

# **FINAL PROGRAM**

## **Vapor Intrusion, Remediation, and Site Closure**

**December 5-6, 2018 • Phoenix, AZ**

**A Decade of Progress and New Challenges**



**AIR & WASTE MANAGEMENT  
ASSOCIATION**

# FINAL PROGRAM

## ABOUT THE CONFERENCE

Building off the momentum gathered during the eight previous vapor intrusion specialty conferences sponsored by A&WMA, this event will bring together internationally-recognized scientists, engineers, regulators, and attorneys with experience in bringing sites to closure in a technically defensible way, while balancing key elements such as risk, sustainability and cost.

With nearly half of US states recently releasing new guidance on VI, this conference comes at the perfect time to bring together scientists, engineers, regulators and attorneys to address the new guidance, new technology, and best practices in remediation and mitigation solutions, toxicology, risk assessment, and more.

## GENERAL INFORMATION

### REGISTRATION

Register online at [www.awma.org/vapor](http://www.awma.org/vapor) or on site on Level 11 of the Westin Phoenix during the following hours:

Tuesday, December 4:	12:00 pm - 5:00 pm
Wednesday, December 5:	7:30 am - 4:00 pm
Thursday, December 6:	7:30 am - 3:00 pm

Your registration will not be processed without payment.

### REFUND POLICY

If written notice of cancellation is received on or before November 21, 2018 payment will be refunded, less a \$75 cancellation fee. (Cancellation fees apply regardless of payment method). Substitutions may be made at any time; payment for any difference is due at the time of substitution. This refund policy applies to all occurrences, including weather-related events and other natural disasters. In the unlikely occurrence of event cancellation, the Association is not liable for any expenses incurred by the registrant other than the full refund of registration fee(s) paid.

### CONTINUING EDUCATION CREDIT OPPORTUNITIES

Conference and course attendees may be eligible for continuing education credits. For more information, please contact Gloria Henning at [glhenning@awma.org](mailto:glhenning@awma.org) or +1-412-904-6021.

### PRESENTERS' MEETING

Presenters and Session Chairs will meet on the day of their session involvement to review program details. Presenters should bring their presentations on a memory stick/USB to this meeting as well as a brief bio.

### CONFERENCE PROCEEDINGS

Online conference proceedings, including final papers and final PowerPoint presentations, will be available after the conference. Final PowerPoint presentations will be collected onsite, converted to PDF files, and then posted online after the conference. You will receive an email with a link to access the proceedings after the conference. If you do NOT want your presentation to be included in the conference proceedings, please let us know.

### CONFERENCE COMMITTEE

#### Conference Chair:

Matthew Traister, OBG

#### Committee Members:

Robert Ettinger, Geosyntec Consultants

Loren Lund, Jacobs

Rich Rago, Haley & Aldrich

### HOTEL

#### The Westin Phoenix Downtown

333 N. Central Ave

Phoenix, AZ 85004

Phone: (602) 429-3500

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## ABOUT THE AIR & WASTE MANAGEMENT ASSOCIATION

A&WMA is a nonprofit, nonpartisan professional organization that enhances knowledge and expertise by providing a neutral forum for information exchange, professional development, networking opportunities, public education, and outreach to more than 5,000 environmental professionals in 65 countries. A&WMA also promotes global environmental responsibility and increases the effectiveness of organizations to make critical decisions that benefit society. **For more information, please visit [www.awma.org](http://www.awma.org).**  
A&WMA Federal Tax ID #: 25-6048614

### Americans with Disabilities Act

The Air & Waste Management Association supports the Americans with Disabilities Act (ADA). Those attendees requiring specific equipment or services should contact Cindy Fontanesi, Conference & Events Planner, at +1-412-904-6031 or [cfontanesi@awma.org](mailto:cfontanesi@awma.org) to make those needs known in advance. We will make every reasonable effort to accommodate them.

# FINAL PROGRAM

## PROFESSIONAL DEVELOPMENT COURSE

### ADVANCES IN ASSESSING THE VAPOR INTRUSION PATHWAY

Tuesday, December 4, 1:00 pm - 5:00 pm, Copper Ballroom

Separate registration is required.

