



Society for Risk Analysis New England Chapter

2016-2017 Event Series

MEETING ANNOUNCEMENT

Tuesday, February 7, 2017

Refreshments: 5:30 pm – 6:00 pm

Presentation: 6:00 pm – 7:00 pm

Discussion: 7:00 – 7:30 pm

HYDRAULIC FRACTURING FOR OIL AND GAS PRODUCTION: RISKS, RESEARCH, AND REGULATIONS

DONNA VORHEES, SC.D.

HEALTH EFFECTS INSTITUTE

KATE KONSCHNIK, J.D.

HARVARD LAW SCHOOL

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SCHLUMBERGER

Location

Health Effects Institute

75 Federal Street, #1400

Boston, MA

Please RSVP by Friday, February 3rd to Sonja Sax (ssax@ramboll.com) or Jeff Cegan (Jeffrey.C.Cegan@usace.army.mil).

Space is limited, so reserve your seat today. For more information on SRA-NE, please go to: <http://sra.org/sra-ne>



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HYDRAULIC FRACTURING FOR OIL AND GAS PRODUCTION: RISKS, RESEARCH, AND REGULATIONS

Over the last ten years, shale gas and tight oil have revolutionized the energy economy of the United States. These new resources have invigorated many sectors of the U.S. economy, and have reduced the cost of energy for consumers worldwide. However, production practices have generated a high level of concern and controversy. Shale gas and tight oil are released from subsurface rock formations by horizontal drilling and massive hydraulic fracturing (“fracking”). Although hydraulic fracturing has been used in geotechnical operations for many years, its recent use is unprecedented in pace and scale. The fracturing of a typical unconventional gas or oil well consumes roughly 5,000,000 gallons of water, 2000 tons of sand, and 200 tons of chemicals. In recent years 8,000 to 15,000 such wells have been drilled every year, mostly in Texas, North Dakota, and Pennsylvania, with significant activity also occurring in Oklahoma, Colorado, Ohio, and West Virginia.

A number of well-publicized accidents and water pollution events have generated a high level of public concern, exacerbated by lack of transparency regarding the chemicals used in hydraulic fracturing fluids. The amount of water used in hydraulic fracturing has been flagged as a potential problem, particularly in water-stressed regions. The associated disposal of waste water has been linked to seismicity in areas where it had been heretofore all but unknown. Air pollution and fugitive emissions of methane, a potent greenhouse gas, are also associated with unconventional oil and gas production. The effect of drilling on landscapes has led to concern for wildlife habitat and community change.

We first briefly review the fundamentals of oil and gas production in general and hydraulic fracturing in particular. We then discuss real vs perceived health, safety, and environmental issues connected with shale gas and tight oil development, and how trends in industry practices have mitigated or magnified the problems. We summarize the status of research on human exposure and health research. Finally, we provide examples of ways regulatory frameworks have been or might be modified to identify and respond to potential risks to public health and the environment.



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New England Chapter

ABOUT THE PRESENTERS

Robert L. Kleinberg has been employed by Schlumberger since 1980 and is a Schlumberger Fellow, one of about a dozen who hold this rank in a workforce of 100,000. He advises Schlumberger senior management on long-range planning, and has served on or advised numerous government and academic committees on energy policy. He is a coauthor, with Harvard faculty, of a textbook on energy technology, in preparation. Dr. Kleinberg was educated at the University of California, Berkeley (B.S. Chemistry, 1971) and the University of California, San Diego (Ph.D. Physics, 1978). From 1978 to 1980 he was a post-doctoral fellow at the Exxon Corporate Research Laboratory in Linden, NJ. At Schlumberger he has worked on geophysical applications of ultrasonics, electrical resistivity, nuclear magnetic resonance, and gravimetry. Recent activities include applied research on heavy oil, methane hydrate, gas shale, tight oil, and oil shale reservoirs. Dr. Kleinberg has authored more than 100 academic and professional papers, holds 36 U.S. patents, and is the inventor of several geophysical instruments that have been commercialized on a worldwide basis. He is a member of the National Academy of Engineering.

Schlumberger is a leading oilfield service company, engaged in all phases of oil and gas exploration and production. These include directional and horizontal drilling, hydraulic fracturing and fracture monitoring, fracture fluid additive formulation, and contaminated water reuse.

