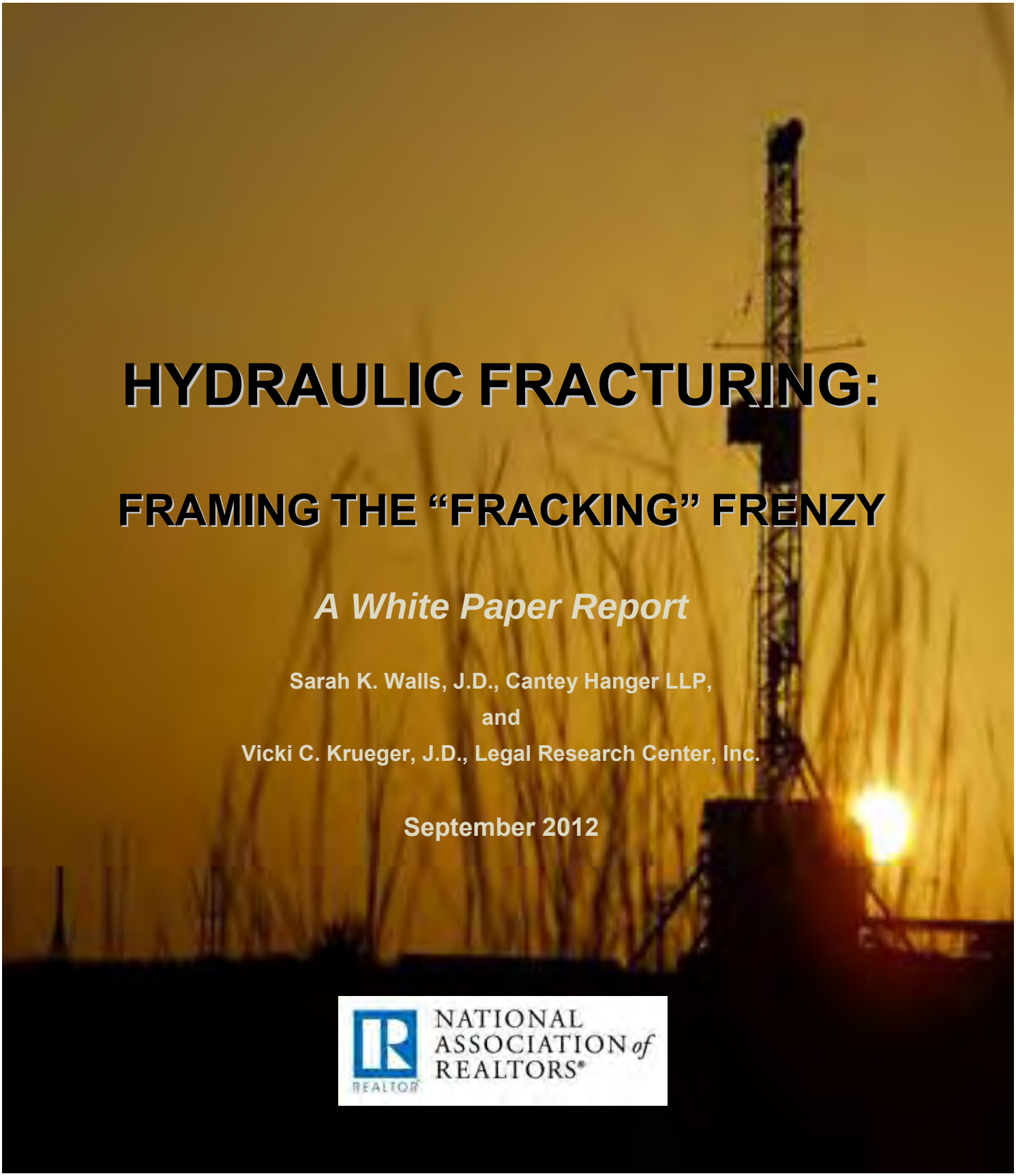

HYDRAULIC FRACTURING:

FRAMING THE "FRACKING" FRENZY

A White Paper Report

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and

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NATIONAL ASSOCIATION of REALTORS®

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Cover photograph from the United States Environmental Protection Agency's website, *Hydraulic Fracturing Research,* http://www.epa.gov/research/waterscience/water-hydraulicfracturing.htm.

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- *Private Transfer Fees—Potential for Trouble, Problems for the Future?*
- *Government Responses to Climate Change—A Look at State and Local Actions Affecting the Real Estate Industry*
- *Maintaining Properties in Foreclosure—How Communities Across America are Responding to the Vacant Property Crisis in Their Own Backyards*
- *Water Rights—A White Paper Report*
- *Building Codes: Origins and Implementation*

Preface

If there was any good news in the real estate market during the recent recession, it just might have been the boom in revenues resulting from the dramatic increase in horizontal drilling and hydraulic fracturing of shale gas—or "fracking," as some call it. Previously unexplored natural gas and oil reserves can now be exploited, with concomitant royalties and bonuses paid to the mineral rights owners. Some property owners are now in the position of being able to use these new, largely unanticipated funds for purchases or development, thereby creating jobs and other benefits to the surrounding communities.

Fracking and drilling are taking place in at least thirty states, and there are more shale plays possible. In the oil and gas industry, "shale play" refers to a geographical region in which operators attempt to extract oil and gas from layers of shale beneath the surface of the earth. Hydraulic fracturing, or fracking, is a relatively new technology that allows extraction of these natural resources from shale layers of rock too tight to develop using traditional methods. Horizontal drilling allows operators to extract gas from a greater distance, without putting vertical wells in every step of the way. Hydraulic fracturing induces greater permeability in the layers of shale, allowing the gas to flow more freely.

In certain areas of the United States, residents cannot open a newspaper without seeing an article or editorial either extolling or bemoaning the increase in horizontal drilling. Much of the drilling and fracturing is taking place in urban areas, which has presented new challenges for both residents and well operators. Although drilling and fracking have been taking place for some time, what is new is the degree of public attention drawn by drilling in high-density population areas. In most cases, urban and suburban dwellers bought their properties without any expectation of oil and gas wells being drilled nearby, so they are not particularly accepting of what the oil and gas

industry consider to be the routine effects of exploration and production. There is also a high degree of controversy over the potential environmental impacts. In response to citizen concerns, governmental entities at all levels have enacted a multitude of new laws and ordinances regulating fracking.

The possibility of drilling or hydraulic fracturing at or near private property has introduced a new element into the decision-making process of buyers and sellers. Legal counsel may be needed to properly address the complex issues that are arising, but real estate professionals who advise buyers and sellers should also have a basic understanding of how drilling can impact a property, its price, the concerns the parties may have, and other issues that may be confronted in a prospective transaction.

This White Paper presents a comprehensive discussion of the development of hydraulic fracturing, its many facets, and its ramifications for the real estate market. The following discussion will help the reader become more conversant in the issues that real estate professionals may face when assisting clients in buying or selling property in the various shale play regions.

Sarah K. Walls

The information presented in this White Paper is not intended as, nor should it be construed as, legal advice. Consult an attorney with experience in the relevant practice area for counsel on particular legal questions relating to hydraulic fracturing or any other areas of concern.

I. WHAT IS HYDRAULIC FRACTURING?[1]

[1] Photograph from the United States Department of Energy's website, Office of Fossil Energy, *Producing Natural Gas from Shale*, http://www.doe.gov/articles/producing-natural-gas-shale.

A. The Hydraulic Fracturing Process

The process of hydraulic fracturing, also called "hydrofracking" or just "fracking," has become a popular method for gaining greater access to both oil and natural gas in shale formations across the United States.[2] The US has vast reserves of these energy resources that are now accessible and commercially viable as a result of advances in horizontal drilling and hydraulic fracturing technologies.[3] Many believe that responsible development of America's shale gas resources offers economic, energy security, and environmental benefits,[4] but the process definitely has its detractors as well. That is, it is a *popular* process in terms of its widespread application, but not necessarily in terms of widespread public opinion.

Although "hydraulic fracturing" is sometimes used interchangeably with "horizontal drilling," fracking is not actually a well-drilling process at all.[5] Rather, fracking is the process used *after* the drilled hole is completed. The process creates underground paths that increase the rate at which fluids can be produced from the reservoir formations, in some cases by many hundreds of percent.[6]

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[2] United States Environmental Protection Agency ("US EPA"), *Natural Gas Extraction—Hydraulic Fracturing*, http://www.epa.gov/hydraulicfracturing/.

[3] *Id*., http://www.epa.gov/hydraulicfracturing/.

[4] *Id*., http://www.epa.gov/hydraulicfracturing/.

[5] FracFocus Chemical Disclosure Registry ("FracFocus"), *Hydraulic Fracturing: The Process*, http://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process.

[6] *Id*., http://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process.

The wells used for fracking may extend thousands of feet below the earth's surface, and may include thousands of feet of horizontal sections as well.[7] Fractures are created by pumping large quantities of fluids at high pressure down these wells and into the target rock formations. Hydraulic fracturing fluid consists of water, proppants (sand, ceramic pellets, or other small incompressible particles), and chemical additives that open and enlarge the created fractures. The fractures, which can extend several hundred feet away from the wellbore, are held open by the proppants, allowing the oil and gas to flow up the well.[8]

Once the injection process is complete, the internal pressure of the rock formation causes fluid, called "flowback" or "produced water," to return to the surface through the wellbore.[9] This fluid contains both the injected chemicals and naturally occurring materials such as brines, metals, radionuclides, and hydrocarbons.

The Fracking Process at a Glance[†]

1. Water, sand, and additives are pumped at high pressure down the wellbore.

2. The liquid goes through perforated sections of the wellbore and into the surrounding formation, fracturing the rock and injecting sand or other proppants into the cracks to hold them open.

3. Experts monitor and gauge pressures, fluids, and proppants, studying how the sand reacts when it hits the bottom of the wellbore and slowly increasing the proportion of sand to water as the fracturing progresses.

4. This process may be repeated several times to reach the most areas of the wellbore. The wellbore is temporarily plugged between each stage to maintain the highest water pressure possible and get maximum fracturing results in the rock.

5. The fracturing plugs are drilled or removed from the wellbore and the well is tested for results.

6. The water pressure is reduced and fluids are carried up the wellbore for disposal or treatment and reuse, leaving the sand in place to prop open the cracks and allow gas and oil to flow.

[†] From *Hydraulic Fracturing Facts*, http://www.hydraulicfracturing.com/Process/Pages/information.aspx

[7] US EPA, *The Process of Hydraulic Fracturing*, http://www.epa.gov/hydraulicfracturing/process.html; *see also* Christopher Bateman, *A Colossal Fracking Mess*, Vanity Fair, June 21, 2012, *available at* http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006.

[8] *The Process of Hydraulic Fracturing*, *supra* n. 7, http://www.epa.gov/hydraulicfracturing/process.html.

[9] *Id.*, http://www.epa.gov/hydraulicfracturing/process.html.

The flowback and produced water are typically stored on-site in tanks or pits before treatment, disposal, or recycling. In some cases, flowback and produced water are injected underground for disposal, or they may be treated and reused, or processed by a wastewater treatment facility and then discharged into surface waters.[10] Figure 1 below illustrates the hydraulic fracturing water cycle.

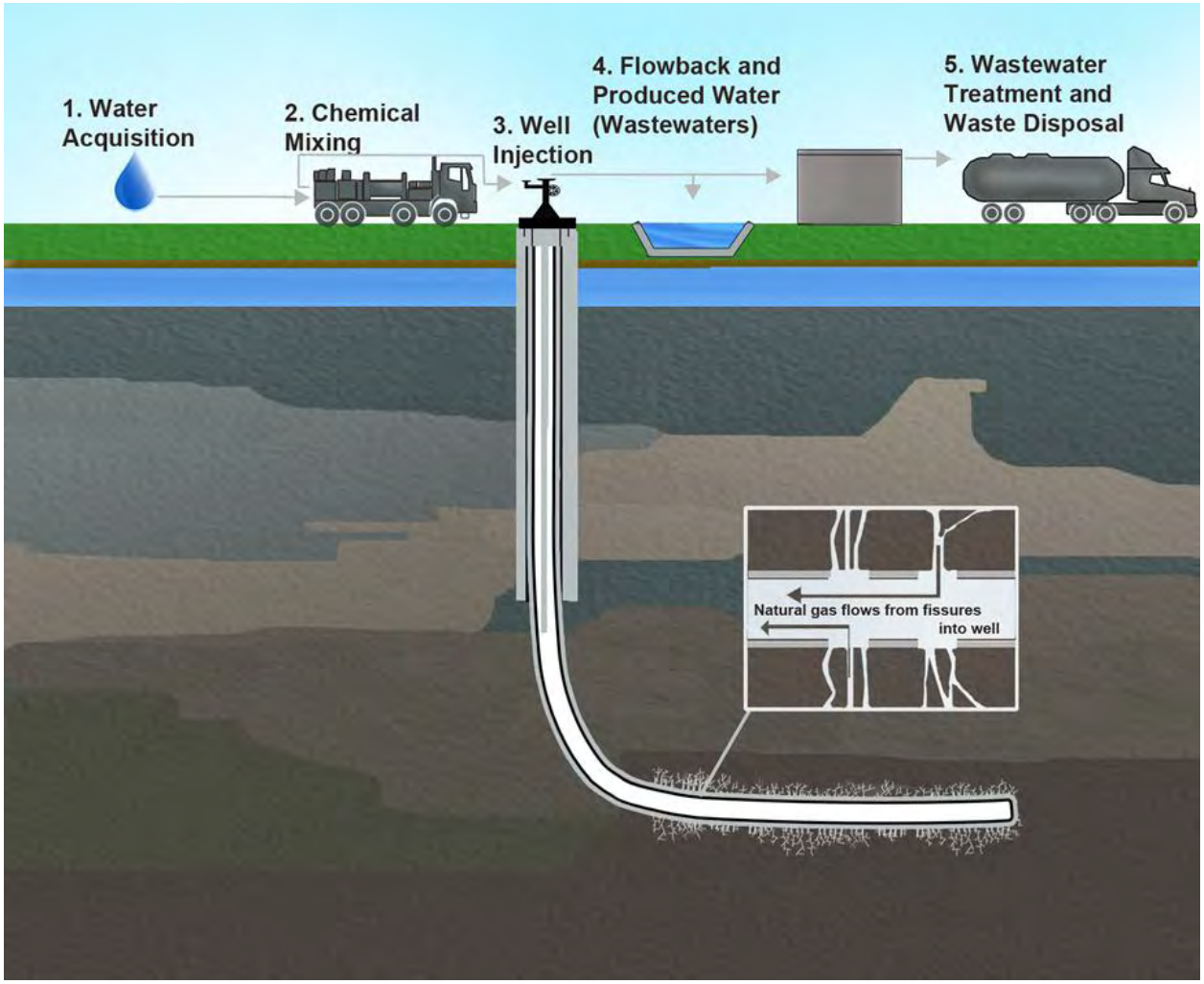

Figure 1. The Hydraulic Fracturing Water Cycle[11]

[10] *Id.*, http://www.epa.gov/hydraulicfracturing/process.html.

[11] Image from the US EPA's website, *The Hydraulic Fracturing Water Cycle*, http://www.epa.gov/hfstudy/hfwatercycle.html.

B. The History of Fracking

Hydraulic fracturing is not actually a new phenomenon, although with all the recent attention fracking has received it may seem that way. The first commercial application of hydraulic fracturing technology to stimulate oil and gas production occurred in as early as 1946 in Kansas, or, by other accounts, in 1949 in Oklahoma.[12] In the ensuing decades, hydraulic fracturing has developed into a routine technology that is commonly used in the completion of gas wells.[13]

Oilfield services provider Halliburton is sometimes credited with the development of hydraulic fracturing technology.[14] Halliburton, which was run by Dick Cheney before he became Vice President of the United States, first implemented the technology in a commercial context in 1949.[15] Since then, hydraulic fracturing has been used in conventional oil and gas wells to increase production when a well starts to run dry.[16] It is fracking's use in unconventional types of drilling, from coal-bed methane to shale gas, that is relatively new, and that has created what some deem the "fracking fracas."[17]

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[12] FracFocus, *A Historic Perspective*, http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing.

[13] *Id*., http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing.

[14] Bateman, *supra* n. 7, *A Colossal Fracking Mess*, http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006.

[15] *Id*., http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006.

[16] *Id*., http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006.

[17] Jacquelyn Pless, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, Fracking Fracas: May 2012, State Legislatures Magazine (National Conference of State Legislatures), http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

C. The Present Pervasiveness of Fracking

Fracking has been used on over 1,000,000 producing wells, and operators now fracture as many as 35,000 wells of all types annually.[18] Some experts project that 60 to 80 percent of all wells drilled in the U.S. in the next decade will require hydraulic fracturing to remain operating.[19] Fracking's popularity hinges in part on its use in extending production for older fields.

Fracking also aids the recovery of oil and natural gas from formations that geologists once believed were incapable of producing those resources, such as tight shale formations, as shown on the map below[20].

Figure 2. Natural Gas Areas Now Accessible as a Result of Hydraulic Fracturing [21]

[18] FracFocus, *supra* n. 12, http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing. "[A]ll types" includes vertical, horizontal, oil and natural gas.
[19] *Id*., http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing.
[20] *Id*., http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing.
[21] FracFocus, *supra* n. 5, *Hydraulic Fracturing: The Process*, http://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process.

Research sponsored by the Office of Fossil Energy projects that by 2035, shale gas production will rise to 13.6 trillion cubic feet, representing nearly half of all US natural gas production.[22]

One look at Figure 3 below demonstrates how shale gas production has increased in recent years in just one shale play in Texas.

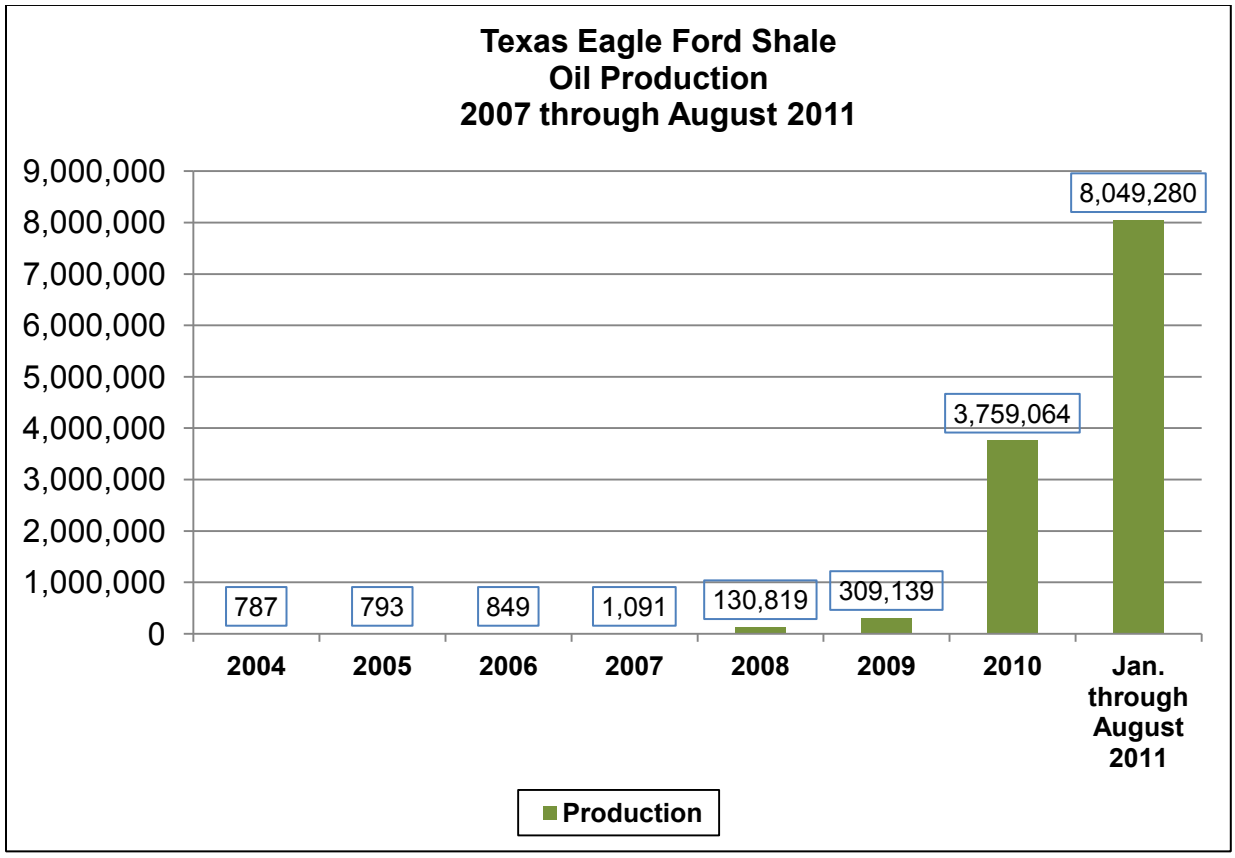

Figure 3. Eagle Ford Shale Production Increases, 2004–2011[23]

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[22] United States Department of Energy ("US DOE"), *Producing Natural Gas from Shale*, http://www.doe.gov/articles/producing-natural-gas-shale.