**Instructors:** Robert Ettinger, Senior Principal, Geosyntec and Loren Lund, Ph.D. VI/Risk Assessment Leader, Jacobs

This course will provide an understanding of state-of-the-practice advances for addressing the vapor intrusion (VI) pathway. Methods for addressing VI continue to evolve in response to emerging policies on TCE short-term toxicity/rapid response, uncertainties with technologies used over the last 10-15 years, an evolving understanding of atypical preferential vapor transport, and the need to address and mitigate VI more efficiently and cost effectively. Next-generation VI investigation and mitigation technologies that will be discussed in this half-day course include:

- A VI quantitative decision framework for systematically assessing multiple lines of evidence
- An understanding/managing temporal and spatial variability
  - Indicators, tracers, and surrogates
  - Building pressure cycling with near real-time sampling
  - High volume subslab soil gas sampling
  - Continuous monitoring
  - Passive samplers and canister low-flow controllers
- Assessing/managing TCE short-term exposure/toxicity
- Understanding/mitigating atypical preferential vapor transport
- Advanced approaches for vapor intrusion mitigation
  - Data collection for mitigation system design
  - Evaluation of mitigation system effectiveness
  - Soil Vapor Extraction (SVE) to prevent VI

Case studies and/or hands-on exhibits or demonstrations will complement the lecture portion of this course. A fundamental understanding of the VI pathway is beneficial, but not a required prerequisite for attendees.

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## TECHNICAL TOUR

### HONEYWELL 34TH STREET BSVE FACILITY

Wednesday, December 5, 4:00 pm - 6:00 pm

Included with your conference registration.

#### A VAPOR INTRUSION SITE CLOSURE SUCCESS STORY

The objective of the Honeywell 34th Street Biologically Enhanced Soil Vapor Extraction (BSVE) system tour is to learn about the innovative approaches used to investigate and then successfully remediate subsurface VOC impacts. The potential for vapor intrusion (VI) into existing buildings was evaluated as part of the site investigation and incorporated multiple lines of evidence (MLE) in order to demonstrate the lack of impacts to occupied buildings. Subslab, indoor, and outdoor measurements of the tracer compound radon were also used to calculate building-specific attenuation factors and ultimately, demonstrate the lack of VI impacts throughout the various air extraction and injection conditions during BSVE treatment.

This tour provides attendees a real-life opportunity to reinforce many of the topics covered during the VI specialty meeting. On-site posters will be available at multiple stations during the tour to highlight the approaches used prior to and throughout the successful implementation of BSVE. One of the posters will include the iterative five-step VI building prioritization process, along with the multiple lines of evidence used during the VI investigation and long-term monitoring. There will be another station highlighting the effective BSVE remediation process. The MLE methodology used to evaluate VI provides a successful framework/menu of options for other VI sites across the nation and world. These lines of evidence included consideration of site history, VOC source areas, and vadose zone soil impacts, groundwater concentrations, exterior soil gas data, building surveys/construction/air exchange, subslab, indoor, and/or outdoor air VOC and radon data, background sources, and building-specific attenuation factors.

This site tour will highlight the successful implementation of BSVE to remediate subsurface impacts in a relatively large area beneath multiple buildings to achieve site closure under the state's corrective action program. The findings of the multiple phases of the VI assessment and MLE evaluation provided strong evidence to support the conclusion of no current or future VI concerns, making this an excellent case study for conference participants.

