COURSE CONTENT

In 2014, NGWA convened a workshop of experts to discuss impacts of unconventional oil and gas development on groundwater quality and ways to study potential problems. The time is right to convene a second workshop to assess current understanding and science needs centered on three key topical areas:

- Sources and migration of stray gas in groundwater associated with shale gas development
- Fate and transport of fracking chemicals and drilling fluids in groundwater, including natural attenuation studies
- Approaches and technology for monitoring groundwater near shale gas wells.

Share your knowledge and join with interested parties to discuss the latest findings regarding groundwater quality and unconventional oil and gas development during this two-day event.

Advances in, and greater use of, horizontal wells and hydraulic fracturing technology have expanded domestic natural gas and oil supplies. However, concerns continue to be raised about the possibility for contamination of shallow groundwater by stray gas, formation water and chemicals used in hydraulic fracturing. Potential groundwater impacts can arise from a variety of sources and pathways, including the annuli of imperfectly cemented wells, accidents during chemical transport and surface handling, improper wastewater management and disposal, nearby old abandoned wells, and upward migration along geologic features.
SCHEDULE & PROGRAM

Tuesday, April 25, 2017

7:00 a.m.-4:30 p.m.  
Registration

8:00 a.m.-8:15 a.m.  
Welcome and Explanation of Format  
Dan Soeder

8:15 a.m.-12:50 p.m.  
Sources and Migration of Stray Gas in Groundwater Associated with Shale Gas Development  
Daniel Soeder, National Energy Technology Laboratory

- 8:15 a.m.  A Geochemical Context for Stray Gas Investigations in the N. Appalachian Basin  
  Fred Baldassare, Principal Geoscientist
- 8:35 a.m.  Evaluating Shallow Aquifer Vulnerability to Potential Shale Gas Exploration and Development in Eastern Canada  
  Christine Rivard
- 8:55 a.m.  Surface casing pressure, well integrity loss, and stray gas migration in the Wattenberg Field, Colorado  
  Greg Lackey
- 9:15 a.m.  Hydrocarbons in Groundwater Overlying the Eagle Ford, Fayetteville, and Haynesville Shale UOG Development Areas  
  Peter B. McMahon, Ph.D.
- 9:35 a.m.  Analysis of Sustained Casing Annular Pressure in Relation to Stray Gas Assessment  
  J. Daniel Arthur, PE, SPEC
- 9:55 a.m.  Approaches for High Resolution Monitoring for Groundwater Impacts from Shale Gas Development  
  Beth Parker, PhD

- 10:15 a.m. Break
- 10:45 a.m. Breakout Session
- 11:50 a.m. Lunch

12:50 p.m.-5:40 p.m.  
Approaches and Technology for Monitoring Groundwater near Shale Gas Wells  
Anthony Gorody, Ph.D., P.G.

- 12:50 p.m.  Recommended Practices for Baseline Sampling of Water Wells in Areas of Shale Gas Development  
  Stephen Richardson, Ph.D., PE,
• 1:10 p.m. **Assessing the Environmental Impacts on Groundwater Quality in Areas of Unconventional Energy Resource Development**
  Bernhard Mayer, Ph.D.

• 1:30 p.m. **Stable Isotope and Radiocarbon Evidence for Biogenic Coalbed Methane in Groundwater Wells in Utica Shale**
  Amy Townsend-Small

• 1:50 p.m. **Evaluating Changes in Freshwater Quality Using Groundwater Monitoring Wells in Areas of Natural-Gas Development**
  Erica Barth-Naftilan

• 2:10 p.m. **Hydrogeophysical Log Analysis of Four Water-Supply Test Wells along an Appalachian Plateau Topographic Profile**
  John H. Williams

• 2:30 p.m. Break

• 3:00 p.m. **Validating a Discriminant Analysis Model Used to Distinguish Salinity Contamination from Deicers vs Produced Water**
  Nathaniel Chien

• 3:20 p.m. **A Flux Based Approach for Monitoring Hydraulic Fracturing Constituents in Groundwater**
  Michael D. Annable

• 3:40 p.m. **A Spatial Data Approach for Assessing Groundwater Resources, Risks, and Uncertainty**
  Kelly Rose, Ph.D.

• 4:00 p.m. **Microbial Activity in Hydraulic Fracturing Produced Water from Two Shale Gas Reservoirs**
  Daniel Lipus

• 4:20 p.m. **Regional Monitoring/Analysis of the Effects of Oil and Gas Development on Groundwater in California**
  Matthew K. Landon

• 4:40 p.m. **EOG Resources' Baseline Groundwater Monitoring Program for the Bakken**
  Justin Soberaski

• 5:00 p.m. **In-line Sampling and Fixed Gas Analyses Help to Evaluate Dissolved Hydrocarbon Concentrations**
  Anthony Gorody, Ph. D., P.G.

• 5:20 p.m. **Probabilistic Risk Assessment: Perspectives on Groundwater Contamination from Hydraulic Fracturing Activities**
  Carolyn Rodak

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**Wednesday, April 26, 2017**

7:30 a.m.-10:00 a.m.

**Registration**

8:00 a.m.-12:30 p.m.

**Fate and Transport of Fracking Chemicals and Drilling Fluids in Groundwater, including Natural Attenuation Studies**
  Peter B. McMahon, Ph.D.
• 8:00 a.m. Methane dispersion from leaky petroleum wells into groundwater: can point-source well leaks cause large plumes?
  John A. Cherry, Ph.D.
• 8:30 a.m. Fate of Hydraulic Fracturing Chemicals Downhole and after Environmental Release
  Jens Blotevogel
• 8:50 a.m. Biodegradability of organic compounds used in hydraulic fracturing fluids and implications for compound fate
  Paula Mouser
• 9:10 a.m. Migration of Hydraulic Fracturing Fluids by Deep-Well Disposal into Fresh-Water Aquifers
  Ronald Green, Ph.D., P.G.
• 9:30 a.m. UOG Wastewater Leaks and Spills: Fate and Transport of Chemical Constituents
  Isabelle M. Cozzarelli

• 9:50 a.m. Breakout Session
• 10:50 a.m. Break
• 11:10 a.m. Group Reporting
• 12:15 p.m. Conclusions and Next Steps
• 12:30 p.m. Adjourn

LOCATION & HOUSING
The workshop will be held in the Fawcett Center for Tomorrow, on the campus of Ohio State University, 2400 Olentangy River Road, Columbus, Ohio 43210. For accommodations, visit the workshop website at http://www.ngwa.org/Events-Education/conferences/Pages/224apr17.aspx.

REGISTRATION: ONLINE AND MAIL OPTIONS
Multiple options are available for registration, including a pre-registration discount for those who register prior to March 25th. To view these options, visit the workshop website at: http://www.ngwa.org/Events-Education/conferences/Pages/224apr17.aspx.

PDH CREDITS
PTTC will issue a certificate for twelve (12) Professional Development Hours at the end of the workshop. To receive this certificate at the workshop, you must register in advance.

For further information contact: Doug Patchen, at 304-293-6216, or doug.patchen@mail.wvu.edu