

**Please Join Us for a Workshop
December 10, 2014**

**UNDERSTANDING POTENTIAL IMPACTS OF 21ST CENTURY OIL AND GAS
DEVELOPMENT IN THE APPALACHIAN BASIN: RESEARCH NEEDS**

HEI's Special Scientific Committee on Potential Impacts of Unconventional Oil and Gas Development in the Appalachian Basin

It is with great pleasure that we invite you to the 2nd in a series of three workshops to examine research needs related to potential impacts of oil and gas development in the Appalachian Basin as it is practiced now and over the coming decades. The Health Effects Institute (HEI)¹ has convened a special committee of experts to develop a *Strategic Scientific Research Plan for Understanding the Potential Impacts of 21st Century Oil and Gas Development in the Appalachian Basin*. The plan will be designed for use by funding agencies and others as a foundation for future research in this complex arena. This 2nd workshop provides an opportunity for you and other interested parties to discuss the committee's draft *Interim Report* and to share your research recommendations and criteria for prioritizing these recommendations with the committee as it begins preparation of the *Strategic Research Plan*.

We hope that you can join us because the committee needs to hear from you!

HOW TO PARTICIPATE

- RSVP by December 4th at: <http://www.iop.pitt.edu/HEI/>
- No fee for this broad multi-stakeholder workshop but due to space constraints attendance is by invitation

WHEN AND WHERE

- Wednesday, December 10, 2014 from 8:30am to 4:30pm
- Oglebay Resort and Conference Center, 465 Lodge Drive, Wheeling, WV, 26003

A buffet lunch will be provided

For more information: Donna Vorhees (617-488-2317; dvorhees@healtheffects.org)

WHY THIS INITIATIVE NOW?

After other expert reviews and newspaper headlines, questions remain about potential impacts of unconventional oil and gas development on people and the environment. While oil and gas development is well underway in the Appalachian region, it represents only a fraction of what is expected in coming years.

This HEI Committee will provide:

- An *impartial, interdisciplinary, scientific review* of what currently available information tells us and does not tell us about potential impacts.
- A *peer-reviewed research plan* that prioritizes the scientific research needed to understand potential impacts.

PURPOSE OF WORKSHOP

- *Meet HEI's Committee* and learn about its work
- *Hear invited speakers* summarize the engineering risks, evolving technology, and potential community impacts related to oil and gas development
- *Hear a Presentation* of the Committee's draft *Interim Report*
- *Add your voice* by sharing with the HEI committee your research recommendations and criteria for prioritizing recommendations
- *Learn how to participate* beyond this 2nd workshop

~ The final agenda and weblink to the *Draft Interim Report* will be sent to registrants one week in advance of the workshop ~

Sponsor and Funding

The workshop is the second in a series sponsored by HEI with organizational support provided by the University of Pittsburgh Institute of Politics and with funding from private foundations in Pennsylvania and West Virginia.

¹ The Health Effects Institute (www.healtheffects.org) is an independent, non-profit research institute funded jointly by government and industry to provide credible, high quality science on air pollution and health for air quality decisions. Periodically, HEI also receives funding from foundations for special projects such as this effort. HEI sponsors do not participate in the selection, oversight or review of HEI science, and HEI's reports do not necessarily represent their view.

HEI INITIATIVE TO DEVELOP A STRATEGIC RESEARCH PLAN FOR UNDERSTANDING POTENTIAL IMPACTS OF 21ST CENTURY UNCONVENTIONAL OIL AND GAS DEVELOPMENT IN THE APPALACHIAN BASIN

(Boston, MA) The Health Effects Institute (HEI)¹ has convened a Special Scientific Committee to explore and define the potential human health, ecological, environmental, and social impacts of 21st century unconventional oil and gas development in the Appalachian Basin and to use the assessment to develop a Strategic Research Plan.

Origin of the Initiative. With the expansion of shale gas development in this region and across the nation has come controversy over possible effects on people and the environment. In response to concerns about natural gas and oil extraction in the Appalachian region, 26 leaders from government, industry, academia, environmental groups, and civil society established the Pennsylvania-based Shale Gas Roundtable (<http://iop.pitt.edu/shalegas/>). In 2013, this group emphasized the need for “efforts to increase balanced research and rigorous monitoring of the possible impacts of unconventional oil and gas development” and identified HEI as “uniquely well suited” to advise it on research in the shale oil and gas area. In agreeing to pursue this important area, HEI Board Chair Richard Celeste noted that “the HEI model of providing independent, high-quality research in controversial circumstances is ideal for work in the complex and challenging arena of shale oil and gas extraction.”