# TECHNICAL PROGRAM - Wednesday, December 5

**7:30 am - 4:00 pm**  
Conference Registration  
Level 11

**7:45 am - 8:30 am**  
Presenters' Meeting  
Copper Ballroom

**7:30 am - 8:30 am**  
Continental Breakfast  
Copper Vista A & B

**8:30 am - 8:45 am**  
**Welcome and Introductory Remarks**  
*Matthew Traister, OBG*

(ALL SESSIONS WILL BE IN THE COPPER BALLROOM)

**8:45 am - 9:30 am**  
**Keynote Address**  
**Vapor Intrusion—Honeywell's Experiences at Multiple Sites**  
*John Morris, Global Remediation Director, Honeywell*

## **Session I: NEW REGULATORY PERSPECTIVES ON VAPOR INTRUSION**

**Chair:** Matthew Traister, OBG

**9:30 am - 9:55 am**  
Control #VI17  
**VI Guidance and Regulatory Considerations - Wisconsin's Perspective**  
*Judy Fassbender, Wisconsin Department of Natural Resources, Madison, WI*

**9:55 am - 10:20 am**  
Control #VI31  
**Guidelines for VI Mitigation in Denmark**  
*Tage V. Bote, Bjarke N. Hoffmark, Hanne Nielsen, Klaus Bundgaard Mortensen, COWI A/S, Lyngby, Denmark*

**10:20 am - 10:45 am**  
Networking Break  
Copper Vista A & B

**10:45 am - 12:15 pm**  
**Session II: TCE SHORT-TERM TOXICITY PANEL**  
**Chair:** Rich Rago, Haley & Aldrich, Inc.

Presenters:

- **Donna Caldwell**, Geologist, Naval Facilities Engineering Command Atlantic, Norfolk, VA
- **David Gillay**, Partner, Barnes & Thornburg LLP
- **Ann Verwiel**, Senior Managing Scientist, ToxStrategies, Inc.
- **Laura Trozzolo**, Senior Risk Assessor/Vapor Intrusion Specialist, TRC Solutions
- **Matthew Williams**, Environmental Quality Specialist, Michigan Department of Environmental Quality

**12:15 pm - 1:15 pm**  
**Lunch and Presentation**  
Copper Vista A & B, Copper Ballroom

**Update on Indicators, Tracers and Surrogates for Improving VI Assessments**  
*Henry Schuver, US EPA, Office of Land and Emergency Management (OLEM)*

## **Session III: NEW DEVELOPMENTS IN VI SAMPLING AND ANALYSIS—MASS FLUX MEASUREMENTS AND REAL-TIME MONITORING**

**Chair:** Rich Rago, Haley & Aldrich, Inc.

**1:30 pm - 1:55 pm**  
Control #VI36  
**New Methods for Design and Monitoring of Vapor Intrusion Mitigation Systems**  
*Darius Mali, Guelph, ON; Todd McAlary, Geosyntec Consultants, Inc, Toronto, ON; William Wertz, Geosyntec Consultants, Inc, Albany, NY*

**1:55 pm - 2:20 pm**  
Control #VI23  
**Use of Mass Loading Assessments to Characterize Potential Risks from VI**  
*Helen Dawson, Geosyntec Consultants, Washington, DC; William Wertz, Geosyntec, Albany, NY; Todd McAlary, Geosyntec, Toronto, ON; Daniel Carr, DBCarr Consulting, Dayton, ME; Theresa Gabris, Geosyntec, Washington, DC*

**2:20 pm - 2:55 pm**  
Control #VI02  
**Rapid Resolution of VI Challenges via Automated Continuous Real-Time Monitoring and Response**  
*Blayne Hartman, Hartman Environmental Geoscience, Solana Beach, CA; Mark Kram, and Cliff Frescura, Groundswell Technologies, Santa Barbara, CA*

**2:55 pm - 3:20 pm**  
Control #VI35  
**Rapid Soil Vapor Plume Delineation for VI Investigations — Lessons Learned**  
*Jennifer Simms, Jacobs, Indianapolis, IN; Chris Lutes, Jacobs, Raleigh, NC; Loren Lund, Jacobs, Shelley, ID*

**3:20 pm - 3:45 pm**  
Control #VI26  
**A New Tool to Meet Risk-Based Screening Levels for VOCs in Soil Gas with High Matrix Effects**  
*Heidi C. Hayes, Diane Benton, Eurofins Air Toxics, Folsom, CA*