[23] Source: Railroad Commission of Texas; *see* Jackson Walker, *Energy Water Usage Panel: Shale Play Hydraulic Fracturing: Emerging Water Resource Conflicts* (Presentation) (JDSupra, Nov. 28, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=c6711bb3-5d7b-47de-b0d3-b76439dabb76.

D. Governmental Response to the Proliferation of Fracking

Although hydraulic fracturing has been used for over sixty years in over one million wells, recent public concern about potential impacts on drinking water and other environmental effects has spurred governmental action.[24] In 2010, Congress directed the Environmental Protection Agency to conduct a study of fracking to better understand any potential impacts on drinking water and groundwater.[25] The scope of the research includes the full lifespan of water in hydraulic fracturing, covering the acquisition of the water; the mixing of chemicals; the actual fracturing; and the post-fracturing stage, including the management of flowback and produced water and its ultimate treatment and disposal. A first progress report is planned for late 2012, and a final draft report is scheduled to be released for public comment and peer review in 2014.[26]

The Department of Energy is working closely with the EPA as it conducts the study and is also collaborating with the Department of the Interior to increase understanding of the risks.[27] In addition, in May 2011, US Energy Secretary Steven Chu charged the Secretary of Energy Advisory Board (SEAB) Natural Gas Subcommittee to make recommendations to improve the safety and environmental performance of natural gas hydraulic fracturing from shale formations.[28] Secretary Chu extended the Subcommittee membership beyond SEAB members to include the natural gas industry,

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[24] US DOE, *Hydraulic Fracturing Technology*, http://www.fossil.energy.gov/programs/oilgas/shalegas/hydraulicfracturing.html.

[25] *Id*., http://www.fossil.energy.gov/programs/oilgas/shalegas/hydraulicfracturing.html.

[26] US EPA, *EPA's Study of Hydraulic Fracturing and Its Potential Impact on Drinking Water Resources*, http://www.epa.gov/hfstudy/; *see also* http://www.epa.gov/hfstudy/index.html (same).

[27] US DOE, *supra* n. 24, http://www.fossil.energy.gov/programs/oilgas/shalegas/hydraulicfracturing.html.

[28] *Id*., http://www.fossil.energy.gov/programs/oilgas/shalegas/hydraulicfracturing.html.

states, and environmental experts. President Obama directed Secretary Chu to form the Natural Gas Subcommittee as part of the President's "Blueprint for a Secure Energy Future"—a comprehensive plan to reduce America's oil dependence, save consumers money, and make the United States the leader in clean energy industries.[29]

The Department of Energy's Shale Gas program works in collaboration with other federal and state agencies, industry, academia, nongovernmental organizations, and national labs to advance oil and gas exploration and production technologies in the most effective and environmentally responsible manner.[30] The DOE is also developing tools to help operators meet the environmental and economic challenges of managing produced water, including water minimization, water treatment and disposal, and reuse. The DOE provides comments for rulemaking by other government agencies, including the Department of the Interior and the Forest Service. Collaborative projects with the Ground Water Protection Council, the Interstate Oil and Gas Compact Commission, the Stripper Well Consortium, and the DOE's Rocky Mountain Oilfield Technology Center help ensure that research and development projects are responsive to public concerns.[31]

For more information on federal, state, and local government responses to the fracking boom, see Part IV below.

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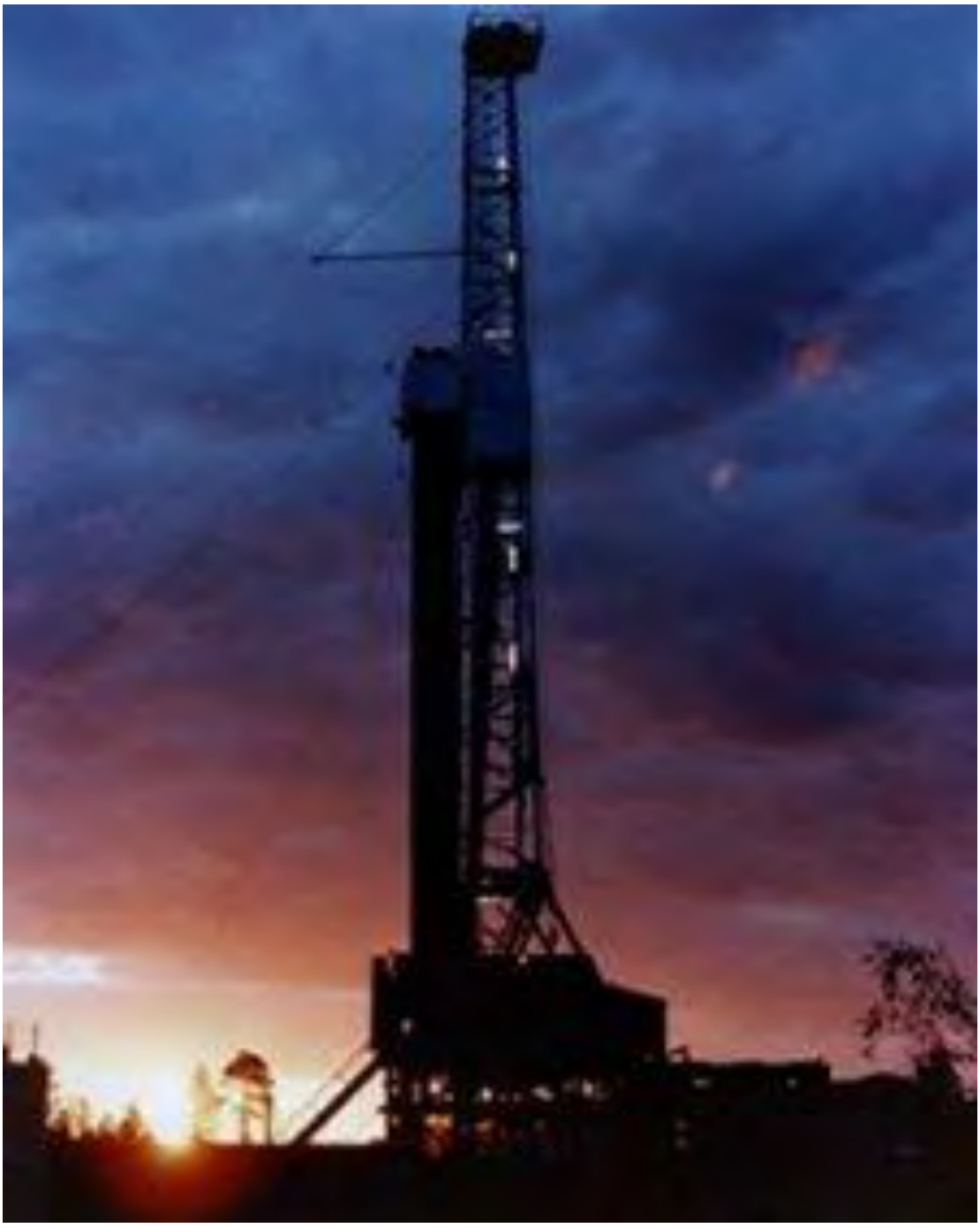
[29] *Id.*, http://www.fossil.energy.gov/programs/oilgas/shalegas/hydraulicfracturing.html.

[30] US DOE, *Shale Gas R&D*, http://www.fossil.energy.gov/programs/oilgas/shalegas/index.html.

[31] *Id.*, http://www.fossil.energy.gov/programs/oilgas/shalegas/index.html.



II. THE RECENT FRACKING FOCUS[32]

[32] Image from the US EPA website, *Hydraulic Fracturing: Drilling for Answers*, http://www.epa.gov/sciencematters/june2010/scinews_fracking.htm.

A. A National Phenomenon

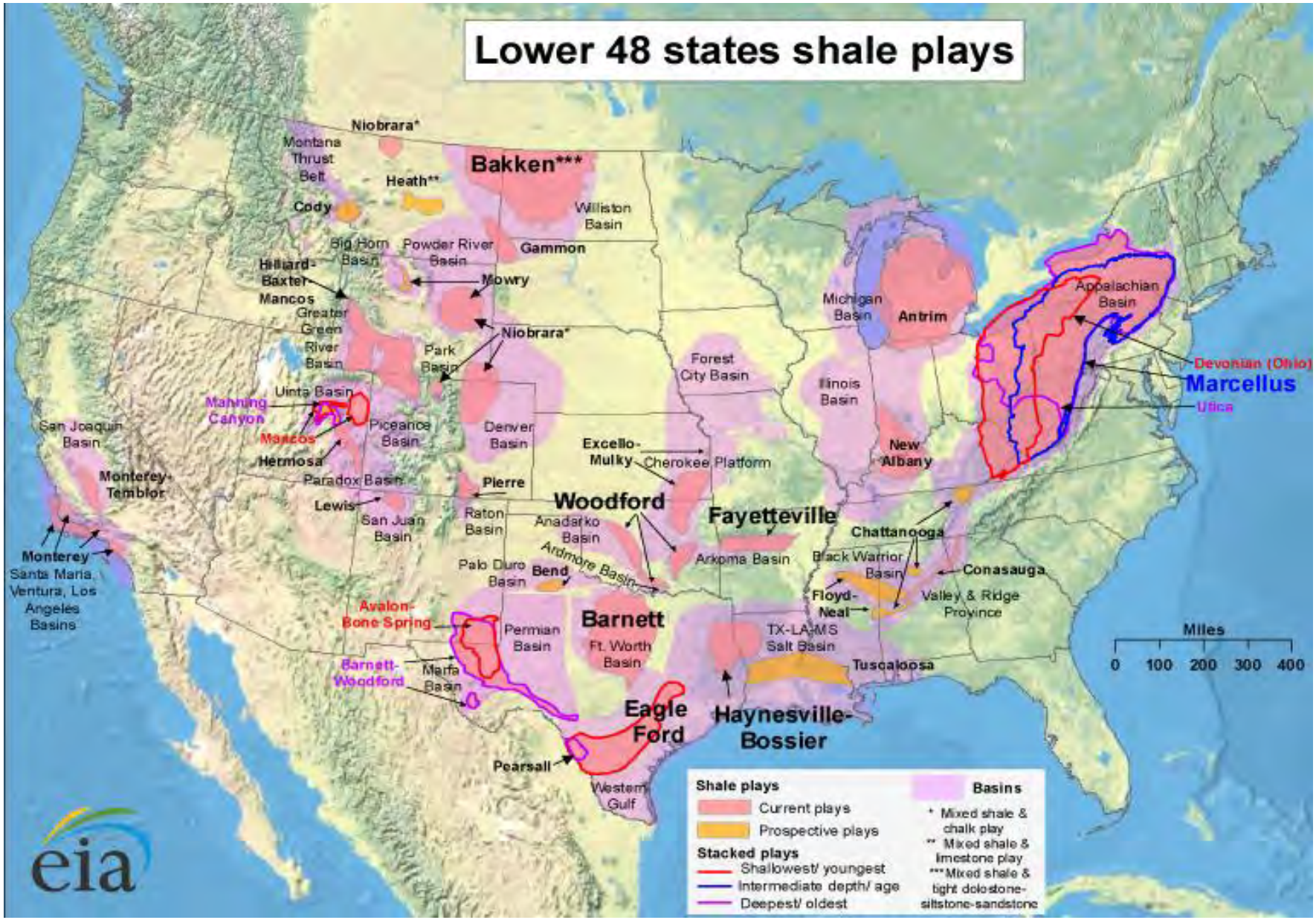
Over the past few years, several technical, economic, and energy policy developments have spurred the increased use of hydraulic fracturing over a broader geographic area, and in more diverse geologic formations.[33] As the map in Figure 4 (next page) shows, hydraulic fracturing now occurs across the entire United States.

Some of the areas receiving the most attention in the midst of the fracking frenzy are the Marcellus Shale in the Eastern United States, the Utica Shale in Ohio, the Barnett Shale in Texas, and the Bakken Shale in North Dakota. Each of these areas is discussed in more detail below. Other areas of note include the Fayetteville Shale, Bossier Shale, Haynesville Shale, Eagle Ford Shale, Niobrara Shale, Collingwood Shale, Susquehanna River Basin, Permian Basin, Anadarko Basin, Raton Basin, the Rockies, and others (see the map in Figure 4[34] on the following page), which face essentially the same problems, and experience many of the same benefits, as those highlighted below.

[33] US EPA, *supra* n. 2, *Natural Gas Extraction—Hydraulic Fracturing*, http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/index.cfm; *see also* Michael Goldman, Guida, Slavich & Flores, P.C., *Drilling into Hydraulic Fracturing and Shale Gas Development: A Texas Environmental Perspective* (JDSupra, Oct. 26, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=2ac95e22-736b-4a29-8dfa-4c3a19bb4162; FracFocus, *Modern Shale Gas Development in the United States: A Primer* (US DOE *et al*. Apr. 2009), http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf.

[34] United States Energy Information Administration ("US EIA"), *Lower 48 States Shale Plays* (updated May 9, 2011), http://www.eia.gov/oil_gas/rpd/shale_gas.pdf; US EIA, *Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays* (July 2011), ftp://ftp.eia.doe.gov/natgas/usshaleplays.pdf at 6.

Figure 4. Shale Plays in the Continental United States



1. Marcellus Shale

The Marcellus Shale extends deep underground from Ohio and West Virginia northeast into Pennsylvania and southern New York.[35] Although the Marcellus Shale is exposed at the surface in some locations, it is as deep as 7,000 feet or more below the earth's surface along the Pennsylvania border, in the Delaware River valley. Geologists estimate that the Marcellus Shale formation may contain up to 489 *trillion* cubic feet of natural gas, although it is not yet known how much of that gas is commercially recoverable. To put this quantity into context, the entire state of New York uses about 1.1 trillion cubic feet of natural gas per year.[36]

Although geologists have long been aware of the natural gas resources in the Marcellus Shale, the depth and tightness of the shale made gas exploration and extraction difficult and expensive. Interest in the Marcellus Shale area has spiked as a result of recent enhancements in gas well development technology—specifically, horizontal drilling and hydraulic fracturing; the proximity of high natural gas demand markets in New York, New Jersey, and New England in general; and the construction of the Millennium Pipeline through the Southern Tier.[37]

As in the rest of the country, questions have arisen about possible environmental and community impacts of hydraulic fracturing in the Marcellus Shale region. Most concerns relate to water use and management, and the composition of the fluids used

[35] New York State Department of Environmental Conservation, *Marcellus Shale*, *The Environmental Review Process for Natural Gas Exploration in the Marcellus Shale*, http://www.dec.ny.gov/energy/46288.html.

[36] *Id.*, http://www.dec.ny.gov/energy/46288.html.

[37] *Id.*, http://www.dec.ny.gov/energy/46288.html.

for fracturing the shale.[38] New York imposed a moratorium on fracking in order to answer some of these questions before hydraulic fracturing begins in that state, but bordering Pennsylvania has already begun tapping into the rich Marcellus Shale resources. Despite the moratorium, New York landowners are already being approached by energy and land management companies about leasing their property.[39]

2. Barnett Shale

In 2008, near the height of the natural gas drilling boom in the Barnett Shale, more than 200 drilling rigs were operating on any given day in North Texas. With the collapse in natural gas prices in 2012, however, that number is down nearly 80 percent from its peak.[40] But in the northwestern reaches of the field, there is currently almost as much drilling activity as there was in 2008. Why? Because there's oil in them thar hills, particularly in Tarrant County.[41] At just over 52,000 barrels a day, the Barnett Shale's production is hardly in a league with the South Texas's Eagle Ford Shale, which just a few years after its discovery is producing nearly 200,000 barrels a day.[42]

Even so, the area has attracted attention, and not just from oil and gas companies. City governments are noting the activity as well. Due to the increase in oil

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[38] *Id.*, http://www.dec.ny.gov/energy/46288.html.

[39] *Id.*, http://www.dec.ny.gov/energy/46288.html. Information about leasing gas well rights is available on the New York Department of Environmental Conservation's website, http://www.dec.ny.gov/energy/42647.html. See generally the Marcellus Shale Law Monitor, http://www.marcellusshalelawmonitor.com/, for more general information about legal developments in the Marcellus Shale.

[40] Jim Fuquay, *Northwest Barnett Shale Is Undergoing Oil Miniboom*, Star-Telegram, June 23, 2012, *available at* http://www.star-telegram.com/2012/06/22/4053259/northwest-barnett-shale-is-undergoing.html.

[41] *Id.*, http://www.star-telegram.com/2012/06/22/4053259/northwest-barnett-shale-is-undergoing.html.

[42] *Id.*, http://www.star-telegram.com/2012/06/22/4053259/northwest-barnett-shale-is-undergoing.html.

and gas operations within or near their borders, several cities in the Barnett Shale area of Texas have passed ordinances regulating such issues as distance requirements, sound levels, water usage, and permitting processes.[43] Setback requirements (the minimum allowable distance between a dwelling and a gas well) and limits on noise levels that may be generated in both daytime and nighttime operations are the most common municipal regulation.[44] These requirements may vary from city to city. For example, the Southlake ordinance provides that a well must be at least 1,000 feet from any habitable structure or from the property line of any occupied public or private school or hospital; the Fort Worth ordinance, by contrast, requires only 600 feet between a well and such structures.[45]

[43] Goldman, *supra* n.33, *Drilling into Hydraulic Fracturing*, http://www.jdsupra.com/post/documentViewer.aspx?fid=2ac95e22-736b-4a29-8dfa-4c3a19bb4162 (citing Barnett Shale Energy Education Council, http://www.bseec.org/stories/legislation; Southlake, Texas, Gas Well Ordinance Article IV, Gas and Oil Well Drilling and Production; Richard Hills, Texas, Gas Well Ordinance No. 996-04, Sept.14, 2004; Haltom City Ordinance No. 0-2004-026-15, Nov. 22, 2004; Fort Worth, Texas Ordinance No. 18449-02-2009, Feb.10, 2009).

[44] *Id.* & nn. 194, 195 therein.

[45] *Id.* & n. 196 therein (comparing Southlake, Texas, Gas Well Ordinance Article IV, Section 2 with Fort Worth Ordinance Section M).

Who Ya Gonna Call?

