balance, and has also sustained an ongoing interest in international development. He participated in establishing and served as Associate Director for Research in the Center for International Agricultural Studies. He has also served as a consultant to the Israel Parliamentary Committee on the Environment and in the development of the Israel EPA, now the Department of the Environment. In 1983, he was invited to Viet Nam to participate in a symposium on The Long Term Effects of Chemicals in Warfare and, while there, pursued an examination of the unintended ecological consequences of chemicals applied to the environment. Presently, Dr. Gunner is continuing his exploration of the interactions between microbes, plants, insects, and plant pathogens to harness these relationships, limiting pest species without stressing the environment, as Chief Scientist of the Performance Nutrition Division of LidoChem, Inc.

Richard (Dick) L. Raymond, Sr. is acknowledged by the US EPA as the “grandfather of in-situ bioremediation” in the United States. During the early 1970’s, while employed by the Sun Oil Company, he developed the microbial and field techniques that are now universally known as the “Raymond Process” for the cleanup of groundwater contaminated with petroleum and petroleum products, a great alternative to the endless and extensive process of “pump and treat.” His 1974 patent for “Reclamation of Hydrocarbon Contaminated Groundwater” provided the basis for the development of the groundwater bioremediation industry that is now a worldwide business. His 1984 patent, “Stimulation of Biooxidation Processes in Subterranean Formations,” developed the use of hydrogen peroxide to overcome limitations in the existing methods for mass transfer of oxygen to groundwater.

Countless books and research articles acknowledge Raymond’s seminal contributions as the inventor of process technology for the in-situ bioremediation of contaminated groundwater. While at Sun Oil Co., Mr. Raymond directed a group of microbiology specialists, and early research activities greatly expanded the scope of biological hydrocarbon oxidations.

Mr. Raymond has received numerous awards for his research over the years including the Society of Industrial Microbiologists Charles Porter Award. He also served on numerous committees including the API Groundwater Task Force, peer review panel of the Robert S. Kerr Environmental Research Laboratory, and the USEPA Valdez Oil Spill Panel. He received his B.S. and M.S. degrees in Microbiology from the University of Illinois-Champaign in 1947 and 1951, respectively. His college studies were interrupted by World War II, when he served as a B-17 navigator in the European theater. After graduation, he worked for Socony Mobil Oil Co. and Sun Oil Co. as a Research Microbiologist. After retiring from Sun Oil Co. in 1982, he founded the first in-situ bioremediation company (Biosystems, Inc.) in the US. The company was later purchased by the DuPont Company and became DuPont Environmental Remediation Services (DERS).

STUDENT COMPETITION/AWARD PROGRAM

We are proud to announce the 13th Annual Student Competition for best student presentation at the conference. One $1000.00 cash prize and two $500.00 cash prizes will be awarded to the three best student presentations. Winners will be announced on Wednesday. See posting at registration desk.

Must be entered prior to the conference in order to compete. Open to all full and part-time students (post-docs excluded).

See www.AEHSFoundation.org for full details and previous winners.
Take the escalator to 2nd level concourse, turn right, and walk toward eateries. Follow signs to the Cape Cod Lounge.
Monday, October 17, 2016 (Monday is workshops only)
Registration: 10:00am – 4:00pm  
Workshop 1 (1:00pm - 5:00pm) Measuring Biological Exposure to Environmental Chemicals, Room 808  
Workshop 2 (1:00pm - 5:00pm) Vapor Intrusion Assessment and Mitigation in Massachusetts: Status of Sites, Findings from the Field, and Guidance for Practitioners, Rm. 164  
Workshop 3 (1:00pm - 5:00pm) Building a Better Background Data Set, Rm. 165  
Workshop 4 (1:00pm - 5:00pm) Sustainable Remediation Principles & Practice, Rm. 168  
Workshop 5 (1:00pm - 4:00pm) Environmental Forensics – Integration of Established and Evolving Techniques to Evaluate Who Was Responsible for the Spill or Release, Rm. 176

Tuesday, October 18, 2016  
Registration: 7:30am – 7:00pm | Exhibit Hall Hours: 9:00am – 7:00pm  
Morning Platform Sessions  
8:30/9:00am – 12:00pm, Sessions are concurrent  
Session 1: Intersection of Transportation & the Environment, Rm. 176  
Session 2: Use of Decision Analysis and Probabalistic Tools to Manage Environmental Risk, Rm. 164  
Session 3: New England’s Regulatory Perspective on Greener Cleanups, Rm. 168  
Session 4: Remediation, Rm. 165  
Afternoon Platform Sessions  
1:30pm – 5:00/5:30pm, Sessions are concurrent  
Session 1: Building Resilience to Climate Impacts: Local Efforts to Implement Adaptation Plans, Rm. 164  
Session 2: Risk Assessment, Rm. 165  
Session 3: In-Situ Chemical Oxidation, Rm. 168  
Session 4: Sustainability and Sustainable Remediation, Rm. 176  
Poster Session 3:00pm – 6:00pm, CCA and Rm. 162  
Wine/Welcome Reception 5:00pm – 7:00pm, exhibit areas, 1st floor  
Evening Workshops  
Workshop 6 (6:30pm – 9:30pm) Incremental Sampling Methodology (ISM), Rm. 168  
Workshop 7 (6:30pm – 9:30pm) Remediation Tools for Challenging Geology – Cutting Edge Technology for Cleanups in Clay & Fractured Bedrock, Rm. 176

Wednesday, October 19, 2016  
Registration: 7:30am – 7:00pm | Exhibit Hall Hours: 9:00am – 7:00pm  
Morning Platform Sessions  
8:30/9:00am – 12:00pm, Sessions are concurrent  
Session 1: Innovative & Sustainable Soil, Sediment, Water & Energy Solutions, Rm. 176  
Session 2: Toward a Sustainable Energy Future, Rm. 168  
Session 3: Advanced Analytical Tools for Management of Contaminated Sites, Rm. 164  
Session 4: Bioremediation, Rm. 165  
Afternoon Platform Sessions  
1:30pm – 5:00/6:00pm, Sessions are concurrent  
Session 1: PFAS (Poly & Perfluoroalkyl Substances), Rm. 164  
Session 2: Environmental Forensics, Rm. 176  
Session 3: Innovative Remedial Approaches, Rm. 168  
Poster Session 3:00pm – 6:00pm, CCA and Rm. 162  
Social 5:00pm – 7:00pm, exhibit areas, 1st floor  
Evening Workshops  
Workshop 8 (6:30pm – 9:30pm) Vapor Intrusion – Reducing Uncertainty in Investigations, Mitigation and Transactions – Tools for the Toolbox, Rm. 176  
Workshop 9 (7:00pm – 9:00pm) The Urban Background Dilemma: A Regional Study and Global Perspective, Rm. 168

Thursday, October 20, 2016  
Registration: 7:30am – 12:00pm | Exhibit Hall Hours: 9:00am – 12:00pm  
Morning Platform Sessions  
8:30/9:00am – 12:00pm, Sessions are concurrent  
Session 1: Advancing the Practice of In-Situ Remediation, Rm. 164  
Session 2: Sediments, Rm. 176  
Session 3: Vapor Intrusion, Rm. 168

Exhibit Hall Hours:  
TUESDAY  
9:00am – 7:00pm  
WEDNESDAY  
9:00am – 7:00pm  
THURSDAY  
9:00am – 12:00pm  
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