Donna J. Vorhees directs the energy research program at the Health Effects Institute (HEI). She is leading an effort to implement a Strategic Scientific Research Agenda designed to understand potential human exposures and health effects from unconventional oil and gas development and how they might be prevented or minimized. Dr. Vorhees has 25 years of consulting experience, assessing multi-pathway chemical exposures in indoor and outdoor environments, quantifying human health risks, and communicating risks to affected communities in the United States on behalf of government and private clients. Dr. Vorhees has conducted similar assessments in Nigeria and Cote d'Ivoire on behalf of the United Nations Environment Program. She currently serves on the U.S. Environmental Protection Agency (USEPA) Board of Scientific Counselors Subcommittee on Chemical Safety for Sustainability, has served on National Research Council committees (Health Risks of Phthalates and Sediment Dredging at Superfund Megsites) and other advisory committees, and has been a peer reviewer on numerous health risk assessments prepared by the USEPA, the Consumer Product Safety Commission, and Health Canada. She previously served as Councilor for the Society for Risk Analysis and President of its New England Chapter. She is Adjunct Assistant Professor at the Boston University School of Public Health where she teaches Risk Assessment Methods. Dr. Vorhees received her ScM and ScD in Environmental Health from the Harvard School of Public Health.

Kate Konschnik is the founding Director of Harvard Law School's Environmental Policy Initiative (EPI), a policy shop providing real-time legal analysis of critical energy and climate issues. EPI seeks to advance discussion and propose solutions with its research, sharing findings in policy-relevant talks, white papers, evaluation tools, and draft legislation. Kate has published a number of papers relating to the governance of unconventional oil and gas development, and has presented her findings to the National Research Council, the National Governors' Association, the Groundwater Protection Council, the Midwestern Power Sector Collaborative, and the United States Secretary of Energy's Advisory Board. Kate is also a lecturer at Harvard Law School. Prior to joining Harvard Law School, Kate served as Chief Environmental Counsel to U.S. Senator Sheldon Whitehouse (D-R.I.), and directed his staff on the Oversight Subcommittee of the Senate Environment and Public Works Committee. In that post,



Society for Risk Analysis

New England Chapter

Kate ran the Senator's Deepwater Horizon oversight work, and negotiated provisions of Senate climate legislation. From 2002 to 2009, Kate served as an environmental enforcement trial attorney in the Environment and Natural Resources Division of the United States Department of Justice. Kate holds a B.A. in political science from Tufts University and a J.D. *with honors* from UC Hastings College of the Law.



Society for Risk Analysis New England Chapter

GETTING TO THE EVENT

Directions to the Health Effects Institute can be found at: <https://www.healtheffects.org/directions>

From the MBTA Subway (on foot):

The office is two blocks north of South Station, connecting you to the Red Line, Silver Line, and the Commuter Rail. Two blocks to our west is Downtown Crossing, connecting to the Red and Orange Lines. Three blocks to our west is Park Street, connecting to the Green Line. (See the [map of the downtown Boston area subway system](#).)

Driving Directions:

From Logan Airport

Take the Sumner Tunnel to I-93 South; then follow the directions below for From Points North. With light traffic, this is a ten-minute trip; at busier times, such as Friday evenings, plan on an hour. The Silver Line bus connects Logan International Airport to South Station, which is two blocks from our office. (See the [street map](#) to make your way from South Station to our offices.)

From Points North

From points north of Boston, take I-93 South into the city. After entering the Central Artery Tunnel, stay to your right, following signs for Exit 23/Purchase Street and South Station. Take the Purchase Street exit and drive southwest on Purchase Street until you come to Summer Street. Turn right onto Summer Street, and take the first right onto High Street. Then take your first left onto Federal Street. There is a public garage that abuts 75 Federal Street on the left. (See the [street map](#) for additional details.)

From Points South

From points south of Boston, take I-93 North into the city. Take the South Station exit, staying to the right for the ramp to downtown Boston/Kneeland Street. At the end of the ramp, take a left onto Kneeland Street. Drive west along Kneeland Street and take your third right onto Lincoln Street. Drive north on Lincoln Street for 4-5 blocks until you come to Summer Street. At Summer Street, take a right and then an immediate left onto High Street. Follow the directions above from High Street to our offices.

From Points West

Take the Mass. Pike (I-90) east to Exit 24 A-B-C. Exit to the left, following the signs for I-93/South Station/Quincy. Take Exit 24-A to South Station, staying to the right for the ramp for downtown Boston/Kneeland Street. At the end of the ramp, take a left onto Kneeland Street. Follow the directions above from Kneeland Street to our offices.