Historically, most exploration and production of oil and gas took place in undeveloped rural areas. If you owned a 3,000-acre ranch and could earn millions of dollars over time by leasing the mineral rights to an oil and gas production company, the installation of a drill rig was a good deal, not a big deal. You might not even see or hear the drilling activities, because 3,000 acres allowed the producer to drill the wells at a great distance from your house. If your family's income was dependent upon the oil and gas "bidness," the smell of oil was the smell of money.

Fast-forward to 2009. Some of the most productive parts of the Barnett Shale, the first big gas play in some years, lay right under the City of Fort Worth, Texas, and its many residential areas. Not everyone in the city was born in Texas or familiar with drilling, and not everyone's Daddy became rich by leasing out his mineral rights. So, when residents from a suburban upbringing, or from other parts of the country, began to see drilling rigs going up near their neighborhoods, were kept awake by sounds, vibrations, and lights, or encountered huge trucks on formerly peaceful neighborhood streets, they began to ask questions.

In some cases, it was difficult to get answers, or even figure out whom to ask. Traditionally, the oil and gas industry had enjoyed a number of exemptions and exclusions under the environmental laws. Access to the drill sites was restricted for safety reasons, so even if the field workers had answers, you couldn't get to them very easily. In some states, it was difficult to discern which regulatory agency had jurisdiction over what issues. In Texas, for instance, many oil and gas issues are within the jurisdiction of the obscurely named Texas Railroad Commission, something not obvious to most people. (In Oklahoma, the primary oil and gas agency is the Oklahoma Commerce Commission. Go figure.) However, if you called the Texas Railroad Commission prior to March 2010 to complain about, say, a curious smell, you would probably be told that odors from oil and gas operations were not within that agency's jurisdiction, and perhaps referred to the Texas Commission on Environmental Quality.* Regulation of odors and certain other oil and gas environmental issues are within the authority of the TCEQ, but if you called the TCEQ about a spill of drilling fluids, you might be told to call the Railroad Commission instead. Many people grew frustrated with the difficulty of obtaining reliable advice and the seemingly limited ability of any of their state agencies to regulate all of the perceived effects of the drilling activities.

Urban drilling has caused an increased focus on the ambient effects of oil and gas exploration and a desire by many for more regulation. Increasingly, citizens have turned to their city councils for help, resulting in the proliferation of municipal ordinances.

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*In March, 2010, the Railroad Commission issued a notice stating, *inter alia*, that a leaking wellhead may create an undesirable air emission and thereby violate an RRC rule that requires the operator to effectively control the well at all times.

3. Bakken Shale/Williston Basin

The Bakken system covers parts of North Dakota and Montana, in addition to parts of Saskatchewan and Manitoba, Canada.[46] In 2008, the United States Geological Survey estimated that the US portion of the Bakken Shale formation contains between 3 and 4.3 billion barrels of recoverable oil, ranking it among the largest US oil plays.[47] Leasing activity in the Bakken has exploded over the last five years, and per-acre bonus payments to landowners have skyrocketed. Total lease bonus payments exceeded $100 million in 2009.[48]

The reason oil production has exploded in the Bakken is, of course, hydraulic fracturing.[49] Production went from 3,000 barrels a day in 2005 to 225,000 per day in 2010, according to the Energy Information Administration.[50] The EIA believes the Bakken Shale will produce 350,000 barrels a day by 2035, but most analysts think even that estimate is far too low.[51] According to Harold Hamm, president of the energy company Continental Resources, the Bakken system could produce as much as a million barrels per day by 2020.[52]

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[46] US DOE, *Bakken—The Biggest Oil Resource in the United States?*, NETL E&P Focus, Winter 2011, http://www.netl.doe.gov/technologies/oil-gas/publications/newsletters/epfocus/EPNews2011Winter.pdf.

[47] *Id.*, http://www.netl.doe.gov/technologies/oil-gas/publications/newsletters/epfocus/EPNews2011Winter.pdf.

[48] *Id.*, http://www.netl.doe.gov/technologies/oil-gas/publications/newsletters/epfocus/EPNews2011Winter.pdf.

[49] Steve Hargreaves, *Billions of Barrels of Untapped U.S. Oil*, CNN Money, Mar. 9, 2011, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

[50] *Id.*, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

[51] *Id.*, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

[52] *Id.*, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

This explosion in production created a job explosion as well. North Dakota State University estimates the oil workforce went from just over 5,000 in 2005 to over 18,000 in 2009.[53] Hamm said the industry currently employs 30,000 in the state, and if production in the Bakken does hit a million barrels a day, the industry could employ over 100,000 people there.[54]

4. Utica Shale

The Marcellus Shale captured public attention when leasing and drilling activities began pumping billions of dollars into local economies and citizens began debating the environmental, social, and economic impacts of hydraulic fracturing. But what happened in the Marcellus Shale is what some view as just the first step in a sequence of natural gas plays. The second step, they say, is starting in the Utica Shale.[55]

The Utica Shale is a rock unit located a few thousand feet below the Marcellus Shale. In the United States, it underlies portions of Kentucky, Maryland, New York, Ohio, Pennsylvania, Tennessee, West Virginia, and Virginia. It also extends beneath parts of Lake Ontario, Lake Erie, and Ontario, Canada. If the Utica Shale is commercially viable throughout this entire extent, it will be geographically larger than any natural gas field known today.[56] The Utica Shale has already proven its ability to

[53] *Id.*, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

[54] *Id.*, http://money.cnn.com/2011/03/04/news/economy/oil_shale_bakken/index.htm.

[55] Hobart King, *Utica Shale—The Natural Gas Giant Below the Marcellus?*, http://geology.com/articles/utica-shale/.

[56] *Id.*, http://geology.com/articles/utica-shale/.

support commercial production, and the results of early testing indicate that the Utica Shale will prove to be a very significant resource.[57]

In early 2011, most of the mineral rights leasing and drilling activity in the Utica Shale was in eastern Ohio and Ontario, Canada, where the Utica Shale is less than 4,000 feet below the surface and the Marcellus Shale is not present.[58] The significant depth of some parts of the Utica Shale presents a challenge for its further development. The Marcellus Shale is less expensive to develop, and operators will likely focus on exploiting that resource before setting their sights on a deeper target with an uncertain payoff.[59]

B. Fracking in the Spotlight

With this expanding implementation of fracking has come increased public concern about potential impacts on water resources, public health, and the environment.[60] Public interest and environmental watchdog groups monitoring the effects of shale gas production abound, and "no fracking" campaigns have taken on significant steam (e.g., americanrivers.org, earthjustice.org, stopthefrackattack.org). State and local governments have joined in on the fracking action as well. More than 200 municipalities,[61] as well as the state of Vermont,[62] recently passed measures

[57] *Id.*, http://geology.com/articles/utica-shale/.

[58] *Id.*, http://geology.com/articles/utica-shale/.

[59] *Id.*, http://geology.com/articles/utica-shale/.

[60] US DOE/EIA, *Annual Energy Outlook 2009 with Projections to 2030*, Mar. 2009, http://www.eia.gov/oiaf/archive/aeo09/pdf/0383(2009).pdf.

[61] Food & Water Watch, *Mapping the Movement*, http://www.foodandwaterwatch.org/water/fracking/fracking-action-center/map/.

"*Greedy oil and gas companies of this country have decided that they can squeeze every last little ounce of oil and gas out of previously pumped wells by injecting the substrata of our planet with highly toxic carcinogenic chemicals . . . they're poisoning our drinking water . . . ladies and gentlemen, we're screwed.*"

~Late Show host David Letterman

banning fracking within their borders. In New Jersey, Governor Christie signed a one-year moratorium on hydraulic fracturing.[63] New York enacted a moratorium as well, but some say Governor Cuomo looked poised in the summer of 2012 to selectively lift it in order to allow drilling in the state's gas-rich southern tier.[64] If he does, his action could face heavy criticism and spur political mobilization.[65]

Hydraulic fracturing issues have become so prominent in New York, which is part of the Marcellus Shale region, that Late Show host David Letterman recently engaged in an on-the-air rant against the practice.[66] Jimmy Fallon, too, recently

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[62] *Vermont Fracking Ban: Green Mountain State is First in U.S. to Restrict Gas Drilling Technique*, The Huffington Post, May 15, 2012, http://www.huffingtonpost.com/2012/05/17/vermont-fracking-ban-first_n_1522098.html; *Vermont First State to Ban Fracking*, CNN U.S., May 17, 2012, http://articles.cnn.com/2012-05-17/us/us_vermont-fracking_1_fracking-shale-natural-gas?_s=PM:US.

[63] Anna Driver & Jim Marshall, *New Jersey Issues One-Year Moratorium on Fracking*, Reuters, Aug. 25, 2011, http://www.reuters.com/article/2011/08/25/us-shale-newjersey-idUSTRE77O6VN20110825.

[64] Ben Wolfgang, *New York Is Set to Join Fracking-Friendly States, Within Limits*, The Washington Times, June 13, 2012, http://www.washingtontimes.com/news/2012/jun/13/ny-set-to-join-fracking-friendly-states-with-limit/?page=all.

[65] Jeff Goodell, *New Anti-fracking Film by Gasland's Josh Fox Targets Cuomo: 'Governor, What Color Will the Sky Be Over New York?,'* Rolling Stone, June 20, 2012, http://www.rollingstone.com/politics/blogs/national-affairs/new-anti-fracking-film-by-gaslands-josh-fox-targets-cuomo-governor-what-color-will-the-sky-be-over-new-york-20120620.

[66] *David Letterman on Fracking: 'We're Screwed'* (Video), The Huffington Post, July 20, 2012, http://www.huffingtonpost.com/2012/07/20/david-letterman-fracking-screwed_n_1687028.html.

criticized fracking on his late-night show.[67] The fact that the likes of Letterman and Fallon would take on the powerhouse fossil fuel industry suggests that they may have the support of an equally powerful grassroots movement.[68]

C. Natural Gas as an Alternative Energy Source

Despite the controversy, the implementation of hydraulic fracturing shows little indication of decline. Part of the reason for its widespread application is the access fracking provides to otherwise unattainable natural gas. Natural gas from shale formations has the potential to significantly increase America's energy supply, and some say it could reduce greenhouse gas emissions and lower prices for consumers as well (though this statement is disputed).[69] Although shale gas has been produced in the United States for decades, it was not viewed as a significant resource until, in just the last decade, new horizontal drilling and hydraulic fracturing technologies facilitated economic production.

Shale gas currently contributes about 16 percent of the natural gas produced in the United States, but that amount is expected to increase significantly as this resource is further developed.[70] On the plus side, natural gas can replace high-emissions fuels like oil and coal, and facilitate variable renewable energy sources such as wind and

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[67] *Yoko Ono, Jimmy Fallon and Sean Lennon Sing 'Don't Frack My Mother,'* The Huffington Post, July 17, 2012 (updated July 18, 2012), http://www.huffingtonpost.com/2012/07/17/yoko-ono-jimmy-fallon-sean-lennon-frack-mother_n_1680464.html.

[68] For more information, see FracFocus, *supra* n. 33, *Modern Shale Gas Development in the United States: A Primer*, http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf.

[69] U.S. DOE, *supra* n. 30, *Shale Gas R&D*, http://www.fossil.energy.gov/programs/oilgas/shalegas/index.html.

[70] *Id.*, http://www.fossil.energy.gov/programs/oilgas/shalegas/index.html.

solar. But even proponents of the practice argue that concerns about the safety, risks, and environmental impacts associated with shale gas development should be addressed before production significantly increases.

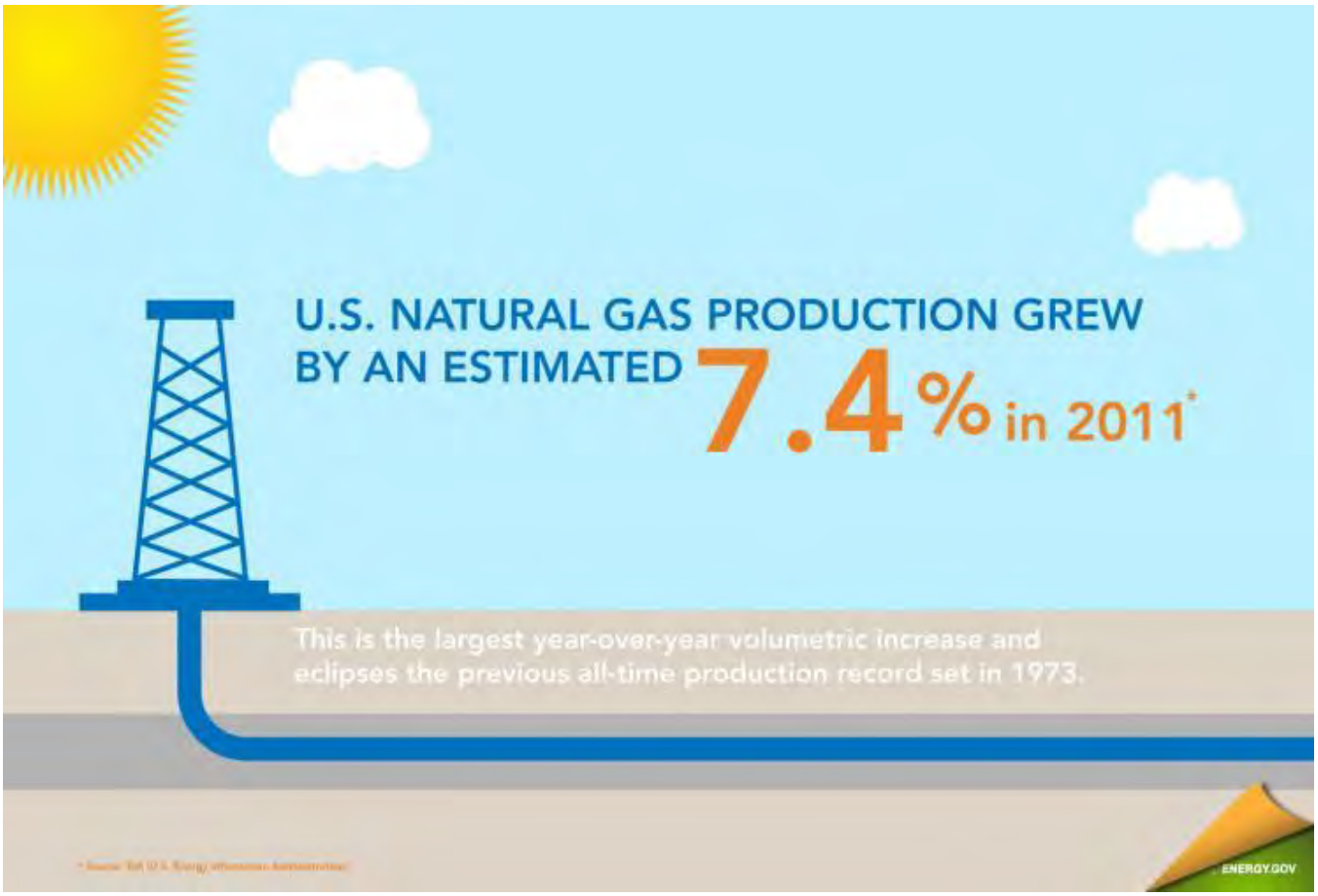

Figure 5. Impact of Hydraulic Fracturing on Natural Gas Production[71]

Whatever one's take on the fracking process, many, including the US Environmental Protection Agency itself, opine that natural gas will play a key role in our nation's clean energy future, and hydraulic fracturing is one very viable way of accessing that resource.[72]

[71] US DOE, *Increasing Energy Security*, Jan. 20, 2012, http://energy.gov/articles/increasing-energy-security.

[72] Goldman, *supra* n. 33, *Drilling into Hydraulic Fracturing and Shale Gas Development*,

D. Environmental Impacts of Hydraulic Fracturing

Public interest and environmental watchdog groups, as well as many individual commentators, have decried the environmental and public health effects of unregulated fracking. Environmental concerns relate to:

- Impacts on air quality;
- Possible soil contamination;
- Potential contamination of groundwater, surface water, and drinking water;
- Wastewater treatment;
- Impacts on aquatic habitats, wildlife, and plants;
- Well blowouts;
- Earthquakes;
- Industry greenhouse gas effects; and
- Long-term impacts.

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http://www.jdsupra.com/post/documentViewer.aspx?fid=2ac95e22-736b-4a29-8dfa-4c3a19bb4162 (citing US EPA, *Natural Gas Extraction—Hydraulic Fracturing*, http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/index.cfm).

According to the Natural Resources Defense Council (NRDC), for instance, fracking is suspected of polluting the drinking water in Arkansas, Colorado, Pennsylvania, Texas, Virginia, West Virginia, and Wyoming.[73] Residents in those states have reported changes in water quality or quantity following the advent of nearby fracturing operations.[74]

> *"Natural gas producers have been running roughshod over communities across the country with their extraction and production activities for too long, resulting in contaminated water supplies, dangerous air pollution, destroyed streams, and devastated landscapes. Weak safeguards and inadequate oversight fail to protect our communities from harm by the rapid expansion of fossil fuel production using hydraulic fracturing or 'fracking.'"*
>
> ~Natural Resources Defense Council

The NRDC does not oppose hydraulic fracturing, per se, but supports strong safeguards for production of all energy sources, including fracking for natural gas. Even the NRDC acknowledges that, since natural gas burns more cleanly than other fossil fuels, it has the potential to actually benefit the public health when used in place of "dirtier" fuels like coal.[75] Some of the NRDC's proposed safeguards are:

- Prohibiting fracking in the most sensitive lands, including critical watersheds;
- Setting clean air standards that ensure methane leaks from wells are less than one percent of production, in order to reduce global-warming pollution, and requiring other techniques to reduce air pollution;

[73] Natural Resources Defense Council, *Risky Gas Drilling Threatens Health, Water Supplies*, http://www.nrdc.org/energy/gasdrilling/?gclid=CLKFoLmh0bECFdIBQAodFnkA3w.

[74] *Id.*, http://www.nrdc.org/energy/gasdrilling/?gclid=CLKFoLmh0bECFdIBQAodFnkA3w.

[75] *Id.*, http://www.nrdc.org/energy/gasdrilling/?gclid=CLKFoLmh0bECFdIBQAodFnkA3w.

- Mandating well drilling and construction standards by implementing strong well siting, casing, cementing, and other drilling best practices;

- Protecting the landscape, air, and water from pollution by closing Clean Air, Clean Water, and Safe Drinking Water Act loopholes, reducing toxic waste, and holding toxic oil and gas waste to the same standards as other types of hazardous waste;

- Funding robust inspection and enforcement programs;

- Fully disclosing all chemicals used in the fracking process; and

- Allowing communities to protect themselves by restricting fracking through comprehensive zoning and planning practices.[76]

The EPA, currently engaged in the ongoing study of fracking's environmental impacts, released a draft report in December 2011 suggesting that the ground water in the Pavillion, Wyoming aquifer contains "compounds likely associated with gas production practices, including hydraulic fracturing."[77] The EPA discovered traces of methane and foaming agents in several water wells near a gas rig in that town. Samples of water taken from the EPA's deep monitoring wells in the aquifer contained synthetic chemicals used in gas production and hydraulic fracturing fluid, as well as high methane levels. The EPA report expressed concerns about the movement of contaminants within the aquifer and the future safety of drinking water, particularly in view of the area's complex geology.[78] In response to the EPA report, the US Department of Health and Human Services' Agency for Toxic Substances and Disease Registry (ATXDR)

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[76] *Id.*, http://www.nrdc.org/energy/gasdrilling/?gclid=CLKFoLmh0bECFdIBQAodFnkA3w; *see also* Earthworks, *Hydraulic Fracturing 101*, http://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101.

[77] US EPA, *Groundwater Investigation, Pavillion*, http://www.epa.gov/region8/superfund/wy/pavillion/.