**SESSION IV: Tour of Honeywell facility in Tempe, AZ**  
**Chair:** Loren Lund, Jacobs

3:45 pm - Meet in Lobby  
4:00 pm - Bus departs from the Westin  
6:00 pm - Bus returns from the tour

**6:00 pm - 7:30 pm**  
Welcome Reception and Poster Session  
Copper Vista A & B



# TECHNICAL POSTERS

## POSTER SESSION

**Wednesday, Dec. 5, 6:00 pm - 7:30 pm**

Copper Vista A & B

**Posters will also be on display throughout the conference on Thursday.**

Control #VI03

**Remote Vapor Intrusion Air Sampling Using SGS Galson-Smart Sense**

*Harry Behzadi, SGS North America Inc., Rutherford, NJ*

Control #VI10

**Proton Transfer Reaction Mass Spectrometry (PTR-MS) for continuous monitoring of Vapor Intrusion Sources**

*L. Joe Sears, Heinz J. Huber, Peter Zemek, Austin Heitmann, RJ Lee Group, Pasco, WA*

Control #VI12

**O&M of Vapor Mitigation – Setting the Stage for Regulatory Approval**

*Alyssa A. Sellwood, TRC Solutions, Madison, WI*

Control #VI14

**A Non-invasive, Surface Method for Direct Gas Flux Measurements**

*Deirdre Mallyon, Nick Nickerson, Colleen Gosse, Eosense Inc., Dartmouth, NS, Canada*

Control #VI15

**Maximizing Radius of Influence for More Efficient Big Building Mitigation**

*Rachel Saari, Mitch Wacksman, Arcadis, Kingsford, MI*

Control #VI18

**Overcoming Challenges with Project-Specific Techniques to Evaluate Vapor Intrusion (VI)**

*Ryan Wahl, Weston Solutions, Inc., West Chester, PA*

Control #VI21

**Closure of a Former Dry Cleaning Site Using Pilot Testing for the Design and Operation of an Active Sub-Slab Vapor Mitigation System to Mitigate PCE/TCE**

*Bob Roth, Andy Safulko, Terracon, Wheat Ridge, CO*

Control #VI28

**Vapor Intrusion Assessment Using a Surrogate Attenuation Factor**

*Tom Biksey, Stephanie Koehne, Nigel Goulding, Chrissy Peterson, EHS Support, Washington, PA*

Control #VI34

**Identifying an Indoor Source of VOCs: The Case of the Trash Dumpster**

*Sigrida Reinis, Hayley Farr, Jessica Schaettle, Jeffrey F. Ludlow, Langan Engineering and Environmental Services Inc., Oakland, CA*

Control #VI37

**Whole Air Sampling and Air Media: The Inside Story on Sampling: Air Media and Sample Matrix Effects: How They Affect Laboratory Data and the Data Quality Reported**

*Andy Rezendes, Will Elcoate, Alpha Lab, Westborough, MA*

Control #VI38

**Sorbent Sampling with an Emphasis on Passive Sampling – Options, Application, and Comparison Studies**

*Rob Uppencamp, Arcadis, Indianapolis, IN*

# TECHNICAL PROGRAM - Thursday, December 6

**7:30 am - 3:00 pm**  
Conference Registration  
Level 11

**7:30 am - 8:15 am**  
Presenters' Meeting  
Copper Ballroom

**7:30 am - 8:15 am**  
Continental Breakfast  
Copper Vista A & B

## **Session V: VAPOR INTRUSION ASSESSMENT AND DATA EVALUATION**

**Chair:** Loren Lund, Jacobs

**8:15 am - 8:40 am**

Control #VI22

### **Empirical Analysis of Vapor Intrusion Attenuation Factors for Sub-Slab and Soil Vapor—An Updated Assessment for California Sites**

*Robert Ettinger, Steve Luis, Nadine Weinberg, Todd McAlary, Gina Plantz, Helen Dawson, Geosyntec, Santa Barbara, CA*