Purpose of this HEI Initiative. This initiative will result in an effective foundation for future research, communication, and decision-making by providing an independent, priority-based assessment of key research questions and gaps. The HEI Committee will (1) explore and define the potential human health, ecological, environmental, and social impacts of unconventional oil and gas development in the Appalachian Basin, and (2) develop a broad strategic scientific research plan to understand such impacts in both a regional and a national context. The HEI model of providing credible, impartial science will result in a research plan that effectively answers questions at the center of the controversy over unconventional oil and gas development. As an independent, priority-based assessment of scientific questions and gaps in knowledge, the research plan can be used by research funders and the scientific community as a basis to inform priority-based funding decisions and also by regulators, oil and gas developers, environmental and public health experts, and other interested parties to better understand the implications of ongoing and future unconventional oil and gas development. With its model and proposed timeframe, HEI will be able to synthesize existing research for near-term use by policy makers, which is vital given the ongoing rapid increase in unconventional oil and gas development.

Geographic Scope of Review. The Strategic Research Plan will be focused on the Appalachian Basin but will serve as a template for the evaluation of unconventional oil and gas development in other

¹ The Health Effects Institute is an independent, non-profit research institute funded jointly by government and industry to provide credible, impartial, high quality science for decision-making. HEI's initiative on unconventional gas and oil development is funded solely by private foundations in the Appalachian region that have taken no public position on unconventional gas and oil development. HEI sponsors do not participate in the selection, oversight or review of HEI science, and HEI's reports do not necessarily represent their views.



regions of the United States and around the world. Although conventional oil and gas development has occurred in the Appalachian Basin for decades, recent advances in technology (e.g. high-volume hydraulic fracturing *combined* with horizontal drilling) have allowed for rapidly increasing development of unconventional reservoirs, notably natural gas from the Marcellus and Utica shale formations.

The HEI Committee Membership. The committee is chaired by George M. Hornberger, Distinguished Professor of Civil and Environmental Engineering and of Earth and Environmental Science at Vanderbilt University and director of the Vanderbilt Institute for Energy and the Environment. The committee members are highly regarded experts in diverse fields of study directly related to unconventional oil and gas development and its possible impacts. Committee members are expert in geophysics, hydrology, geology, medicine, epidemiology, toxicology, cumulative risk assessment, quantitative uncertainty analysis, aquatic ecology, terrestrial ecology, atmospheric modeling, human exposure assessment, engineering, environmental monitoring, groundwater and surface water quality assessment, and sociology. Special advisors and consultants contribute additional areas of expertise, including economics and petroleum engineering.

HEI Special Committee on Unconventional Oil and Gas Development

George M. Hornberger (chair), *Vanderbilt University*

Alison C. Cullen, *University of Washington*

Jeffrey J. Daniels, *Ohio State University*

Alan M. Ducatman, *West Virginia University*

John K. Jackson, *Stroud Water Research Institute*

William (Bill) M. Kappel, *Hydrogeologist, retired*

Richard (Rick) S. Krannich, *Utah State University*

Vince Matthews, *Principal of Leadville Geology; former State Geologist of Colorado*

Allen L. Robinson, *HEI Research Committee and Carnegie Mellon University*

Dale P. Sandler, *National Institute of Environmental Health Sciences*

Susan L. Stout, *Federal Liaison, United States Department of Agriculture Forest Service*

Deborah L. Swackhamer, *University of Minnesota*

Junfeng (Jim) Zhang, *Duke University*

Special Advisors to the Committee:

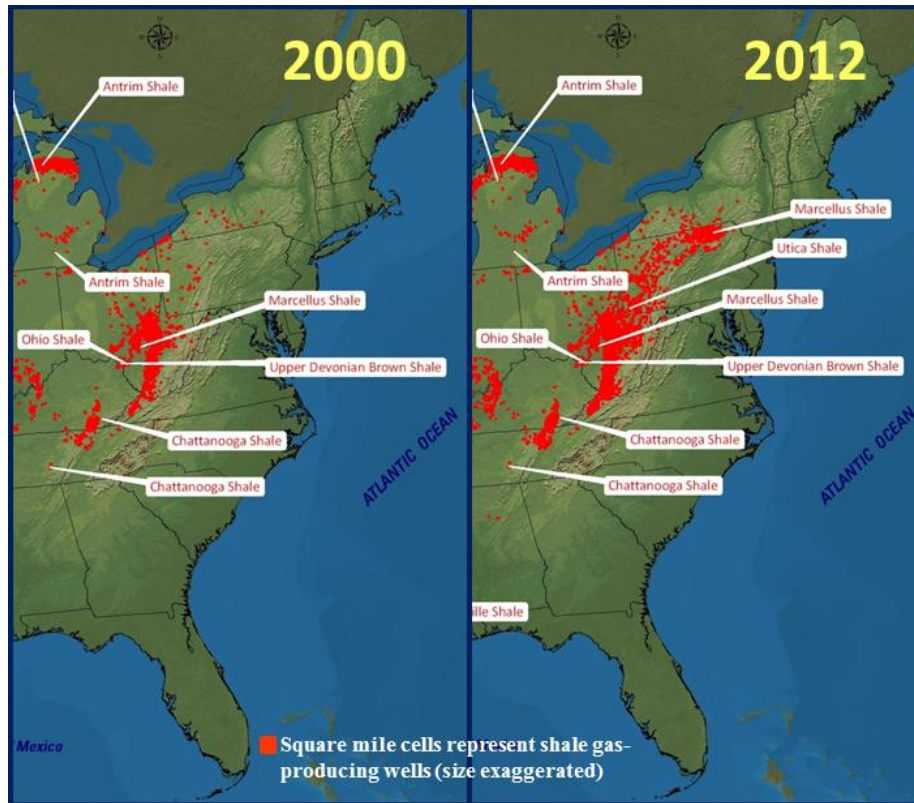
Bernard Goldstein, *University of Pittsburgh*