[78] *Id.*, http://www.epa.gov/region8/superfund/wy/pavillion/.

recommended that owners of tainted wells use alternate sources of water for drinking and cooking, and ventilation when showering.[79]

The "infotainment" industry has also trumpeted its concerns about fracking. In 2010, the film *Gasland* premiered at the Sundance Film Festival.[80] Filmmaker Josh Fox claims in the film that chemicals including toxins, known carcinogens, and heavy metals have polluted the groundwater near well sites in Pennsylvania, Wyoming, and Colorado.[81] Perhaps not surprisingly, the film was criticized by the oil and gas industry group Energy in Depth as factually inaccurate.[82] In response, Energy in Depth presented its own movie version of the hydraulic fracturing story, *Truthland*.[83]

Air and water quality may be the primary environmental concerns, but they are definitely not the only ones. According to seismologists at Columbia University, several earthquakes that hit Youngstown, Ohio in 2011 are linked to a disposal well for injecting wastewater used in the hydraulic fracturing process.[84] And, although some say natural gas is the key to our clean-energy future, scientists at New York's Cornell University

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[79] *See, e.g.*, Centers for Disease Control, *ATSDR Investigates the Groundwater of Pavillion, WY*, http://www.atsdr.cdc.gov/stories/pavillion.html. Note that the Wyoming study was performed in an area of very shallow groundwater, i.e., the aquifer is closer to the surface than in other shale plays, so the significance of its findings may be limited to the location tested.

[80] *See Gasland, A Film by Josh Fox*, http://www.gaslandthemovie.com/. *Gasland* may be viewed at public screenings throughout the country, on HBO, or on DVD. See http://www.gaslandthemovie.com/about-the-film and http://www.pbs.org/now/shows/613/index.html for more information about *Gasland*.

[81] *Gasland*, *supra* n. 80, http://www.gaslandthemovie.com/.

[82] Energy In Depth, *Debunking GasLand*, June 8, 2010, http://www.energyindepth.org/debunking-gasland/.

[83] *Truthland, Dispatches from the Real Gasland*, http://www.truthlandmovie.com/. The *Truthland* movie is available for viewing at no charge on the Internet, as well as at public screenings and on DVD.

[84] Columbia University Earth Institute, *Ohio Quakes Probably Triggered by Waste Disposal Well, Say Seismologists*, Jan. 6, 2012, http://www.ldeo.columbia.edu/news-events/seismologists-link-ohio-earthquakes-waste-disposal-wells.

believe that current shale gas extraction techniques may actually result in a greater carbon footprint than oil, coal, and conventional gas over at least a twenty-year period.[85] It is clear that the jury is still out on the environmental impacts of hydraulic fracturing, but given the number of questions that still exist, fracking is certainly a matter deserving of the attention it is getting.

E. Public Health Concerns

The potential health effects of hydraulic fracturing have also raised concerns. Human exposure to fracking chemicals can occur in a variety of ways, including from improper well venting, by ingesting chemicals that have spilled and entered drinking water sources, through direct skin contact with the chemicals or wastes (e.g., by workers, spill responders, or health care professionals), or by breathing in vapors from generators or flowback stored in pits or tanks.[86]

Many studies of fracking's health impacts have been conducted, but the results have proven to be inconsistent. One such study, Natural Gas Operations from a Public Health Perspective*,* summarized health-effect information for 353 chemicals used to drill and fracture natural gas wells in the United States.[87] The chart below illustrates the possible health effects identified by the results of that study.

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[85] Dayna Linley, *Fracking Under Pressure*, Sustain Analytics, Aug. 2011, http://sustainalytics.com/sites/default/files/unconventional-fossil-fuel-shalegas_final.pdf & n.10.

[86] Earthworks, *Hydraulic Fracturing 101*, http://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101.

[87] Theo Colborn, Carol Kwiatkowski, Kim Schultz, & Mary Bachran, *Natural Gas Operations from a Public Health Perspective* (The Endocrine Disruption Exchange 2010), selected for publication in *International Journal of Human and Ecological Risk Assessment* (2011), *available at* http://www.endocrinedisruption.com/files/Oct2011HERA10-48forweb3-3-11.pdf.

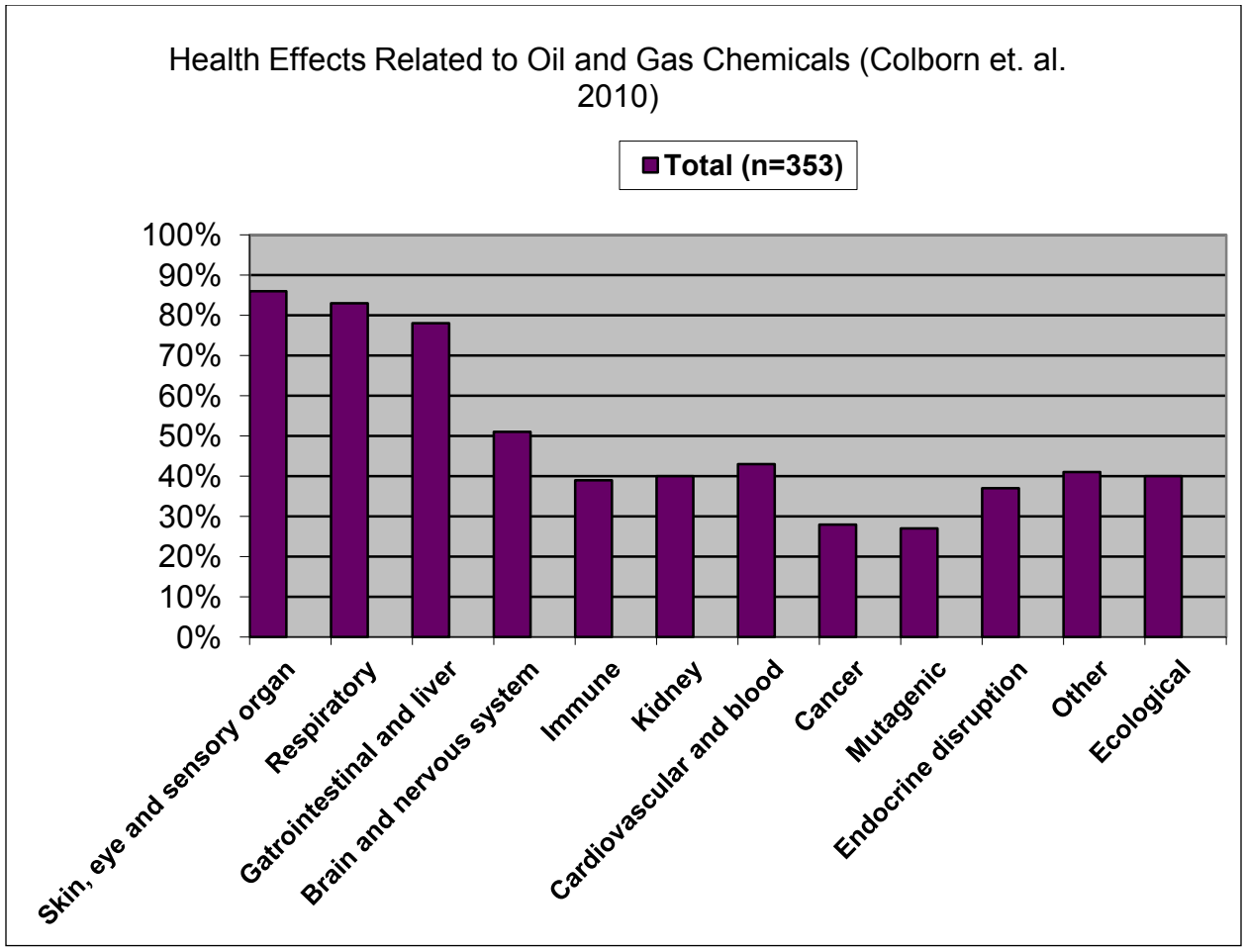

Figure 6. Potential Health Impacts of Hydraulic Fracturing[88]

An EPA study conducted in 2004, by contrast, concluded that hydraulic fracturing in coal-bed methane wells poses little to no threat to underground drinking water.[89] Compare that finding with Cornell's College of Veterinary Medicine report indicating that fracking is harming not only humans, but also cows, horses, goats, llamas, chickens,

[88] *Id.*, http://www.endocrinedisruption.com/files/Oct2011HERA10-48forweb3-3-11.pdf.

[89] Jackson Walker L.L.P, *Energy Water Usage Panel: Shale Play Hydraulic Fracturing: Emerging Water Resource Conflicts* (Presentation), Nov. 28, 2011, *available at* http://www.jdsupra.com/post/documentViewer.aspx?fid=c6711bb3-5d7b-47de-b0d3-b76439dabb76 (citing *EPA Frac Study Plan and Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (IPA 816-R-04-003)).

dogs, cats, fish, and other wildlife.[90] The Cornell report included case studies of hundreds of cows dying after exposure to hydraulic fracturing chemicals that resulted from dumping the fluid into streams, and from workers slitting the lining of evaporation ponds so that they would drain and be able to accept more waste.[91]

A 2011 study for the city of Fort Worth, Texas examined air quality around natural gas sites and reportedly did not reveal any significant health threats.[92] However, Texas residents living near shale gas drilling sites have complained of headaches, diarrhea, nosebleeds, dizziness, blackouts, muscle spasms, and other health problems.[93] Critics of the Fort Worth study, which was performed by Eastern Research Group, pointed

"There are no demonstrated cases of negative health impacts associated with natural gas development in the United States," Brad Gill, executive director of the Independent Oil and Gas Association of New York, told the Associated Press. "In fact, a $1 million study, completed last August in Fort Worth, Texas, concluded natural gas development in the Barnett Shale did not lead to adverse health effects."[†]

[†] *http://www.thirteen.org/metrofocus/2012/04/conflicting-links-between-fracking-and-health/*

[90] Krishna Ramanujan, *Study Suggests Hydrofracking is Killing Farm Animals, Pets*, Cornell University Chronicle Online, Mar. 7, 2012, http://www.news.cornell.edu/stories/March12/FrackingAnimals.html.

[91] *Id.*, http://www.news.cornell.edu/stories/March12/FrackingAnimals.html.

[92] *City of Fort Worth Natural Gas Air Quality Study*, http://fortworthtexas.gov/uploadedFiles/Gas_Wells/AirQualityStudy_final.pdf; *Environmental Impact of Hydraulic Fracturing in the United States*, http://en.wikipedia.org/wiki/Environmental_impact_of_hydraulic_fracturing_in_the_United_States & n. 44.

[93] Charles W. Schmidt, *Blind Rush? Shale Gas Boom Proceeds Amid Human Health Questions*, Environmental Health Perspectives, Aug. 1, 2011, http://ehp03.niehs.nih.gov/article/info%3Adoi%2F10.1289%2Fehp.119-a348.

out that the study looked only at air quality and not water, and they recommended greater continued environmental review.[94]

A 2012 study conducted by the Colorado School of Public Health supports a connection between hydraulic fracturing and health complaints, concluding that air pollution caused by fracking may contribute to health problems for those living near drilling sites.[95] The Colorado study, which took three years to complete and looked at the prevalence of toxins in the air, found that people who lived within half a mile of fracking sites face higher risks of cancer than the rest of the state's population. Fracking advocates and local residents have continued to disagree over the meaning of the study's findings.[96]

A battle over the impact of fracking on water recently unfolded in Dimock, Pennsylvania.[97] Controversy erupted in that town in 2009 when ProPublica reported that three drinking wells actually exploded in the area where Cabot Oil and Gas was conducting fracking operations; nine other wells were found to be contaminated with methane.[98] In January 2012, the EPA took over a state investigation in the town[99] and

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[94] John Farley, *Conflicting Links Between Fracking and Health*, MetroFocus, Apr. 11, 2012, http://www.thirteen.org/metrofocus/2012/04/conflicting-links-between-fracking-and-health/.

[95] *Study Shows Air Emissions Near Fracking Sites May Pose Health Risk* (Colorado School of Public Health, Mar. 19, 2012), http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx.

[96] Farley, *supra* n. 94, http://www.thirteen.org/metrofocus/2012/04/conflicting-links-between-fracking-and-health/.

[97] Farley, *supra* n. 94, http://www.thirteen.org/metrofocus/2012/04/conflicting-links-between-fracking-and-health/.

[98] Abrahm Lustgarten, *Officials in Three States Pin Water Woes on Gas Drilling* (ProPublica, Apr. 26. 2009, updated June 9, 2009), http://www.propublica.org/article/officials-in-three-states-pin-water-woes-on-gas-drilling-426.

began testing water in sixty Dimock homes. After the results from eleven wells returned from the EPA's lab, the federal agency announced that the water was safe to drink. But the EPA took flack from several Dimock residents, who were given the EPA's raw data indicating that most of the well water contained high levels of methane gas and other contaminants that the Centers for Disease Control describe as carcinogenic.[100]

The environmental and health impacts of hydraulic fracturing are inexorably intertwined, and at a minimum require close scrutiny.

[99] US EPA Memorandum, Jan. 19, 2012, http://www.epaosc.org/sites/7555/files/Dimock%20Action%20Memo%2001-19-12.PDF.

[100] Farley, *supra* n. 94, http://www.thirteen.org/metrofocus/2012/04/conflicting-links-between-fracking-and-health/.

III. THE IMPACT OF FRACKING ON LOCAL COMMUNITIES

A. The Good, the Bad, and the Ugly

In addition to the environmental and health impacts, the dramatic increase in hydraulic fracturing activities has also had various notable effects on local communities near the fracking hubs. While some communities are "clamoring" for the attention of oil and gas companies,[101] others are saying "not in my backyard."[102]

Some of the local impacts of fracking are viewed positively, but others—well, not so much. On the positive side, large-scale fracking operations bring with them the need to fill many new jobs. Because not all of the fracking positions can be filled by local residents, some communities experience a dramatic influx of workers—workers who need places to stay, eat, purchase necessary goods, and otherwise sustain their existence, thereby pumping much-needed cash into struggling local economies.

On the flip side, this increase in population can strain the existing housing supply. Wastewater treatment plants may lack the capacity to handle the increase in the volume of sewage. Local infrastructures, too, are put to the test by an unanticipated increase in traffic. The truck traffic from the fracking operations can itself strain local roadways, not to mention the increased traffic generated by the spike in local population. Some communities find themselves expending significant tax dollars to improve their highway systems. Sometimes the funds come from the oil and gas industry itself, through severance taxes and impact fees that provide a significant source of public revenue. But it is not inconceivable that the oil and gas operators could be long gone before all the

[101] Telephone Interview with Mike Kelly, NYSAR Director of Government Affairs (July 18, 2016).

[102] *E.g.*, Sam Akhtar, *Gas Pipeline Here? No Fracking Way—Not in My Backyard!*, Canarsie Courier, Aug. 2, 2012, http://www.canarsiecourier.com/news/2012-08-02/Other_News/Gas_Pipeline_Here_No_Fracking_Way__Not_In_My_Backy.html.

costs are paid in full. After all, even with hydraulic fracturing techniques, wells eventually run dry.

The following discussion takes a look at the impacts of hydraulic fracturing on local communities and the resulting reverberations that may be felt throughout the real estate industry.

B. Fracking as a Public Revenue Generator

The fracking debate has evolved into a political and social balancing act. Legislators and regulators are faced with the need to protect the environment and public health, while recognizing the benefits that can arise from revenues the fracking industry brings to state and local economies.[103] A study by IHS Global Insight estimates that in 2010 alone, shale natural gas production generated $18.6 billion in federal, state, and local government taxes and federal royalty revenues.[104] Many struggling communities, and individual taxpayers as well, stand to benefit from this financial shot in the arm.

"Development of natural gas from shale resources is responsible for:

- *Supporting 600,000 jobs in 2010, which could increase to more than 1.6 million jobs by 2035;*
- *Contributing more than $76 billion to U.S. GDP in 2010, which could triple to $231 billion in 2035; and*
- *Contributing $18.6 billion in federal, state and local government tax and federal royalty revenues, which could more than triple to $57 billion by 2035—generating more than $933 billion in federal, state, and local tax and royalty revenues over the next 25 years on a cumulative basis."*

http://www.energyanswered.org/questions/where-is-hydraulic-fracturing-occurring-and-how-has-that-impacted-local-com; http://www.energyindepth.org/wp-content/uploads/2011/12/Shale-Gas-Economic-Impact-Dec-2011_EMB1.pdf

[103] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[104] *Id.*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; IHS, *The Economic and Employment Contributions of Shale Gas in the US*, http://www.ihs.com/info/ecc/a/shale-gas-jobs-report.aspx.

As discussed in Part IV below, most natural gas-producing states impose some form of severance tax on resources removed from the ground, which is generally based on the market price of the resource.[105] (*See* Tables 3 and 4 in Appendix 2.) In fact, of the above-mentioned revenues generated in 2010, more than $11 billion came from severance taxes. In energy-rich states, as much as 74.3 percent of the total state tax revenue is derived from severance taxes.[106] The funds raised through severance taxes generally go into the state's general funds and are often used to pay the public costs associated with resource extraction, such as road construction and maintenance, conservation, and environmental cleanup. Some tax money goes to local governments affected by increased drilling. Alaska, New Mexico, and Wyoming reserve part of their collected severance taxes for long-term accounts, using the interest to help balance state budgets.[107]

States can also generate revenue through the imposition of impact and permit fees. Pennsylvania, the largest natural gas-producing state without a severance tax, recently enacted an impact fee, the proceeds from which will go mainly to local communities.[108] "The legislation provided a way for local governments to address local impacts resulting from natural gas activities," according to Pennsylvania Rep. Brian

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[105] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[106] *Id.*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[107] *Id.,* http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[108] *Id.,* http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

Ellis. "A majority of the impact fee assessed on well operations goes back to local communities[.]"[109]

Derick King, Political Affairs Coordinator of the New York State Association of Realtors, noted the boomtown effect in neighboring Pennsylvania, and the spillover effect for New York, where fracking has not yet begun. There is not enough housing in Pennsylvania to accommodate all the workers, so they are crossing the border into New York looking for places to eat and stay. As a result, Broome County, King says, has reported an increase in sales tax revenues.[110]

C. Increased Revenues for Private Businesses, Too

The hydraulic fracturing boom may bring an economic boom to the communities that experience it in other ways as well.[111] As drilling companies move in, local spending rises. Oil and gas company employees spend money on everything from auto parts to pizza and beer.[112] New jobs are created in the hotel, restaurant, and retail industries in order to serve all these new employees/residents.[113] Even dry cleaners have benefited, because the frackers' heavily soiled laundry is too hard on the local laundromat equipment. Dry cleaners agreed to take on the challenge and stay open longer hours to

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[109] *Id.,* http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[110] Telephone Interview with Derick King, NYSAR Political Affairs Coordinator (July 18, 2012).

[111] Susan Christopherson and Ned Rightor, *How Should We Think About the Economic Consequences of Shale Gas Drilling?*, *A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale* (Cornell University Working Paper Series, May 2011), http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[112] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[113] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

accommodate the extra business.[114] Local manufacturers, too, may benefit from hydraulic fracturing coming to town. Manufacturers of tubular steel, pumps, valves, and fittings are reportedly seeing a substantial demand for their products as a result of local drilling.[115] In addition, landowners may receive royalty payments and have extra spending money in their pockets, which ultimately gets funneled into local economies.[116]

As hotels and motels fill up with gas workers, the increased demand may benefit the hotel and motel owners, as well as local restaurants, but it can actually hurt other local businesses that typically serve the interests of a more traditional clientele.[117] Hotels may have fewer rooms available for business travelers, tourists, hunters, and other recreational travelers, for instance, who may therefore choose to go elsewhere. And because of the "permanent resident exclusion" from state and local hotel taxes for longer stays, the frackers may be exempt from paying the taxes that help support tourism activities, such as local festivals and heritage projects.[118]

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[114] Telephone interview with Kim Skumanick, Associate Broker, Lewith & Freeman Real Estate, Inc., Clarks Summit, PA (July 18, 2012). Ms. Skumanick is also the 2012 First Vice President of the PAR.

