U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HEARING CHARTER

Hydraulic Fracturing: Banning Proven Technologies on Possibilities Instead of Probabilities

Thursday, April 23, 2015
9:00 a.m. – 11:00 a.m.
2318 Rayburn House Office Building

PURPOSE

The Committee on Science, Space, and Technology will hold a hearing titled, *Hydraulic Fracturing: Banning Proven Technologies on Possibilities Instead of Probabilities* on Thursday, April 23, at 9:00 a.m. in Room 2318 of the Rayburn House Office Building. The purpose of the hearing is to examine the science behind claims that hydraulic fracturing causes groundwater contamination and other environmental concerns.

WITNESS LIST

- **Ms. Christi Craddick**, Chairman, Railroad Commission of Texas
- **Dr. Donald Siegel**, Jessie Page Heroy Professor & Department Chair, The Department of Earth Sciences, Syracuse University
- **Mr. Simon Lomax**, Western Director, Energy in Depth
- **Mr. Elgie Holstein**, Senior Director for Strategic Planning, Environmental Defense Fund

BACKGROUND

Geologists have long known that certain geological formations contain vast amounts of hydrocarbons and although recovery of those resources was possible, it was not considered economically viable.[1] While shale and other "tight" formations had the porosity to make them commercially viable, the permeability was previously considered inadequate to allow its development. Traditionally, hydraulic fracturing involved injecting high pressured water through a wellbore to fracture a geological formation in order to recover natural resources.[2] Advancements in the hydraulic fracturing process were the technological innovations that led to

[1] DAN YERGIN, THE QUEST: ENERGY, SECURITY, AND THE REMAKING OF THE MODERN WORLD, at 325-7 (Penguin Group, 2011) [hereinafter *The Quest*].
[2] *See* EIA, *Glossary*, http://www.eia.gov/tools/glossary/index.cfm?id=H (last visited April, 14, 2015).

the ability to recover these resources from tight formations. When taken together with the sheer size of the plays,[3] the entrepreneurial spirit of those in the industry, and the private property rights enjoyed in the United States, hydraulic fracturing can be a critical component for American energy independence for decades to come (See Figure 1).

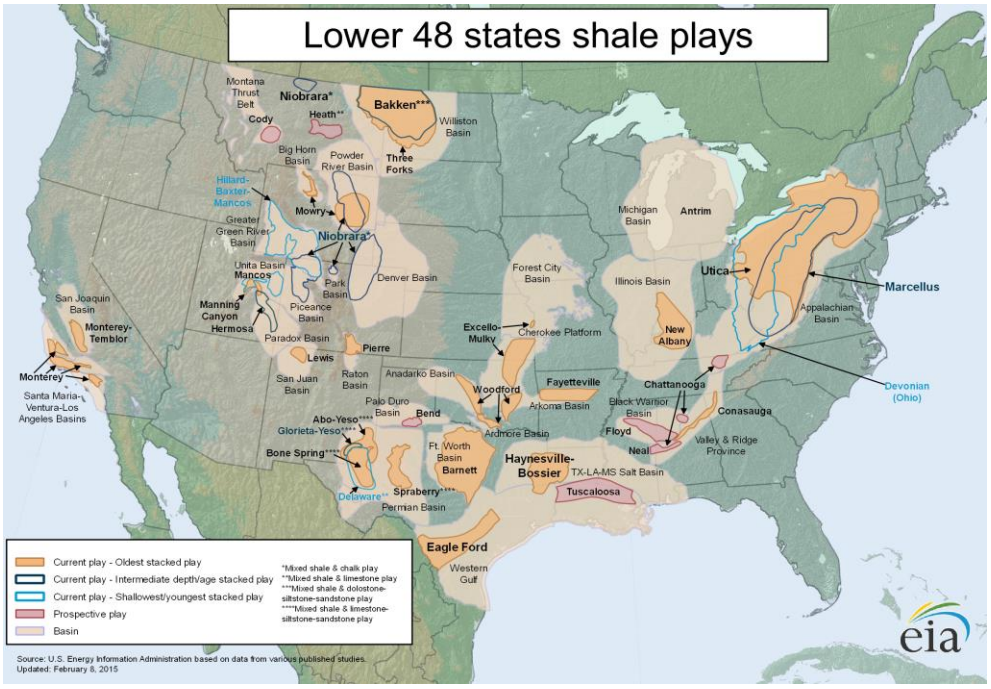

Figure 1: Oil and Gas Plays in the Lower 48 States.