Alan Krupnick, *Resources for the Future*

Michael Parker, *Parker Environmental and Consulting, LLC*

Consultations with Other Experts and Interested Parties. Throughout the process, the committee, with organizational support provided by the University of Pittsburgh Institute of Politics, will consult with a wide variety of experts and government officials, as well as with industry, community, and environmental groups, to ensure that it considers the full range of issues and questions. A public

workshop early in the Committee's review process (June 10, 2014) helped to ensure that the Committee was aware of the range of issues and questions surrounding unconventional oil and gas development. Additional public workshops will be conducted after release of the draft Interim Report and the draft Strategic Research Plan to provide opportunities for additional stakeholder input and active communication of the final Plan.



Rapid increase in shale gas development in the Appalachian Basin (Source: Map of assessed shale gas in the United States, 2012: U.S. Geological Survey Digital Data Series 69–Z).

Committee's Approach. The Committee will review the potential human health, ecological, environmental, and social impacts of unconventional gas and oil development in the Appalachian Basin and use the review to develop a priority-based Strategic Scientific Research Plan for better understanding these potential impacts.

The Committee will conduct a systematic and independent review of the published literature and other data and information regarding possible near- and long-term impacts of 21st century unconventional gas and oil development in the Appalachian Basin to determine which potential impacts warrant new or additional scientific investigation. Potential impacts related to all stages of oil and gas development will be reviewed, including well exploration through well closure and site reclamation, and all ancillary facilities (e.g., compressors and processing facilities) and waste management (e.g., deep well injection, landfilling, recycling of wastewater) associated with the production of oil and gas.

The Committee's review includes potential human health, social, environmental, and ecological impacts from oil and gas development. The evaluation of potential human health impacts includes consideration of both short-term (i.e., acute) and long-term (i.e., chronic) health effects from exposure to one or more health stressors associated with oil and gas development, including, but not limited to, chemical and radiation exposures through water, air, and soil, and increased light, noise, odors, and societal changes. Stress to regional resources and infrastructure also will be examined. The evaluation of potential ecological impacts is similar to that being conducted for human health impacts, except that instead of societal changes, it involves consideration of habitat loss and fragmentation and changes in ecological community structure.

The Committee's initial review will be compiled in an *Interim Report*, which will include documentation of effects potentially related to unconventional gas and oil development and gaps in knowledge of such effects. Following release of the draft *Interim Report*, the Committee will seek from a range of interested parties before the Committee develops the Strategic Scientific Research Plan. The Committee will develop and utilize criteria that are explicit and, to the extent feasible, quantitative to prioritize its research recommendations in the Strategic Research Plan. The Committee's review will occur even as the regulatory environment, gas and oil market, and industry standards-of-practice continue to evolve; therefore, the Committee will track these changes and take them into account when defining its plan. The plan also will include an estimate of time and cost to conduct priority research.

Schedule. Committee work commenced in May 2014, and the initial review of the existing scientific literature and the preparation of the *Interim Report* in late 2014. Drawing on previous efforts to define needs for the study of unconventional oil and gas development, comments from other experts, and its own independent work, the committee will then create a draft Strategic Scientific Research Plan. The plan will undergo public review and HEI peer review in 2015, before a final *Strategic Scientific Research Plan for Understanding the Potential Impacts of 21st Century Oil and Gas Development* is published later in 2015. HEI will share and discuss the plan with the policy and stakeholder communities at the state, regional, and national levels.

Source of Funding. Funding comes solely from private foundations in the Appalachian region that have taken no public position on unconventional oil and gas development. These currently include the Richard King Mellon Foundation, Henry L. Hillman Foundation, Claude Worthington Benedum Foundation, Henry C. and Belle Doyle McEldowney Fund of The Pittsburgh Foundation, and other private foundations in Pennsylvania and West Virginia. HEI sponsors do not participate in the selection, oversight or review of HEI science, and HEI's reports do not necessarily represent their views.

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