[115] International Lawyers Network, *How Recent Oil and Gas Oil and Gas Discoveries Will Impact Ohio Businesses and Landowners* (JDSupra, Oct. 4, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=f33776ab-c7a0-477a-a8ca-0b72fa4a1431

[116] Christopherson and Rightor, *supra* n. 111, *How Should We Think About the Economic Consequences of Shale Gas Drilling?*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[117] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[118] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

D. Increased Traffic

Of course, all these new people, and all this new industry, brings a concomitant increase in traffic, which can lead to local complaints and strained infrastructures. Dust, noise, and road damage from industry truck traffic top the list of citizen complaints in areas where shale gas drilling occurs.[119] A typical Marcellus Shale well, for instance, requires 5.6 million gallons of water during the drilling process, almost all of which is delivered by truck. Liquid additives are shipped to the well site on flatbed trucks, and flowback is hauled away in tanker trucks. Millions of gallons of liquid used in the short initial drilling period account for half of the estimated 890 to 1,340 truckloads required per well site. The impact of water hauled to one site is the equivalent of nearly 3.5 million car trips.[120] Few local roads have been built to withstand this volume of traffic.

Sources in the Barnett Shale region report early deterioration of city streets, which ultimately increases the burden on taxpayers.[121] And as the traffic on major roads increases, so does the number of traffic accidents, which results in an increase in emergency response runs.[122] More emergencies leads to an increased need for emergency response personnel, which may also place an extra burden on taxpayers.

E. Social Impacts

As population increases, so does the need not only for commercial services, but also for public and social services, to provide support for all the new residents. As noted

[119] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[120] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[121] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[122] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

above, fast-growing communities need more police and fire protection. And if the new workers bring their families with them, they will want to put their children in school. Some affected school districts have reported scrambling for classroom space as the number of students and staff has skyrocketed.[123]

As rents increase based on an increase in demand for rental housing, local renters who can no longer afford their apartments may be displaced and seek economic assistance from local governments.[124] Local governments subjected to a wide range of demands for new services, or increased levels of service, may be hard-pressed to immediately meet a spike in administrative, staffing, equipment, and expertise demands that are beyond what they planned and budgeted for before fracking came to town.

F. Impermanence as a Concern

The extraction of nonrenewable natural resources such as natural gas is sometimes characterized as a "boom-bust" cycle, in which a rapid increase in economic activity is followed by an equally rapid decline. The increase occurs when drilling crews and other gas-related businesses move into the region, but when drilling ceases, an economic "bust" may follow.[125]

One of the ways that the boom-bust cycle plays itself out is with regard to housing. The introduction of a large (primarily) male workforce in small towns where

[123] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[124] *Id.*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[125] Id., http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

drilling operations are established has resulted in what some dub "man camps."[126] Man camps are temporary housing facilities commonly set up by oil and gas companies for their employees at project locations. These camps can house from as few as six to as many a few hundred men, often for months at a time. When drilling companies make deals with landowners to drill on their private property, the smaller versions of these camps may pop up right near a person's home. Landowners do not always approve of transient strangers living so close to them. When large camps are built in more rural or wilderness areas, different concerns arise, such as wildlife habitat preservation and even increased crime.[127]

If the frackers move into the existing housing supply in communities around the drill site instead of a man camp, however, the impact on housing can be even more dramatic. The oil and gas industry can afford to pay higher prices for rent and housing than many existing residents, who may find themselves priced right out of their homes.[128] Seniors on fixed incomes may be especially hard-hit.[129] These sudden rent increases have created difficulties for those living in Bradford County, Pennsylvania, for

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[126] Danielle Peters, *Can Hydraulic Fracturing Help Local Communities?*, *A Large Influx of Male Workers Tip Community Balance* (Green Renaissance of Western New York, Nov. 10, 2010), http://growwny.org/whats-new/332-hydraulic-fracturing-man-camps; *Man Camp--Energy Companies Turn to Portable Dormitories During Housing Crunch*, High Country News, Jan. 22, 2007, http://www.hcn.org/issues/338/16781.

[127] *Id.*, http://growwny.org/whats-new/332-hydraulic-fracturing-man-camps; http://www.hcn.org/issues/338/16781.

[128] Telephone Interviews with Jennifer Schockley, Assistant Director, PAR Public Policy and Government Affairs (July 16, 2012); Kim Skumanick, Associate Broker, Lewith & Freeman Real Estate, Inc., Clarks Summit, PA (July 18, 2012).

[129] Interview with Dale Tice, Esq., Marshall, Parker & Associates, Williamsport, PA (July 19, 2012).

"Are the man camps our modern day boomtowns, thriving for short periods of time, only to be inevitably abandoned when all of the riches have been exploited?"†

†http://growwny.org/whats-new/332-hydraulic-fracturing-man-camps

instance, where rents doubled or even tripled when the industry came to town.[130] Landlords in Bradford County reportedly are not renewing leases with previous tenants, because they know they can get more money by signing on industry workers. Even local motels have been filled to capacity due to out-of-town employees housed by the oil and gas industry, and waiting lists for public housing and other assistance programs have grown rapidly as well.[131]

The impermanence of the drilling sites could suggest that, despite any short-term economic boom, in the long run local communities might be worse off once the industry leaves. Many well operations last only about five to seven years.[132] Once the temporary residents leave, everything the town did to gear up is no longer required. In the interim, permanent residents may have chosen to move on, settling outside the fracking hub where rents are more affordable.

In the long run, however, given the population declines already suffered by many communities such as those in the Marcellus Shale region, the influx of new residents, temporary or not, could be welcome. Some newcomers may like the area and decide to stay. Indeed, according to a recent news story, Wyoming has experienced genuine

[130] James Loewenstein, *Skyrocketing Rent in Bradford County: Influx of Gas Workers Creating Shortage of Affordable Housing*, The Daily Review, Jan. 22, 2010, http://thedailyreview.com/news/skyrocketing-rent-in-bradford-county-influx-of-gas-workers-creating-shortage-of-affordable-housing-1.563248.

[131] *Id.*, http://thedailyreview.com/news/skyrocketing-rent-in-bradford-county-influx-of-gas-workers-creating-shortage-of-affordable-housing-1.563248.

[132] *Id.*, http://thedailyreview.com/news/skyrocketing-rent-in-bradford-county-influx-of-gas-workers-creating-shortage-of-affordable-housing-1.563248.

population increases, especially in the Hispanic population, as well as an overall drop in unemployment over the past decade, particularly in communities near gas drilling areas.[133]

G. Impacts on the Real Estate Profession

All of these social and economic changes are bound to have reverberations in an industry devoted to serving local housing and development needs. The demand for housing may skyrocket, for instance, when the oil and gas companies set up camp in a town, creating significant activity in the housing and rental markets. Some real estate professionals have even devoted their practices to this phenomenon, setting up "Homes for Frackers" websites.[134] But other areas may experience significant declines in property values, or a glut of properties that are hard to sell because of nearby fracking operations. Some of the benefits and challenges that fracking brings to the real estate industry are summarized below.

1. Property Value Fluctuations

Depending on one's perspective, fracking may be either good or bad for property values. In reality, depending on the circumstances, it can be either. On the one hand, some areas, such as the Northeast Ohio commercial real estate market, reportedly look extremely positive, primarily because of hydraulic fracturing,[135] and some REALTOR®s

[133] Christopherson and Rightor, *supra* n. 111, *How Should We Think About the Economic Consequences of Shale Gas Drilling?*, http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_SC_NR.pdf.

[134] *See* "Homes for Frackers," http://www.ro4realestate.com/Homes_For_Frackers/page_2214571.html.

[135] *E.g.*, Lake County Development Council, Apr. 2012 Newsletter, http://www.lakecountydevelopmentcouncil.org/april-2012-newsletter/.

report that 2012 has been their best year of the last several. On the other hand, anti-fracking group "Save Colorado from Fracking" reports that properties with gas wells are valued lower than similar properties without wells.[136]

The same anti-fracking group also reports that, according to the Colorado School of Public Health, "[n]atural gas development causes a decline in property value, especially during the development phase of the project," but that "land values partially recover when the development phase of a project ends."[137] The group does acknowledge, and most would probably agree, that the "effects will be impacted by how well other concerns, such as air emissions, traffic, noise and community wellness, are mitigated."[138]

Property values will also be affected by whether or not the mineral rights have been severed from the surface rights, whether the mineral rights can be or are leased to an oil and gas company, and problems getting mortgages and insurance coverage. These concerns are addressed separately, below.

2. Severance Issues

Under traditional property law principles, minerals located beneath the surface of the earth may be owned separately from the surface of the property.[139] As a result, mineral rights (including oil and gas rights) may be transferred apart from the surface rights. When this occurs, the rights are deemed to be "severed."

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[136] Save Colorado from Fracking, http://www.savecoloradofromfracking.org/harm/propertyvalues.html.

[137] *Id.*, http://www.savecoloradofromfracking.org/harm/propertyvalues.html.

[138] *Id.*, http://www.savecoloradofromfracking.org/harm/propertyvalues.html.

[139] *See* NC REALTORS Talk, Mineral Rights Discussed (May 2, 2012), http://ncrealtors1.blogspot.com/2012/05/mineral-rights-discussed.html.

Because mineral rights may be either sold or leased apart from the surface rights, REALTORS® and property owners must be aware of their responsibility to disclose the existence of severed rights.[140] The North Carolina Real Estate Commission believes the existence of mineral rights or any severed rights constitutes a material fact and must be disclosed not only by the seller, but also by the agent.[141] Janet Thoren, General Counsel for the NCRE Commission, explained that the disclosure "should be at a time when a purchaser can make a reasonable decision about whether to proceed with the

To Sever or Not to Sever, That Is the Question

In Texas, Pennsylvania, and certain other states, the mineral estate is severable, meaning that it is a separate interest in the land that can be severed, legally speaking, from the surface estate. (An "estate," in this context, refers to the nature of a person's ownership interest in land or minerals.) A mineral right is the right to explore and produce the minerals from the land, or to receive a royalty based on production of the minerals by someone else. Thus, a landowner can sell the mineral rights and keep the surface, or sell the surface and keep the mineral rights.

If you are the agent for a seller who holds mineral rights, the seller will have to decide whether he or she is willing to sell those rights along with the property. If so, the seller will likely want to ask a significantly higher price. How one determines the value of the mineral rights, and the corresponding price, involves some guesswork. When will drilling begin? How long will it last? How much oil or gas will be produced and at what price? What will the royalty percentage be?

Many property owners who know the potential value of mineral rights are not willing to sell them. If your seller wants to keep the mineral rights, the real estate contract must reflect that. There is language specially designed to reserve mineral rights, which language can vary from state to state. If a landowner of property in a state where the mineral interest is severable does not expressly reserve the minerals when selling the surface, the buyer will get whatever mineral interest the owner had.

If the seller's property is relatively small, such as one-quarter of an acre, or the seller owns only a fraction of the mineral rights, the amount of money to be gained through royalties may not be so significant or alluring that it outweighs the benefit of selling more quickly at a price that does not include a premium for the potential bonus and royalties. This weighing of options can be a matter of some angst for the seller and buyer, and the real estate professionals involved need to be sensitive to it.

[140] *See id.,* http://ncrealtors1.blogspot.com/2012/05/mineral-rights-discussed.html.

[141] *See id.,* http://ncrealtors1.blogspot.com/2012/05/mineral-rights-discussed.html.

transaction. For example, when you get to closing, it is probably too late."[142] Thoren also recommended that sellers strongly consider an additional disclosure document beyond the standard Residential Property Disclosure Form.[143]

Accordingly, when representing buyers or sellers in areas of potential or historic mineral development, one of the key determinations will be whether a fee simple estate is being transferred, or whether ownership will be shared with others, such as the holders of mineral rights associated with the property.[144] Buyers' representatives should always ask the seller to specify what rights are being conveyed; even then, legal counsel may be required to confirm that the seller really owns what is being sold. Mineral rights transactions are normally a matter of public record. In some areas, however, sales of mineral rights are recorded in a different deed book or database than sales of surface property, so the deed to the surface property might not mention that mineral rights have been separately sold.[145] Additional investigation is often required.

3. Oil and Gas Leases

In many instances, the oil and gas rights to a particular piece of property will be leased to an oil and gas company for exploration or exploitation, which can result in a significant financial boon to property owners.[146] But working with property subject to an

[142] *See id.,* http://ncrealtors1.blogspot.com/2012/05/mineral-rights-discussed.html.

[143] *See id.,* http://ncrealtors1.blogspot.com/2012/05/mineral-rights-discussed.html.

[144] *Mineral Rights—Basic Information about Mineral, Surface, Oil and Gas Rights*, http://geology.com/articles/mineral-rights.shtml.

[145] *Id.*, http://geology.com/articles/mineral-rights.shtml.

[146] Telephone interview with Dale Tice, Esq., Esq., Marshall, Parker & Associates, Williamsport, PA (July 19, 2012).

oil and gas lease raises concerns for both buyers and sellers of real estate.[147] Buyers need to know about the specific rights granted to the gas company in the lease, which means a copy of the signed lease must be available for review. In many cases, however, buyers cannot obtain a copy of the lease from the county recorder of deeds, because the gas companies do not typically record the actual lease. Instead, the industry practice in some states is to record an abbreviated "memorandum" of the lease that does not include all of the necessary information, so some additional digging may be required.[148] (See Part IV below for more about lease recording requirements.)

Most leases grant very broad rights to the oil and gas company, including the rights to drill wells, construct roads, place pipelines and related facilities, use the property for underground gas storage, and drill wells for the disposal of waste fluids. In many cases, the seller will have worked with an attorney to restrict this broad grant of rights, but a buyer needs to know the details before entering into a purchase agreement.[149]

[147] *See, e.g.*, *Gas Leasing and Real Estate*, Marcellus Shale Law Monitor, Jan. 30, 2012, http://www.marcellusshalelawmonitor.com/.

[148] *Id.*, http://www.marcellusshalelawmonitor.com/.

[149] *Id.*, http://www.marcellusshalelawmonitor.com/.

Mr. Landman, Bring Me a Lease

The ability to develop subsurface oil and gas resides in the mineral interest holder and is commonly known as "holding [or having] the mineral rights." The person who holds the mineral rights can transfer the right to remove and sell the minerals through a sale of the rights, for example, or by leasing the mineral rights to others for development. Oil and gas companies are the usual lessees. Typically, these companies will offer an initial sign-on bonus to the mineral rights holder, followed by royalties that are paid as oil or gas is produced. Traditionally, the amount of the bonus is not set forth in the lease and is the subject of a separate writing. Early in the Barnett Shale natural gas play, some homeowners were getting as much as $30,000 an acre just for signing a lease. Royalties are paid as a percentage of production, subject to terms of the lease, which may allow the lessee to deduct certain costs.

What is the first step in leasing one's minerals? Often a "landman" will contact an individual homeowner about leasing his or her rights for production. A landman can be an employee of an oil and gas company that is seeking to lease the mineral rights, or an independent contractor who negotiates leases for a number of companies. More often than not, the landman will offer the homeowner a form lease developed by the company he or she represents. Naturally, the form lease favors the oil and gas company, not the mineral rights holder.

A sophisticated property owner will not rush to sign the lease proffered by the landman, but will have an oil and gas attorney review and suggest changes to the lease terms. Often homeowners in a particular neighborhood will band together, jointly hire an attorney, and seek to increase the amount of the proffered bonus and royalty percentage. However, the percentage amount of the royalties is only one of the terms of the lease. There are many other lease terms that are significant and should be the subject of negotiation. For example, what happens if an oil and gas company leases your mineral rights, but later decides natural gas prices are not high enough to justify drilling? The mineral rights holder will want to make sure that the lease protects him or her against this and many other eventualities.

A few of the provisions that the mineral rights holder should consider requesting are:

- Exclusion of water and non-hydrocarbons from the lease, so that the lease is limited to oil and gas and does not authorize withdrawal of water, coal, sulfur, or like minerals.
- More stringent environmental standards and indemnities than required by law, e.g., dust minimization, landscaping, and restoration of surface.
- Insurance requirements, including pollution liability coverage.
- A higher royalty fraction, and exclusion of the costs of production, transportation, and other marketing costs.
- Establishment of a minimum royalty.
- Limiting the terms of the lease if oil or gas is not produced.

There is some question as to whether a real estate licensee's negotiation and drafting of an oil and gas lease constitutes the unauthorized practice of law.[150] Although the generally understood definition of the "practice of law" includes the preparation of legal instruments of all kinds, some courts have observed that drafting legal instruments is also a "necessary concomitant" of the real estate business. However, a lack of familiarity with the intricacies of oil and gas leasing could cast doubt on whether drafting oil and gas leases is truly a "necessary concomitant" of the average real estate professional's business.[151]

Property owners presented with a leasing opportunity are faced with some critical decisions: the size and timing of the bonus payment; the amount of the royalty (the standard is said to be about 12.5 percent of what is produced from the well, but the royalty can be negotiated up to 15 or 18 percent, or even higher); and the time period for the company to hold the lease until drilling takes place.[152] More complex negotiations may involve restrictions on unitization (the right of the lessee to combine one lessor's property with that of other landowner lessors); prohibiting the storage of gas or the disposal of toxic liquids on the property; obtaining mutual agreement on the placement of roads, wells, and pipelines; and having the groundwater tested, both before and after drilling.[153]

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[150] James L. Goldsmith, Esq., *Gas and Oil Leases and Beyond* (Caldwell & Kearns, P.C., 2012), http://www.caldwellkearns.com/CM/Articles/Gas-and-Oil-Leases-and-Beyond.asp.

[151] *Id.*, http://www.caldwellkearns.com/CM/Articles/Gas-and-Oil-Leases-and-Beyond.asp.

[152] SmartBusiness, supra n. 115, *How Recent Oil and Gas Oil and Gas Discoveries Will Impact Ohio Businesses and Landowners*, http://www.sbnonline.com/2011/10/how-recent-oil-and-gas-discoveries-will-impact-ohio-businesses-and-landowners/?full=1.

[153] *Id.*, http://www.sbnonline.com/2011/10/how-recent-oil-and-gas-discoveries-will-impact-ohio-businesses-and-landowners/?full=1.

Websites such as that of the Ohio Department of Natural Resources offer more information on oil and gas leases. Real estate professionals confronted with oil and gas leasing dilemmas would be wise to review additional information and consult with legal counsel experienced in this area of the law.

4. Mortgage Issues

While oil and gas leases may bring potential windfalls to property owners, they can bring potential headaches as well. Lenders are reportedly becoming increasingly concerned about the growing number of oil and gas leases on mortgaged property.[154] The mortgage industry has seen more than its share of troubles in recent years, and hydraulic fracturing could be bringing even more.