The technological breakthrough involved refining and then combining two separate procedures, both of which were used for decades in the industry. The first breakthrough came with refining how hydraulic fracturing was completed. It was discovered that with the right combination of water, sand, and a small amount of additives, fissures could be created in deep rock formations that would allow the release of the trapped natural resources. The second breakthrough was horizontal drilling, which involves drilling vertically to a desired depth and then changing the direction of the drill to laterally bore through a particular geological formation.[4]

Earlier forms of the hydraulic fracturing process were used by the oil and natural gas industry to stimulate production since the late 1940s. However, the oil and gas industry had tried and failed multiple times to get "gas from rock," or more specifically, to make shale permeable

[3] A "play" is defined as "a set of known or postulated oil and gas accumulations sharing similar geologic, geographic, and temporal properties, such as source rock, migration pathway, timing, trapping mechanism, and hydrocarbon type." *See* EIA, *Glossary*, http://www.eia.gov/tools/glossary/index.cfm?id=P (last visited April 14, 2015).
[4] *Id*.

enough to release its gas filled pores. In the late 1990s, petroleum engineer George Mitchell began experimenting with different hydraulic fracturing techniques in the Barnet Shale.[5] He discovered that with the right mixture of water, sand, and compounds to lower surface tension, he was able to "hydraulically fracture" shale rock. The major breakthrough was figuring out how to complete the process in a way that left the sand in the cracks (See Figure 2). This allowed the fissures to remain open which created a pathway for the natural gas to flow out and be economically recovered.[6]

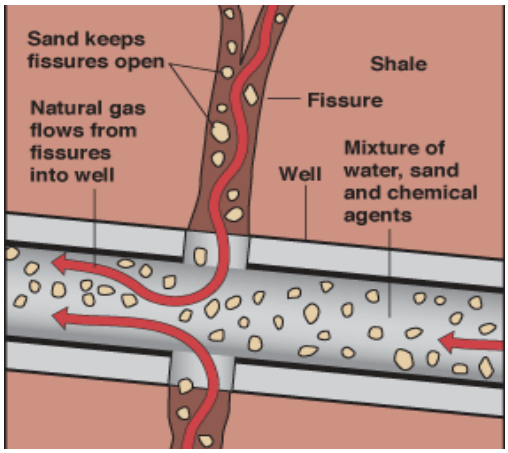

Figure 2: Illustrates the use of fracturing fluid. Diagram provided by Bureau of Land Management

Horizontal drilling itself has been effectively used in oil and gas development since the late 1980s.[7] This process penetrates a greater portion of the target formation because it exposes more of the hydrocarbon-bearing rock to the wellbore and increases the production of natural gas or oil from any one well.[8] In addition, it also reduces the environmental impact at the surface by allowing a single well pad to accomplish what historically required multiple wells (See Figure 3). The impact of the combination of hydraulic fracturing and horizontal drilling was not fully realized until horizontal wells surpassed vertical wells in the Barnett Shale around 2007.[9]

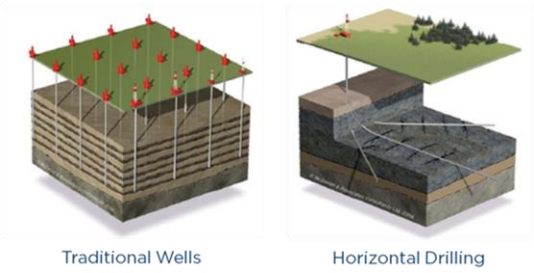

Figure 3: Traditional vs. Horizontal Wells. Source: API.