**8:40 am - 9:05 am**

Control #VI20

### **Improved Approaches for VI Assessment of Multiple Building Types**

*Ian Hers, Parisa Jourabchi, Golder Associates, Vancouver, BC*

**9:05 am - 9:30 am**

Networking Break, Copper Vista A & B

**9:30 am - 9:55 am**

Control #VI30

### **Advection. Diffusion. It's No Illusion!: An Analysis of TCE Diffusion Through Concrete Slabs**

*Eric Lovenduski, Geosyntec Consultants, Latham, NY; Jared Brisman, Geosyntec Consultants, Ewing, NJ; Matthew Mraw, Geosyntec Consultants, Blue Bell, NJ; Helen Dawson, Geosyntec Consultants, Washington DC; Bill Wertz, Geosyntec Consultants, Albany, NY; Todd Creamer, Geosyntec Consultants, Portsmouth, NH*

**9:55 am - 10:20 am**

Control #VI27

### **High Performance Passive Compartment Ventilation System: CFD-Simulations and Three Years of Monitoring Data**

*Bjarke N. Hoffmark, COWI A/S, Odense, Denmark; Tage V. Bote, Morten Dreyer, Jacob Bukh, COWI A/S, Lyngby, Denmark; Line M. Fischer, Mariam Wahid, Capital Region of Denmark, Hilleroed, DK*

**10:20 am - 10:45 am**

Control #VI06

### **Methods for Field Application of CSIA to Evaluate Residential VI of TCE**

*Devon Rowe, Carol Serlin, Ramboll US Corp., Vancouver, WA; Safaa Dergham, Erik Pearson, Ramboll US Corp., Irvine, CA*

**10:45 am - 12:00 pm**

## **Session VI: VI SITE CLOSURE PANEL**

**Chair:** Robbie Ettinger, Geosyntec

**Presenters:**

- **Matt Narter**, Hydrologist, Arizona DEQ
- **Michelle Hartman**, Environmental Specialist, Missouri Department of Health and Senior Services
- **Matthew Williams**, Environmental Quality Specialist, Michigan Department of Environmental Quality

**12:00 pm - 1:15 pm**

### **Lunch and Presentation**

Copper Vista A & B, Copper Ballroom

### **What do these items have in common? TCE Averaging Time, PFOA Kinetics and the US Senate**

*Michael Dourson, Director of Science, Toxicology Excellence for Risk Assessment*

## **Session VII: VAPOR INTRUSION MITIGATION AND CASE STUDIES**

**Chair:** Matthew Traister, OBG

**1:15 pm - 1:40 pm**

Control #VI08

### **VI Assessment and Remediation of a Challenging Industrial Building Using Interior SVE**

*Joseph W. Corsello, David Shea, Sanborn, Head & Associates, Inc., Concord, NH; Kevin Whalen, IBM Corporation, Manassas, VA*

**1:40 pm - 2:05 pm**

Control #VI16

### **Case Study - Complete VI Mitigation Services for an Industrial Plastics Manufacturing Plant**

*Paul Hurst, Ian Hers, and Bob Ireson, Golder Associates Inc., Vancouver, BC, Canada*

**2:05 pm - 2:30 pm**

Control #VI33

### **State-of-the-Science Update on Evaluating Vapor Intrusion Preferential Pathways**

*Julia Roth, Jacobs, Charlotte, NC; Chase Holton, Jacobs, Englewood, CO; Loren Lund, CH2M, Shelley, ID*

**2:45 pm - 3:10 pm**

Control #VI32

### **Sewer Systems as Potential VI Preferential Pathways**

*Tage V. Bote, Bjarke N. Hoffmark, Hanne Nielsen, Klaus Bundgaard Mortensen, COWI A/S, Lyngby, Denmark*

**3:10 pm - 3:35 pm**

Control #VI09

### **Mass Flux Assessment of VI After Groundwater Remediation in Endicott, NY**

*David Shea, Bradley A. Green, Sanborn, Head & Associates, Inc., Concord, NH; Kevin Whalen, IBM Corporation, Manassas, VA*

**3:35 pm - 3:45 pm**

Closing discussion and future conferences