Most mortgages are secured by both the "surface" and "subsurface" rights to the land. As a result, the mortgage terms generally require that the landowner obtain prior permission from the lender before entering into a lease. Some mortgages include a rider specifically prohibiting the landowner from leasing mineral, oil, or gas rights.[155] When deciding whether to grant permission to enter into an oil and gas lease, lenders generally consider whether the lease is customary in the area, whether it will prevent the use of the property as a residence or materially affect the value of the property, and whether the activity contemplated in the lease will expose residents to serious health or safety hazards.[156] Mortgage lenders may also require the landowner to pay an

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[154] David Dolendi, *Mortgage Lenders Are Becoming Increasingly Concerned with Gas and Oil Leases Associated with Hydraulic Fracturing* (Sedgwick LLP, 2011), *available at* http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[155] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[156] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

additional amount toward the balance of the loan before approving the lease. The failure of a landowner to get the mortgage lender's permission before entering into a lease may be deemed a breach of the mortgage agreement, and could give the lender the right to demand immediate payment of the mortgage or to foreclose on the property.[157]

The potential ramifications from a breach of the mortgage may not be limited to the landowner. Approximately 90 percent of all mortgages are sold by primary lenders to secondary lenders, like Fannie Mae and Freddie Mac.[158] The primary lenders often guarantee that the mortgage complies with standard mortgage rules and underwriting requirements. If a mortgage does not comply with standard mortgage requirements, the secondary lender may refuse to acquire the mortgage from the primary lender, or hold the primary lender responsible if the mortgage is acquired without knowledge of the lease. Title insurance, also a common requirement related to mortgages, may include specific exclusions for certain types of commercial or hazardous activities, which can lead to additional exposure for both primary and secondary lenders.[159]

Opinions differ—and data is scarce—on the effects of an oil and gas lease on property values and mortgages. Some recent reports suggest that a lease may actually enhance the value of the associated property, and that the additional income may make mortgage repayment more likely.[160] On the other hand, an oil and gas lease may decrease the value of the property or make the property less marketable. Both primary

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[157] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[158] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[159] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[160] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

and secondary lenders typically require comparable sales data and a marketability analysis before issuing a mortgage. Appraisers have expressed concern that issuing an appraisal on properties subject to oil and gas leases is often difficult, because comparable sales of similar properties are unavailable in many areas. As a result, mortgage lenders may be more reluctant to grant permission to landowners interested in signing an oil and gas lease, or may refuse to issue a mortgage on a property already subject to a lease.[161]

The increase in oil and gas leases related to hydraulic fracturing may negatively impact the entire mortgage lending industry, and recent news articles suggest that it could even prolong the industry's recovery from the subprime mortgage debacle.[162] With hydraulic fracturing operations expanding, the concern over oil and gas leases is likely to capture even more attention from the mortgage industry and lawmakers alike.[163]

5. Homeowner's Insurance Issues

Nationwide Mutual Insurance Company recently became the first major insurer to announce that it will not cover damages related to hydraulic fracturing.[164] The Ohio-based insurer's personal and commercial policies "were not designed to cover" risk from

[161] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[162] *Id.*, http://documents.jdsupra.com/e50e172f-340b-4550-9d5c-b3a374518160.pdf.

[163] *Id.*; *see also* Andrew Schenkel, *Hydraulic Fracturing Undermining Mortgages—Agreements to Frack on Private Property Could Cause Defaults and Plummeting Home Prices* (Oct. 20, 2011), *available at* http://checksandbalancesproject.org/2011/10/20/hydraulic-fracturing-undermining-mortgages/. Other articles of possible interest include The Marcellus Effect: Gas Leases Conflict with Mortgage Rules; MortgageOrb: Residential Fracking Puts Lenders In A Gassy Hole; How Fracking Threatens the Health of the Mortgage Industry; How the Fracking Mess is About to Make the Mortgage Mess Worse.

[164] Mary Esch, *Nationwide Insurance: Fracking Damage Won't Be Covered*, The Huffington Post, July 12, 2012, http://www.huffingtonpost.com/2012/07/13/nationwide-insurance-fracking_n_1669775.html.

fracking, Nationwide spokesperson Nancy Smeltzer said.[165] Stating that risks involved in fracking operations "are too great to ignore," the company now excludes hydraulic fracturing risks from General Liability, Commercial Auto, Motor Truck Cargo, Auto Physical Damage, and Public Auto coverage. Although homeowner's policies are not specifically listed, Nationwide stated that "prohibited risks" apply to landowners who lease land for shale gas drilling.[166]

> *"Nationwide has not changed our policies or guidelines, nor are we cancelling policies. Fracking-related losses have never been a covered loss under personal or commercial lines policies. Nationwide's personal and commercial lines insurance policies were not designed to provide coverage for any fracking-related risks.*
>
> . . . .
>
> *Insurance is a contract and it is designed to cover certain risks. Risks like natural gas and oil drilling are not part of our contracts. . . ."*
>
> *http://www.nationwide.com/newsroom/071312-FrackingStatement.jsp*

Given that this announcement was made just months ago, in July 2012, it is too soon to tell how many other insurers will follow suit, and just what the impact will be on landowners and oil and gas lessors. But the mortgage and insurance issues are likely to further complicate an arena already plagued with questions and concerns, and some REALTOR®s believe that the Nationwide move is just "the tip of the iceberg."[167]

[165] *Id.*, http://www.huffingtonpost.com/2012/07/13/nationwide-insurance-fracking_n_1669775.html.

[166] *Id.*, http://www.huffingtonpost.com/2012/07/13/nationwide-insurance-fracking_n_1669775.html.

[167] Telephone Interview with Mike Kelly, NYSAR Director of Government Affairs (July 18, 2012).

IV. LEGISLATION, REGULATION, AND OTHER FRACKING-RELATED LEGAL ACTION

A. Federal Laws

The production of oil and gas in the United States is subject to an intricate web of federal, state, and local laws that address both exploration and operation.[168] Generally speaking, the laws and regulations that apply to conventional oil and gas operations apply to shale gas development as well, but there are certain intentional exceptions. The Environmental Protection Agency administers most of the federal laws relating, or potentially relating, to hydraulic fracturing.[169] The relevant federal environmental statutes include:

- The Safe Drinking Water Act, which regulates the underground injection of fluids from shale gas activities;
- The Clean Water Act, which regulates surface discharges of water associated with shale gas drilling and production; and
- The Clean Air Act, which limits air emissions from engines, gas processing equipment, and other sources associated with drilling and production.

Each of these federal laws is discussed in more detail below.

1. Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) regulates the nation's public drinking water supply. Pursuant to the SDWA, the EPA set national health-based standards to protect

[168] US DOE, Office of Fossil Energy, *Modern Shale Gas Development in the United States: A Primer* (Apr. 2009) at 25, http://www.netl.doe.gov/technologies/oil-as/publications/epreports/shale_gas_primer_2009.pdf).

[169] *Id.* at 25, http://www.netl.doe.gov/technologies/oil-as/publications/epreports/shale_gas_primer_2009.pdf).

against both naturally occurring and man-made contaminants that may be found in drinking water. It may seem as though this law would apply to hydraulic fracturing operations, but at the present time that is not the case. In 2005, Congress passed the Energy Policy Act, which amended the SDWA to *exclude* from regulation the underground injection of fluids or propping agents (other than diesel fuels) as an incident to hydraulic fracturing operations related to oil, gas, or geothermal production activities. Not everyone was happy about that intentional exclusion. In 2011, the Fracturing Responsibility and Awareness of Chemicals Act (FRAC Act) was reintroduced in both the US Senate and House of Representatives. The FRAC Act, if passed, would close the fracking loophole by amending the Safe Drinking Water Act to require oil and gas companies to disclose the chemicals used in hydraulic fracturing operations.[170]

2. The Clean Water Act

The Clean Water Act (CWA) is the primary federal law governing the pollution of surface water. Its provisions were designed to protect water quality, in part by establishing pollutant limits on the discharge of oil- and gas-related produced water. The CWA makes unlawful the unpermitted discharge of any pollutant into US navigable waters. The CWA applies in the fracking context, because shale gas extraction produces large volumes of wastewater, as well as small volumes of produced water from the formation.

3. The Clean Air Act

The Clean Air Act (CAA) is the primary means by which the EPA regulates emissions affecting air quality. Pursuant to the CAA, the EPA set national standards to limit levels of certain pollutants. In 2011, the EPA proposed new air pollution standards to

[170] *See* http://thomas.loc.gov/cgi-bin/bdquery/z?d112:s.587:.

reduce emissions of methane and volatile organic compounds by the oil and gas industry.

4. Other federal laws

A variety of other federal environmental statutes may also be implicated by hydraulic fracturing operations.

- The Emergency Planning and Community Right-to-Know Act (EPCRA) establishes requirements for federal, state, and local governments, as well as industrial entities, regarding emergency planning and community right-to-know reporting on hazardous and toxic chemicals.
- The Endangered Species Act (ESA) protects plants and animals that are listed by the federal government as endangered or threatened. Sections 7 and 9 apply to oil and gas activities. Section 7 covers federal permits for construction work in waters or wetlands, and Section 9 makes it unlawful for a private party to harm an endangered animal or its habitat.
- The Toxic Substances Control Act (TSCA) complements other federal environmental statutes that regulate pollution by controlling chemical products prior to their entry into the environment. Pursuant to TSCA, chemical manufacturers must provide the EPA with information on the chemicals they produce.
- The Resource Conservation and Recovery Act (RCRA) addresses problems associated with the increasing volume of municipal and industrial waste. In 1980, however, the Solid Waste Disposal Act amended RCRA to exempt drilling fluids, produced waters, and other wastes associated with the exploration, development, and production of crude oil or natural gas.

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) creates general liability for the cost of cleaning up property contaminated with hazardous substances, but § 101(14) excludes certain substances from the definition of hazardous substance, including petroleum, natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel.[171]

B. Legislative Activity at the State Level

Many state legislatures are not waiting for a first look at the EPA study results to enact measures specifically directed at hydraulic fracturing within their borders. Environmental concerns in general, along with the realization that few state regulatory agencies are equipped to address hydraulic fracturing technology, prompted a flurry of proposed legislation in 2012—as many as 130 bills in at least twenty-four states, according to the National Conference of State Legislatures.[172] Chemical disclosure requirements were the most popular legislative trend of 2012.[173]

The proliferation of state legislation is illustrated in the map below.

[171] *See* US EPA, *Petroleum Exclusion*, http://www.epa.gov/oem/content/reporting/faq_subs.htm#exclusion.

[172] Jim Malewitz, *In Energy Policy, A Year Marked by Clashes in Federalism*, Stateline, June 14, 2012, http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

[173] Jim Malewitz, *States Scramble to Regulate Fracking*, Stateline, May 9, 2012, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

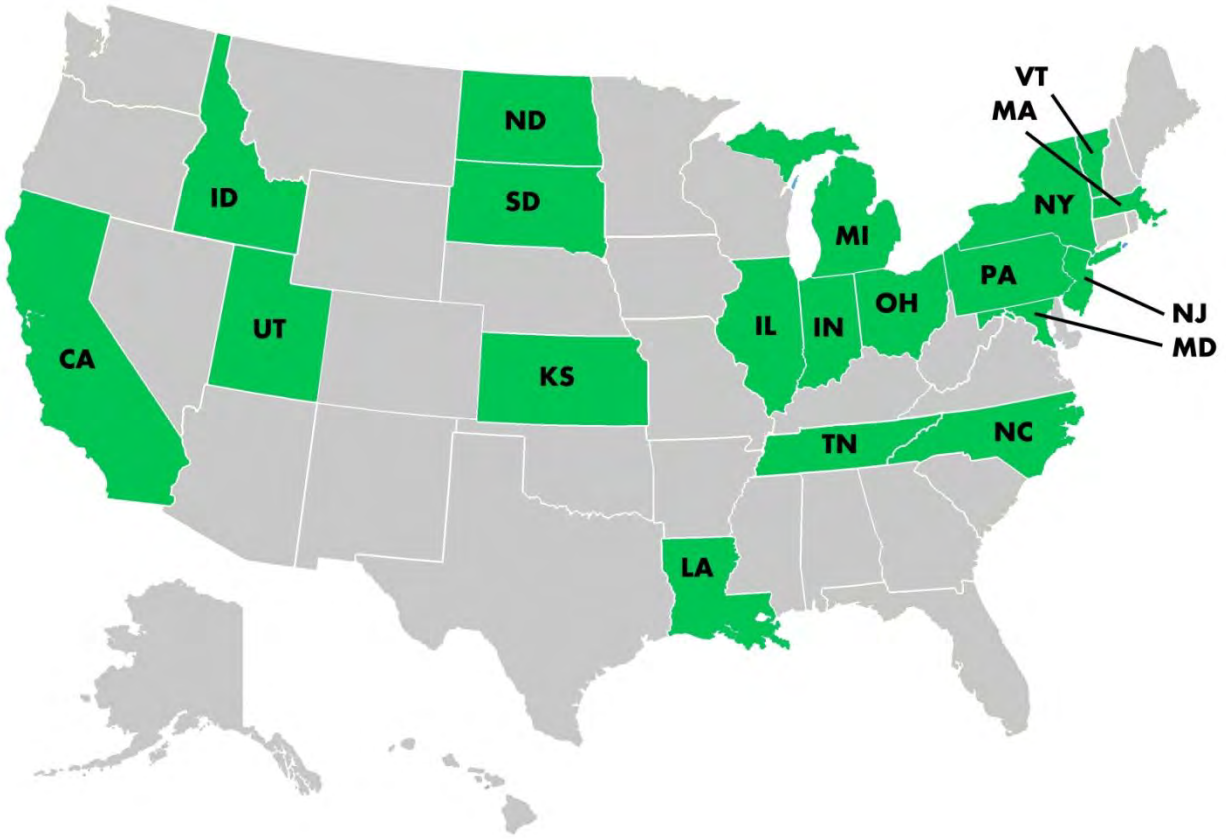

Figure 7. States With Hydraulic Fracturing Legislation in Early 2012 Legislative Sessions[174]

As of May 31, 2012:

- At least nine states had proposed chemical disclosure requirements (*see* Table 1 in the Appendix);
- At least eight states proposed casing, well spacing, setback, water withdrawal, flowback, or waste regulation requirements or other measures to protect water resources (Table 2);

[174] Jacquelyn Pless, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, National Conference of State Legislatures (revised June 2012), http://www.ncsl.org/documents/energy/frackingguide_060512.pdf. The map is based on research performed by the NCSL as of May 31, 2012, but just two weeks later the same group is reported to have increased its count of states with proposed legislation to "at least 24." *See* Malewitz, *supra* n. 172, *In Energy Policy, A Year Marked by Clashes in Federalism*, http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213. These numbers are sure to continue to increase as time goes on.

- At least eleven states proposed legislation to impose new or amend existing severance taxes (*see* Tables 3 and 4);
- Legislators in at least eight states proposed hydraulic fracturing suspensions, moratoriums, or studies to investigate fracking impacts (Table 5); and
- At least seven states proposed resolutions addressing hydraulic fracturing (Table 6).[175]

Tables 1 through 6 in Appendix 2 present the details of the various types of proposed state legislation.

"How ironic that in an industry plagued with accidents, hydrologic fracturing or 'fracking' today become legal in North Carolina based on an accidental vote."

~ Molly Diggins, North Carolina director of the Sierra Club

http://www.charlotteobserver.com/2012/07/03/3357704/state-senate-overrides-gov-perdues.html#storylink=cpy

While some states enacted fracking bans or moratoriums, the North Carolina legislature recently opened the state to fracking.[176] North Carolina's story is one of the more interesting, perhaps not so much for the substance of the legislation as for the process by which it was implemented. After the North Carolina House and Senate approved the fracking bill, Governor Perdue attempted to veto it, but the legislature overrode his veto—by the apparent accidental push of a button by just one (chagrined?) state legislator.[177]

[175] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[176] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[177] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; John Murawski, *Carney's Mistaken Vote Is Key in Fracking Override*, Charlotte Observer, July 3, 2012, http://www.charlotteobserver.com/2012/07/03/3357704/state-senate-overrides-gov-perdues.html.

Gas-rich states like Ohio, Pennsylvania, West Virginia, Texas, Wyoming, and Colorado appear eager to tap into their plentiful resources. Motivated by the lure of new jobs and tax revenues, policy makers in these states have given fracking the green light.[178] But even in these states, officials recognize the need to manage a technology capable of transforming the country's landscape. "This is such a huge issue. It really is a balancing act," observes Jacquelyn Pless, fracking policy tracker for the National Conference of State Legislatures. "Every state is looking at it differently."[179] Ohio Governor Kasich has said he wants to develop the nation's most environmentally responsible fracking regulations, but environmental groups have not been satisfied with that state's recently enacted rules on well construction, water handling, and chemical disclosure.[180]

As states continue to enact a patchwork of regulations, some environmental advocates are calling on the federal government to take more regulatory control over an industry specifically exempted from parts of the Clean Air Act and Clean Water Act.[181] The Obama administration has taken small steps toward regulating natural gas extraction, moving forward on two rules: one that limits methane emissions during

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[178] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[179] *Id.*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[180] Malewitz, *supra* n. 172, *In Energy Policy, A Year Marked by Clashes in Federalism*, http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

[181] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; Malewitz, *supra* n. 172, *In Energy Policy, A Year Marked by Clashes in Federalism*, http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

drilling,[182] and a proposal unveiled in May 2012 that sets standards for well integrity and water management on public lands, while also requiring chemical disclosures.[183] Some of these moves have angered officials in natural gas–producing states, especially those in the western states that have wide swaths of public lands.[184]

Some state officials call the federal rules redundant, predicting that they will slow the fracking industry's expansion. They argue that states are better equipped to police the industry, because local regulators have a greater knowledge of local resources and geography.[185] Kansas, South Dakota, and Utah lawmakers enacted resolutions calling on Congress to leave fracking rules to the states.[186] (*See also* Table 6 in Appendix 2.) Proponents of more federal oversight counter that states are unable to do the job themselves, especially as many state regulatory bodies deal with ongoing budget cuts.

[182]US EPA, *Regulatory Actions*, http://www.epa.gov/airquality/oilandgas/actions.html.

[183] United States Department of the Interior, *Interior Releases Draft Rule Requiring Public Disclosure of Chemicals Used in Hydraulic Fracturing on Public and Indian Lands*, Press Release, May 4, 2012, http://www.doi.gov/news/pressreleases/Interior-Releases-Draft-Rule-Requiring-Public-Disclosure-of-Chemicals-Used-in-Hydraulic-Fracturing-on-Public-and-Indian-Lands.cfm.

[184] Jim Malewitz, *Western States Wary of Federal Fracking Regs*, Stateline, May 4, 2012, http://www.pewstates.org/projects/stateline/headlines/western-states-wary-of-federal-fracking-regs-85899384478.

[185] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; Malewitz, *supra* n. 172, *In Energy Policy, A Year Marked by Clashes in Federalism*, http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

[186] *Id*., http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

In Colorado and West Virginia, for instance, just a handful of inspectors oversee tens of thousands of operating oil and natural gas wells.[187]

The following discussion highlights some of the more common types of state and local statutes, rules, and legislative activities in the fracking arena. It is not an exhaustive analysis; that is, not every state's laws or proposed laws are covered, and not every potentially relevant enactment is mentioned. (See Appendix 2 for a more detailed presentation of hydraulic fracturing laws.)[188]

C. Hydraulic Fracturing Bans and Moratoriums

While some states race to the fracking fore, others are putting the brakes on hydraulic fracturing, at least temporarily. In May 2012, Vermont became the first state to enact an outright fracking ban. "We don't want to allow [fracking] until we get the science straight," said State Representative David Deen before voting on the newly enacted Vermont ban. "The science is very poor at giving us assurances that ground water and surface water wouldn't be contaminated."[189] The New Jersey Legislature passed a similar ban in late 2011, but Governor Chris Christie conditionally vetoed it, opting instead for the one-year moratorium he signed in 2012.[190] Michigan's pending

[187] *Id.*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; http://www.pewstates.org/projects/stateline/headlines/in-energy-policy-a-year-marked-by-clashes-in-federalism-85899398213.

[188] For an interactive map of state-by-state progress, see http://groundwork.iogcc.org/topics-index/hydraulic-fracturing/state-progress.