Until 2007, signs pointed to a steady decrease in domestic oil and natural gas production in the United States.[10] The prevailing view was that the United States had reached what is referred to as "peak oil" and that development and production would thereafter decline.[11] The belief was that the world was running out of oil and natural gas.[12] The concern of "peak oil" became widespread in the 1970s, and was premised on the

[5] *The Quest*, *supra* note 1, at 325-7.
[6] *Id*. at 328.
[7] EIA, DRILLING SIDEWAYS – A REVIEW OF HORIZONTAL WELL TECHNOLOGY AND ITS DOMESTIC APPLICATION, vii (Apr. 1993), *available at* http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/drilling_sideways_well_technology/pdf/tr0565.pdf.
[8] *See* EIA, *Technology drives natural gas production growth from shale gas formations*, July 12, 2011, *available at* http://www.eia.gov/todayinenergy/detail.cfm?id=2170 [hereinafter *Natural Gas Production Growth*].
[9] *Id*.
[10] EIA, *U.S. natural gas net imports at lowest levels since* 1992, *available at* http://www.eia.gov/todayinenergy/detail.cfm?id=5410.
[11] *The Quest*, *supra* note1, at 228-9.
[12] *Id. at 228-9, 335*.

rising demand of oil and natural gas and the seemingly dwindling supplies.[13] As a solution, crude oil was prohibited from being exported[14] and natural gas was prohibited from being used as a primary fuel source for power generation.[15] An increased focus was placed on coal and renewables as a way to supplement the declining production. Coal was seen as the best alternative fuel source for power generation.[16] With the mistaken belief that the United States was running out of oil and natural gas, the emphasis of near-term supply shifted to other parts of the world (Russia, Middle East, and offshore) to secure America's oil and gas supplies.[17] However, the technological breakthrough of hydraulic fracturing has reversed the decline in domestic on-shore development, reduced our reliance on Middle Eastern oil, and renewed a dwindling manufacturing sector. Given the economic importance of developing the country's natural resources, attempts to regulate it should be based on science.

POSSIBILITY VS PROBABILITY

The increased development of natural resources comes with risks that should be mitigated with modern engineering procedures and practice. It is under this context that this hearing will discuss the science behind hydraulic fracturing.

As this Committee has previously examined, the use of hydraulic fracturing has raised questions regarding the potential effects of this technology on groundwater supplies.[18] As

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[13] *Id.*

[14] 42 U.S.C. § 6212 (Permits to the prohibition are reviewed by the Sec'y of Commerce under the Export Administrative Act of 1979, *see* 42 U.S.C. § 92).

[15] 42 U.S.C. § 92 (The Powerplant and Industrial Fuel Use Act (FUA) was passed in 1978. The sections of the FUA that prohibited the use of natural gas as a primary fuel source in the production of electricity were repealed in 1987).

[16] EIA, *Repeal of the Powerplant and Industrial Fuel Act (1987), available at* http://www.eia.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/repeal.html (last visited April 14, 2015).

[17] *The Quest*, *supra* note 1, at 228-9; 325.

[18] *See* H. Comm. on Science, Space, & Technology, *Review of Hydraulic Fracturing Technology & Practices*, 112th Cong. (May 11, 2011); H. Comm. on Science, Space, & Technology, Subcomm. on Energy & Environment, *Fractured Science: Examining EPA's Approach to Groundwater Research: The Pavilion Analysis*, 112th Cong. (Feb. 1, 2012); H. Comm. on Science, Space, & Technology, Subcomms. on Energy & Environment, *Supporting American Jobs and the Economy Through Expanded Energy Production: Challenges and Opportunities of Unconventional Resources Technology*, 112th Cong. (May 10, 2012); H. Comm. on Science, Space, & Technology, Subcomms. on Energy & Environment, *Review of Federal Hydraulic Fracturing Research Activities*, 113th Cong. (Apr. 26, 2013); H. Comm. on Science, Space, & Technology, Subcomms. on Energy & Environment, *Lessons Learned: EPA's Investigations of Hydraulic Fracturing*, 113th Cong. (July 24, 2013).

previously discussed in these hearings, the risk of contamination of underground water sources is managed in different ways. Potential leakage of the fracking fluid during the injection and fracturing job are reduced by: adherence to state well construction requirements; the significant vertical distance between the fractured zone and ground water; and the presence of additional impermeable zones between the fractured zone and the deepest ground water that act as geologic barriers to the movement of fluid from the fractured zone into groundwater resources.[19] While all oil and gas development involves a certain level of risk, evaluation and management of these risks should be based on the best available science, not simply speculation without adequate scientific evidence to support it.

[19] Department of Energy, *State Oil and Natural Gas Regulations Designed to Protect Water Resources*. May 2009.