[189] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[190] *Id.*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

H.B. 5150 would prohibit hydraulic fracturing under certain circumstances, until a specified advisory committee makes recommendations.[191]

Meanwhile, New York may be planning to lift its moratorium on fracking, originally enacted in 2008 to allow time to craft new environmental regulations. News of the potential lifting prompted vigorous protests from environmentalists, however, which some say could cast doubt on whether the moratorium will actually be lifted, and if so, to what extent.[192] The *New York Times* reported in June 2012 that Governor Cuomo was pursuing a compromise that would permit fracking only where shale deposits reach depths of more than 2,000 feet, in an attempt to reduce the risk of groundwater contamination while still pumping revenue into struggling rural communities.[193] Under this plan, individual communities would have a say over whether to allow drilling within their borders, according to a senior official with the State Department of Environmental Conservation.[194]

Some moratorium action is already occurring at the local level. Several cities in the Barnett Shale have requested moratoriums on drilling permits in order to provide them

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[191] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[192] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[193] Danny Hakim, *Cuomo Proposal Would Restrict Gas Drilling to a Struggling Area*, The New York Times, June 13, 2012, http://www.nytimes.com/2012/06/14/nyregion/hydrofracking-under-cuomo-plan-would-be-restricted-to-a-few-counties.html?_r=2&emc=eta1.

[194] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716; *see also* Duane Morris LLP, New York "Light Years" Behind Pennsylvania in Reaping Marcellus Shale Benefits (JDSupra, Nov. 30, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=19b9bcd0-f035-458e-9f55-673d52b95285.

with more time to consider whether to implement general fracking-related moratoriums.[195] The Southlake City Council, for instance, passed a resolution in 2011 to place a 180-day moratorium on oil and gas permits to determine whether it should amend its current regulations.[196] Back in 2008, the City of Flower Mound adopted a six-month moratorium for new permits for certain pipelines and centralized collection facilities.[197]

Outside of Texas, the City of Pittsburgh banned fracking in November 2010.[198] Pittsburgh is reportedly considering a referendum on natural gas production to incorporate the ban into the City Charter, which would make it more difficult for any Pittsburgh City Council to revoke the ban in the future.[199] Just months later, in February 2011, the City of Buffalo, New York banned fracking and the disposal of drilling wastewater and other production wastes within city limits.[200]

In West Virginia, the Morgantown City Council attempted to ban fracking, but a

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[195] Goldman, *supra* n. 33, *Drilling into Hydraulic Fracturing*, http://www.jdsupra.com/legalnews/drilling-into-hydraulic-fracturing-and-s-89124/.

[196] *Id.* & n. 197 therein; *see City of South Lake Oil & Gas Drilling and Production*, http://www.cityofsouthlake.com/index.aspx?NID=905.

[197] *Id.* & n. 198 therein (citing *Flower Mound Passes Gas Drilling Moratorium*, Shelley Kofler, KERA News (June 8, 2010)), http://www.publicbroadcasting.net/kera/news.newsmain?action=article&ARTICLE_ID=1660511). See Tex. Loc. Gov't Code ch. 212 for more information on moratoriums in Texas.

[198] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale* (The Network for Public Health Law, Nov. 1, 2011), http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; Jennifer C. Yates, *Pittsburgh First Pa. City to Ban Gas Drilling*, Bloomberg Businessweek, Nov. 16, 2010, http://www.businessweek.com/ap/financialnews/D9JHE61O0.htm.

[199] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; Joe Smydo, *Onorato Says 'Legal Issues' Could Block Natural-gas Referendum*, Pittsburgh Post-Gazette, Aug, 4, 2011, http://www.post-gazette.com/pg/11216/1165099-503.stm.

[200] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; Daniel Trotta, *City of Buffalo Bans Hydraulic Fracturing*, Reuters, Feb. 8, 2011, http://www.reuters.com/article/2011/02/08/us-energy-natgas-buffalo-idUSTRE7176BZ20110208.

Monongalia County Circuit Court reversed the ban, ruling that local municipalities lack the authority to preempt the actions of a state agency like the Department of Environmental Protection (DEP).[201] In that state, the DEP is the agency responsible for issuing drilling permits. Fracking is currently taking place in Morgantown.[202]

D. Zoning Laws

Some communities are using their zoning ordinances to impose a de facto fracking ban, but in certain instances this maneuver has resulted in court action.[203] In New York's Town of Dryden, for instance, the Anschutz Exploration Corporation filed suit against the Town, claiming that the ordinance prohibiting fracking under the Town's zoning authority is preempted by state laws regulating gas drilling. In the Dryden case, the parties appeared to agree that the Town is preempted under state law from regulating the drilling operations themselves, but the Town took the position that it retained its zoning and police power to determine where, or if, this type of use was allowed within the city limits.[204] The court held that the Town did indeed have the authority to regulate the use of land within its borders, even to the extent of prohibiting fracking, but it did not have the authority

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[201] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; *Northeast Natural Energy v. Morgantown*, W.Va. Cir. Ct., Docket No. 11-C-411, Aug. 12, 2011.

[202] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; *Protest Near Drilling Site In Morgantown*, MetroNews, Sept. 15, 2011, http://www.wvmetronews.com/news.cfm?func=displayfullstory&storyid=47850; Associated Press, *Fracking Begins at Morgantown Gas Well Site*, The Wall Street Journal, Sept. 30, 2011, http://online.wsj.com/article/AP60d83ab69a6a494b8fe90b48b31270aa.html.

[203] Poyner Spruill LLP, *Literally, A Million Dollar Question* (JDSupra, Nov. 22, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=9c8a6e6a-491e-462a-8113-ba249b7ced42.

[204] *Id.*, http://www.jdsupra.com/post/documentViewer.aspx?fid=9c8a6e6a-491e-462a-8113-ba249b7ced42.

to invalidate an otherwise valid permit issued by another state agency, such as the Department of Environmental Conservation.[205]

Other local governments, including some in Pennsylvania, have adopted zoning amendments that regulate fracking by allowing it only in certain zoning districts, establishing certain radius and buffer requirements, or requiring operators to obtain a special or conditional use permit.[206] Issuance of such a permit generally requires that the applicant show the drilling operation would not have an adverse impact on the health, safety, or welfare of the general public. Zoning ordinances in North Carolina already regulate similar industrial uses, such as mining and quarry operations, so their application in the fracking context is not much of a stretch.[207]

E. Severance Taxes and Impact Fees

Severance taxes are excise taxes on resources that are "severed" from the earth.[208] Historically, severance taxes have been a significant source of revenue for energy-rich states. Many oil- and natural gas-producing states have some form of severance tax.[209] (*See* Tables 3 and 4 in Appendix 2.) Severance taxes help ensure that costs associated with resource extraction are paid by the producers, alleviating

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[205] *Anschutz Exploration Corp. v. Town of Dryden* (Tompkins County Supreme Court Feb. 21, 2012), http://dryden.ny.us/Downloads/DrydenCourtDecision.pdf .

[206] Poyner Spruill LLP, *supra* n. 203, *Literally, A Million Dollar Question*, http://www.jdsupra.com/post/documentViewer.aspx?fid=9c8a6e6a-491e-462a-8113-ba249b7ced42.

[207] *Id.*, http://www.jdsupra.com/post/documentViewer.aspx?fid=9c8a6e6a-491e-462a-8113-ba249b7ced42.

[208] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[209] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

some of the potential economic burden that would otherwise befall state and local taxpayers.[210]

In 2010, more than $11 billion was generated from severance taxes across the United States, and in at least six states—Alaska, Montana, New Mexico, North Dakota, Oklahoma, and Wyoming—between 10.5 and 74.3 percent of total state tax revenue came from severance taxes.[211] At least thirty-six states impose some sort of severance tax, and thirty-one states specifically levy taxes on oil and gas extraction.[212] Pennsylvania remains the largest natural gas-producing state that has no severance tax; however, it recently enacted legislation to impose an impact fee, which is somewhat similar in nature and result.[213]

At least eleven states considered legislation in 2012 to impose new, or amend existing, oil and gas severance taxes.[214] The map in Figure 8 below shows which states have severance tax provisions in place, which are considering amending them, and which are considering implementing new severance tax provisions.

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[210] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[211] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[212] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[213] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[214] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; see *Oil and Gas Severance Taxes: States Work to Alleviate Fiscal Pressures amid the Natural Gas Boom* for 50-state charts that detail existing severance tax rates and structures, and pending state legislation that would impose new—or amend existing—oil and gas severance taxes, available at http://www.ncsl.org/issues-research/energyhome/oil-and-gas-severance-taxes.aspx.

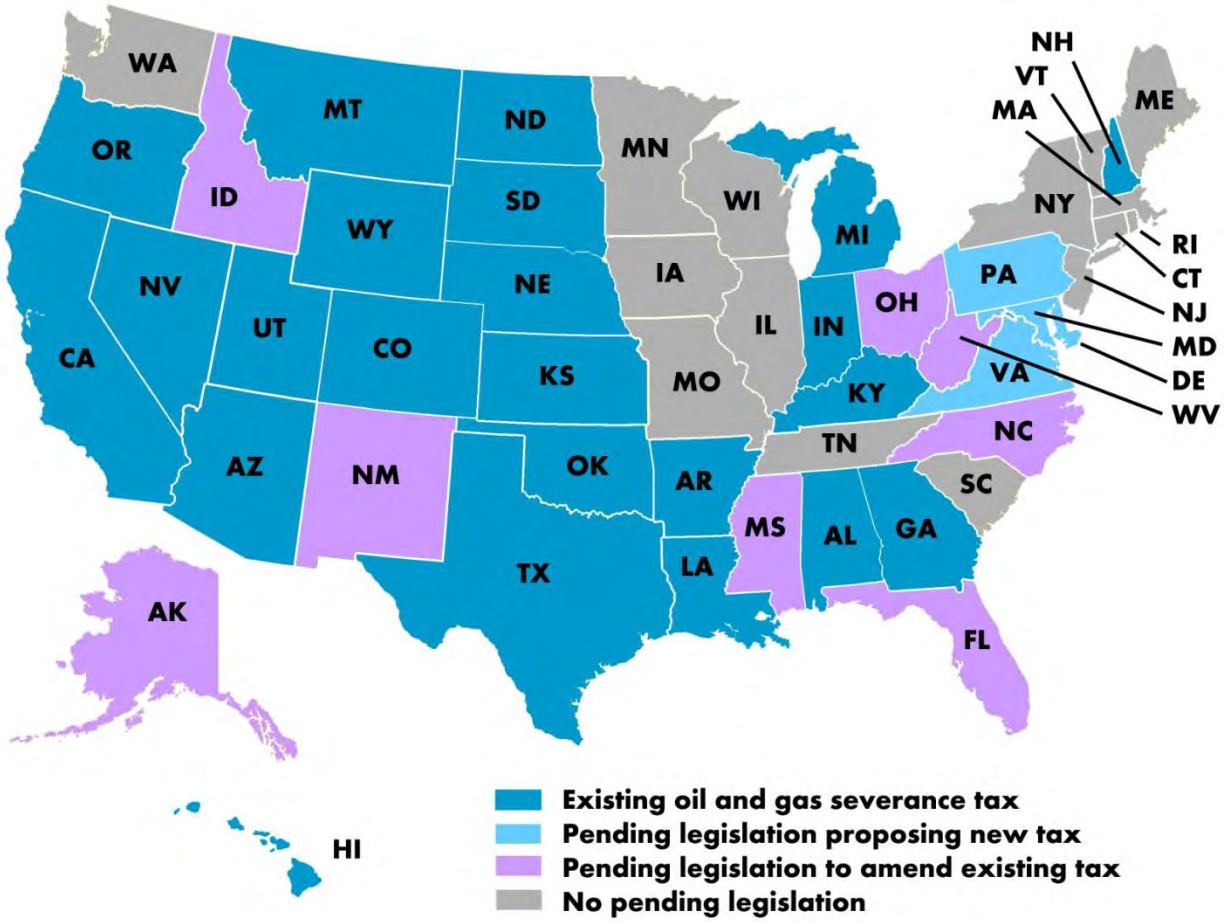

Figure 8. Oil and Gas Severance Tax Laws and Proposed Legislation[215]

Idaho, for example, recently enacted H.B. 379 to increase the state's oil and gas conservation tax from 2 to 2.5 percent of the market value of the extracted oil or gas, and at least thirteen bills were introduced in Pennsylvania that present a range of proposed rates and structures.[216]

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[215] *See* Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[216] *Id.*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

As noted above, states may also impose impact fees, which are generally established as a set fee per well drilled. Impact fees are imposed, as one could imagine, to offset the *impact* that hydraulic fracturing has on local communities. Pennsylvania enacted H.B. 1950 in February 2012 to place an impact fee on every well drilling for gas in the Marcellus Shale region, based on the average price of natural gas during the preceding year.[217] In 2012, drillers paid $50,000 per well. Smaller, vertical wells, by contrast, paid only $10,000 in 2012.[218] The fee is capped at $355,000 per well during a fifteen-year period.[219]

Sixty percent of the fees collected in Pennsylvania will stay at the local level, going to the counties and cities hosting wells.[220] The rest will go to various state agencies. Although the fees are administered and collected at the state level, each county may decide whether or not to enact an impact fee. If any county chooses *not* to impose a fee, the individual municipalities within that county will have sixty days to over-ride the decision. If more than half of the county's townships and boroughs pass a resolution calling for an impact fee, the levy will automatically be adopted.[221]

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[217] StateImpact, *What the New Impact Fee Law, Act 13, Means for Pennsylvania*, http://stateimpact.npr.org/pennsylvania/tag/impact-fee/.

[218] *Id.*, http://stateimpact.npr.org/pennsylvania/tag/impact-fee/.

[219] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[220] StateImpact, *supra* n. 217, http://stateimpact.npr.org/pennsylvania/tag/impact-fee/.

[221] *Id.*, http://stateimpact.npr.org/pennsylvania/tag/impact-fee/.

F. Disclosure Laws

Chemical disclosure has emerged as a key issue in fracking legislation in many states.[222] Lawmakers in at least sixteen states want to require drilling companies to reveal the contents of the fracking fluid that they inject into the ground. (*See* Table 1 in Appendix 2.) A handful of states, including Wyoming, Texas, Pennsylvania, and Colorado, enacted disclosure laws even before the 2012 legislative session. Ohio and Oklahoma followed suit in 2012, and Pennsylvania added additional requirements to its existing disclosure law. The Indiana Legislature passed a law requiring regulators to draw up disclosure rules,[223] and some states—including Illinois and Pennsylvania—are considering requiring companies to use FracFocus, the national online chemical disclosure registry of the Interstate Oil and Gas Compact Commission and the Groundwater Protection Council, while others require the use of state agency websites for reporting.[224]

Figure 9 below summarizes the disclosure laws and proposed legislation in map form.

[222] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[223] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

[224] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

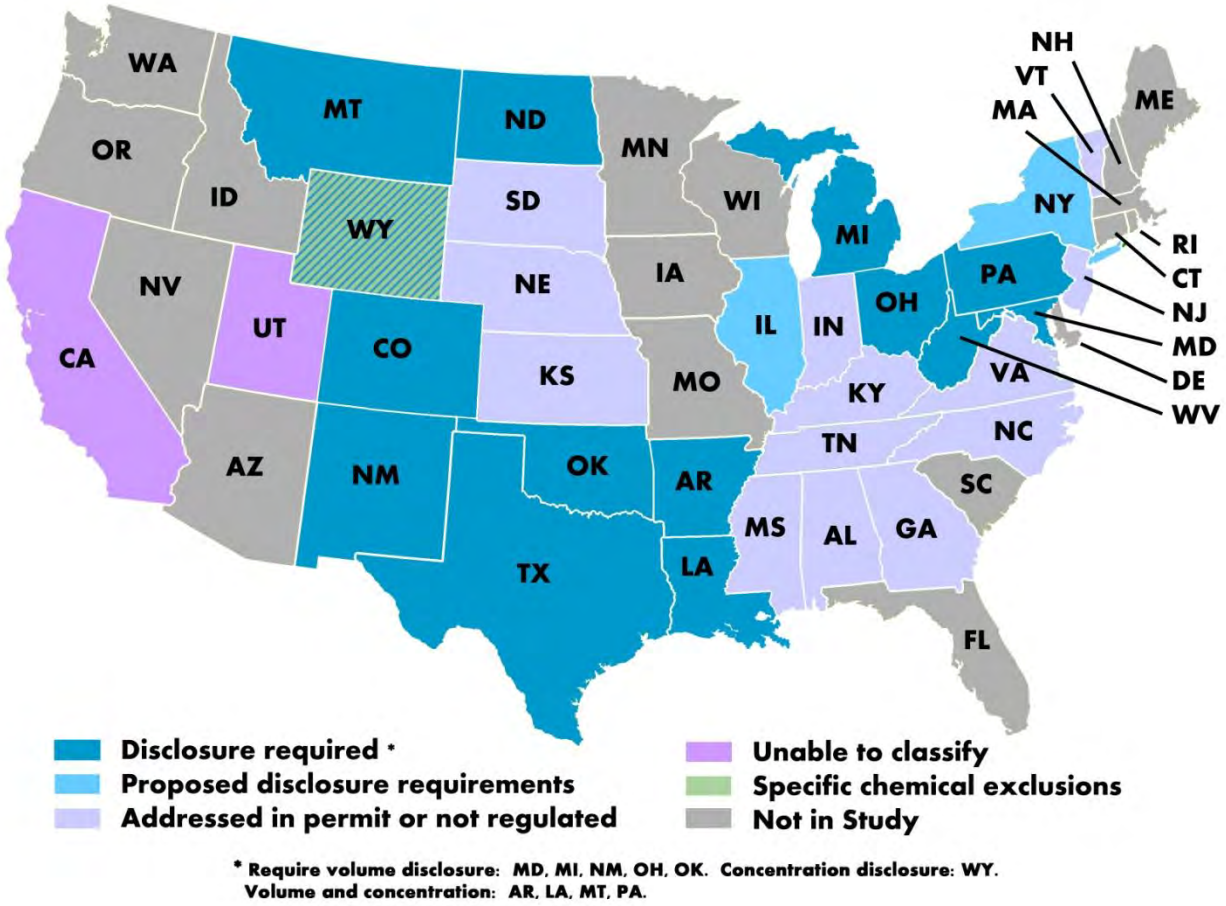

Figure 9. Fracking Fluid Disclosure Laws[225]

Texas is the nation's top producer of natural gas, so it may come as no surprise that it was at the legislative forefront in responding to fracking-related issues.[226] In 2011, Texas became the first state to enact a law specifically directed toward hydraulic fracturing operations. Section 91.851 of the Natural Resources Code requires hydraulic

[225] Information from Brad Plumer, *How States Are Regulating Fracking (In Maps)*, The Washington Post, July 16, 2012, http://www.washingtonpost.com/blogs/ezra-klein/wp/2012/07/16/how-states-are-regulating-fracking-in-maps/ and Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[226] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx.

fracturing operators to disclose, among other things, the total amount of water used and the chemical ingredients used in fracturing fluids.[227] Disclosures may be made through the online chemical disclosure registry. The Texas law also provides a process by which operators may assert a trade secret privilege with regard to the chemical ingredients used in their hydraulic fracturing fluids. Trade secret protection does not apply in cases of medical emergencies.[228]

The Ohio and Pennsylvania rules also require drilling companies to disclose chemical information to physicians treating a patient who has been exposed, but the rules prohibit doctors from sharing this information with their peers.[229] Even Colorado's disclosure law, considered the country's strictest, allows for trade secrets. The Colorado law does, however, require companies to justify to regulators why a chemical should be considered "secret" and to reveal its chemical family.[230]

Environmental and public health groups have criticized most state disclosure rules as being too weak, because they allow the fracking companies to decide which chemicals are classified as trade secrets and therefore do not need to be disclosed.[231]

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[227] Tex. Nat. Res. Code Ann. § 91.851 (2011).

[228] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; Tex. Nat. Res. Code Ann. § 91.851.

[229] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; *see also* Brandon J. Murrill & Adam Vann, *Hydraulic Fracturing: Chemical Disclosure Requirements* (Congressional Research Service, June 19, 2012), http://www.fas.org/sgp/crs/misc/R42461.pdf.

[230] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[231] Pless, *supra* n. 17, *A New Method of Extracting Natural Gas Has Yielded a Bounty of Supply, Along with Health and Environmental Concerns*, http://www.ncsl.org/issues-research/energyhome/fracking-fracas.aspx; Tex. Nat. Res. Code Ann. § 91.851.

Lisa Brown, a Michigan state representative, says that she "think[s] anyone has the right to know what's going into the ground." Brown proposed the bill that would require greater chemical disclosure in Michigan, where drillers have their eyes on the Antrim Shale deposit that stretches beneath most of the Lower Peninsula.[232]

Some oil and gas companies, such as Chesapeake Energy, voluntarily disclose the chemicals they use by posting the information on FracFocus.org, the website set up by the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission to serve as a clearinghouse for information on hydraulic fracturing.[233]

G. Permitting Requirements

All oil and gas producing states have some type of permitting requirement governing the location, drilling, completion, and/or operation of wells.[234] In most states, the legislature has delegated the authority to oversee the permitting process to an oil and gas division, commission, or board (*see* Appendix 3 for a list of state agencies). The regulatory authority usually includes technical staff such as engineers, geologists, and environmental scientists who are trained and qualified to review applications for water resource protection purposes.[235] Some states also require a geologist or engineer

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[232] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[233] *Id.*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[234] Janie Hauser, *Regulation of Hydraulic Fracturing: An Overview of Permitting Systems in Seven Oil and Gas Producing States* (N.C. Dep't of Environment & Natural Resources, Summer 2010), http://portal.ncdenr.org/c/document_library/get_file?uuid=64645d1d-80a0-4885-8478-cf2c59b9726f&groupId=14.

[235] *Id.*, http://portal.ncdenr.org/c/document_library/get_file?uuid=64645d1d-80a0-4885-8478-cf2c59b9726f&groupId=14 & n. 3 therein (citing Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 Fordham Envtl. L. Rev. 115 (2009)).

to review drilling permit applications.[236] The permitting process is important for several reasons. It provides the applicant-operator with an overview of the regulations regarding drilling, while also providing the regulatory agency with the applicant's plan for drilling, including well location, depth, construction, water use, waste disposal, and emergency plans.[237]

Permitting requirements may interrelate with state disclosure laws (see the map in Figure 9, above), wastewater treatment requirements, use of the state's infrastructure, fracking moratoriums, or a variety of technical requirements. In New York, for instance, former Governor Paterson signed an executive order banning any new permits for "high-volume, horizontal hydraulic fracturing" until studies confirmed the practice's environmental safety, thereby effectively invoking a moratorium.[238] No drilling permits will be issued in New York until both the environmental impact statement and

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[236] *Id.*, http://portal.ncdenr.org/c/document_library/get_file?uuid=64645d1d-80a0-4885-8478-cf2c59b9726f&groupId=14.

[237] For more information on state permitting requirements, see *id.*, http://portal.ncdenr.org/c/document_library/get_file?uuid=64645d1d-80a0-4885-8478-cf2c59b9726f&groupId=14.

[238] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; *Executive Order No. 41: Requiring Further Environmental Review* (New York State Office of the Governor, Dec. 13, 2010), http://www.governor.ny.gov/archive/paterson/executiveorders/EO41.html.

any new regulations are finalized.[239] Other pending legislation in New York (A.B. 6426) would require permits for water withdrawals of more than 5,000 gallons.[240]

Horizontal fracking had occurred in West Virginia for several years before, in 2011, Governor Tomblin ordered the State Department of Environmental Protection to issue emergency rules focused on fracking, while lawmakers continued their work on crafting more permanent regulations.[241] The new rules include regulations on permits, well construction, drilling location, and water withdrawals. Although environmentalists did not fully endorse the new rules, James Morton, a West Virginia oil and gas regulator, stated that West Virginia is "in a much better position now. The [previous] regulatory framework was not built for this kind of activity."[242]

Also in 2011, Maryland Governor O'Malley issued an executive order establishing a commission to conduct a three-part study of drilling for natural gas from the Marcellus Shale in Western Maryland, and to present findings and recommendations pertaining to revenue generation, liability standards, environmental impacts, economic impacts, and best practices.[243] The final part of the study is not due

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[239] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; *Protecting the Environment, Water Resources and Public Water Supplies* (New York State Department of Environmental Conservation 2012), http://www.dec.ny.gov/energy/46288.html; Edward McAllister, *New York Extends Period for Comments on Fracking*, Reuters, Sept. 7, 2011, http://www.reuters.com/article/2011/09/07/us-newyork-fracking-idUSTRE7866QG20110907.

[240] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[241] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[242] *Id.*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

[243] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; *The Marcellus Shale*

until 2014. Maryland has not yet issued any shale-gas drilling permits, and some opine that the study is likely to further delay any permitting.[244]

While some permitting legislation effectuates a moratorium, other permitting laws act as fee generators. In West Virginia, a special legislative committee convened in late 2011 to consider whether to charge natural gas operators $10,000 in permit fees to drill an initial well in the Marcellus Shale field, and $5,000 in permit fees for each subsequent well at that location.[245] Senate Bill 42454 and House Bill 287855, both still under consideration in 2012, would establish permit fees and give the Department of Environmental Protection additional enforcement powers.[246]

The Environmental Protection Agency also gets in on the permitting action. The EPA urged Pennsylvania officials to take a series of additional steps to strengthen that state's regulation of wastewater from fracking operations, including reevaluating permits at wastewater treatment plants that are accepting drilling waste.[247]

Safe Drilling Initiative – Executive Order (State of Maryland Office of the Governor, June 6, 2011), http://www.governor.maryland.gov/executiveorders/01.01.2011.11.pdf.

[244] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; Tim Wheeler, *Baltimore's Drinking Water at Risk from Shale Gas Waste?*, The Baltimore Sun, Feb. 28, 2011, http://weblogs.baltimoresun.com/features/green/2011/02/nyt_finds_radioactive_shale_ga.html.

[245] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; Lawrence Messina, *W.Va. Marcellus Committee Clears Permit Fee Hurdle*, Bloomberg Businessweek, Sept. 15, 2011, http://www.businessweek.com/ap/financialnews/D9PP0B3O0.htm.

[246] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; West Virginia Senate Bill No. 424, *available at* http://www.legis.state.wv.us/bill_status/bills_text.cfm?billdoc=sb424%20intr.htm&yr=2011&sesstype=RS&i=424; West Virginia House Bill No. 2878, *available at* http://www.legis.state.wv.us/bill_status/bills_text.cfm?billdoc=hb2878%20intr.htm&yr=2011&sesstype=RS&i=2878.

[247] *Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf; US EPA, *Letter From*

H. Technical Regulations

State legislatures are also taking steps to help protect water quality by creating well location, water withdrawal, flowback, and waste regulations, as well as setting casing and mechanical integrity requirements.[248] Table 2 in Appendix 2 details technical legislation introduced in the first half of 2012, the highlights of which are summarized below.

1. Spill and Leak Prevention through Mechanical Integrity Tests or Casing Requirements

Research suggests that above-ground spills, leaky drill casings, and wastewater mishandling could be causing groundwater pollution.[249] Possible solutions include more stringent regulation of drill casings or other mechanical integrity measures to prevent spills and leaks. Pending H.B. 3897 in Illinois, for instance, requires integrity testing of casings and other mechanical testing prior to hydraulic fracturing in that state. New York's pending A.B. 6540 would require certificates of competence to use a derrick or other drilling equipment. A few pending bills in Pennsylvania (S.B. 425, H.B. 971, and H.B. 1645) address casing requirements as well.[250]

Shawn M. Garvin, Regional Administrator, to Hon. Michael Krancer, Acting Secretary, Pennsylvania Department of Environmental Protection, May 12, 2011, http://www.epa.gov/region3/marcellus_shale/pdf/letter/krancer-letter5-12-11.pdf.

[248] Pless, supra n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[249] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf (citing research conducted by the Energy Institute at the University of Texas).

[250] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

2. Wastewater Transportation Requirements

Concerns about possible spills during fracking waste transportation have spurred some states to take action to mitigate the risk. For example, Pennsylvania's pending H.B. 1741 would require trucks to display a placard on the outside of the vehicle indicating that they are carrying hydraulic fracturing wastewater.[251]

3. Regulations for Treating and Disposing of Waste

State reaction to waste treatment and disposal concerns has varied, due in part to each region's unique geological factors. Illinois's pending H.B. 389 addresses disposal and reuse of well stimulation fluid that is recovered during flowback, and S.B. 3280 addresses the storage of such fluids.[252] Two pending New Jersey bills (A.B. 575 and S.B. 253) prohibit treatment, discharge, disposal, and/or storage of fracking wastewater in the state. And New York's pending A.B. 6488 would require treatment facilities to refuse industrial fracking waste that contains high levels of radium. Under the proposed legislation, waste must be tested for radioactive containments. The bill also provides for scheduled wastewater discharges.[253]

4. Well Location Restrictions

In 2012, a number of states considered well setback or location restrictions to create buffers between drilling and public drinking water resources. New York's pending A.B. 4237 and S.B. 1230 would prohibit drilling within ten miles of the New York City

[251] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[252] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[253] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

water supply infrastructure. A few pending Pennsylvania bills address well spacing or location restrictions. H.B. 230 would prohibit drilling within the surface or subsurface area of, or using hydraulic fracturing or horizontal drilling within 2,500 feet of any, primary source of a community water system.[254]

5. Water Withdrawal and Quality Monitoring

State legislatures are also considering managing water withdrawals, particularly in areas where there is competition for scarce water supplies. In California, pending A.B. 591 would require recording the amount and source of water used in hydraulic fracturing operations. Pending legislation in New York (S.B. 1234) would also regulate water withdrawals, and A.B. 6426 would require permits for withdrawals of more than 5,000 gallons.[255]

In addition to water *quantity* measures, some states are acknowledging that water *quality* monitoring could help increase knowledge of how hydraulic fracturing affects both water supplies and water quality. In New York, for instance, pending legislation (S.B. 3483 and A.B. 7986) would require groundwater testing before and after drilling wells for oil and gas.[256] Performing this kind of testing can help operators avoid liability, even when it is not legally required. The Marcellus Shale Coalition, for instance, released new recommended practices in August 2012 calling for natural gas producers to take groundwater samples before beginning any drilling activity, in order to protect drillers from a presumption of liability for any contamination later discovered

[254] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[255] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[256] *Id.*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

near gas wells.[257] The guidance comes after the passage of Pennsylvania's Act 13, a set of rules governing natural gas drilling that includes a provision for a presumption of liability for any water contamination that occurs with twelve months and 2,500 feet of certain wells that utilize hydraulic fracturing.[258]

6. Venting Regulations

While much of the recent legislation deals with water-related issues, air quality is also a major concern. Twenty-two states have imposed restrictions on well venting.[259] The venting process can release heat-trapping methane into the atmosphere, as well as "volatile organic compounds" such as benzene, which can produce smog and trigger health problems.[260] Some states ban the practice entirely, while others restrict it to emergencies or require that operators not harm public health. The map below illustrates how different states treat "venting," or the release of excess gas into the air as a result of hydraulic fracturing operations.

[257] *MSC Releases Recommended Practice for Pre-Drill Water Sampling*, Marcellus Shale Coalition Press Release, Aug. 28, 2012, http://marcelluscoalition.org/2012/08/msc-releases-recommended-practice-for-pre-drill-water-sampling/; *see also* Pennsylvania Public Utility Commission, Act 13 (Impact Fee), http://www.puc.state.pa.us/naturalgas/naturalgas_marcellus_Shale.aspx.

[258] *MSC Releases Recommended Practice for Pre-Drill Water Sampling*, Marcellus Shale Coalition Press Release, Aug. 28, 2012, http://marcelluscoalition.org/2012/08/msc-releases-recommended-practice-for-pre-drill-water-sampling/.

[259] Plumer, *supra* n. 225, *How States Are Regulating Fracking (In Maps)*, http://www.washingtonpost.com/blogs/ezra-klein/wp/2012/07/16/how-states-are-regulating-fracking-in-maps/:.

[260] *Id.*, http://www.washingtonpost.com/blogs/ezra-klein/wp/2012/07/16/how-states-are-regulating-fracking-in-maps/:; *Study Shows Air Emissions Near Fracking Sites May Pose Health Risk*, *supra* n. 95, http://www.ucdenver.edu/about/newsroom/newsreleases/Pages/health-impacts-of-fracking-emissions.aspx and http://attheforefront.ucdenver.edu/?p=2546%2526utm_source=feedburner%2526utm_medium=feed%2526utm_campaign=Feed%25253A%252Btheforefront%252B%252528%252540theForefront%252529.

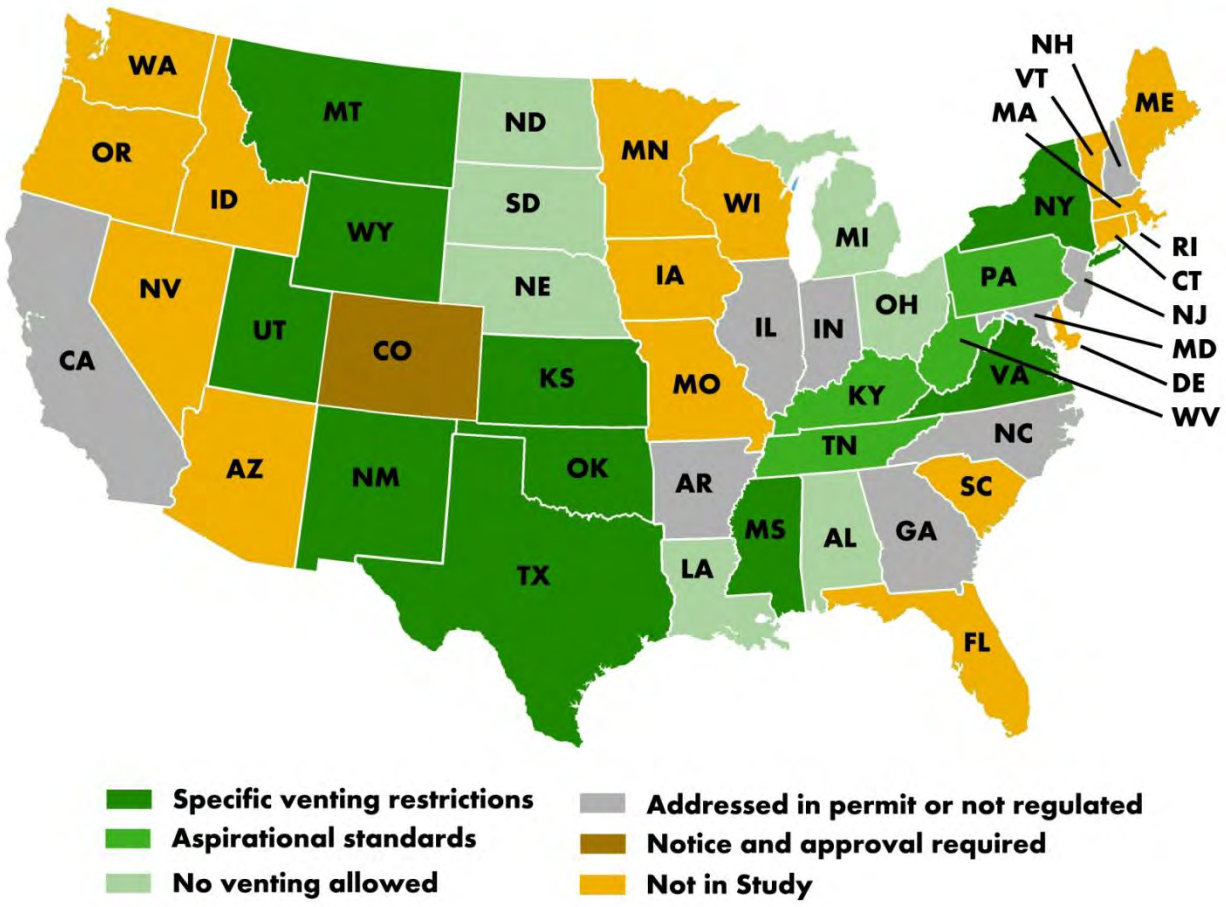

Figure 10. Hydraulic Fracturing Venting Regulations[261]

I. Oil and Gas Lease Recording Requirements

Although it may not be one of the hottest legislative topics, it is also important to note that various state laws address oil and gas lease recording requirements. Not all states require deed recordation, which can create problems from a realtor's perspective. If a lease is not recorded, a property buyer may not know whether the mineral rights have already been separated from the land, and a fair appraisal could not be performed. Oil and gas companies may oppose recording leases, because recording requirements

[261] Information from Plumer, *supra* n. 225, *How States Are Regulating Fracking (In Maps)*, http://www.washingtonpost.com/blogs/ezra-klein/wp/2012/07/16/how-states-are-regulating-fracking-in-maps/.

may force them to disclose a lot about their operations, including what they are paying for leases. In some states, such as Pennsylvania, parties have the option of recording a memorandum of a lease as opposed to the lease itself, in order to keep sensitive financial or other lease provisions from becoming part of the public record.[262]

Recordation of leases is particularly important in the oil and gas context, because a subsequent interest holder will generally not have actual notice of the earlier lease. Many years may pass after an oil and gas lease is executed before any surface activities occur. And when horizontal drilling is involved, the operator may enjoy its rights under an oil and gas lease without conducting any activities on the surface.

The Ohio legislature has been tinkering with its oil and gas leasing law in recent sessions. Oil and gas lease recording in Ohio is governed by Ohio Code § 5301.09, which provides:

> All leases, licenses, and assignments thereof, or of any interest therein, given or made concerning lands or tenements in this state, by which any right is granted to operate or to sink or drill wells thereon for natural gas and petroleum or either, or pertaining thereto, shall be filed for record and recorded in such lease record without delay, and shall not be removed until recorded.[263]

In 2010, Senate Bill 165 significantly amended Ohio's oil and gas law, which is found primarily in Chapter 1509 of the Ohio Revised Code.[264] Among other changes, the bill added § 1509.31(D) to the Code, creating a new priority for oil and gas leases,

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[262] *See* 21 Pa. C.S. § 405.

[263] Ohio Rev. Code § 5301.09 (2012).

[264] *Super Priority of Oil and Gas Leases* (Ohio Title Corp. Aug. 2010), http://lookbeforeyoulease.files.wordpress.com/2011/10/oil-and-gas-foreclosure.pdf; Ohio Rev. Code ch. 1509 (2012).

pipeline agreements, and other instruments related to the production or sale of oil or natural gas. Section 1509.31(D) states:

> If a mortgaged property that is being foreclosed is subject to an oil or gas lease, pipeline agreement, or other instrument related to the production or sale of oil or natural gas and the lease, agreement, or other instrument was recorded subsequent to the mortgage, and if the lease, agreement, or other instrument is not in default, the oil or gas lease, pipeline agreement, or other instrument, as applicable, has priority over all other liens, claims, or encumbrances on the property so that the oil or gas lease, pipeline agreement, or other instrument is not terminated or extinguished upon the foreclosure sale of the mortgaged property. If the owner of the mortgaged property was entitled to oil and gas royalties before the foreclosure sale, the oil or gas royalties shall be paid to the purchaser of the foreclosed property.[265]

In other words, when an oil and gas lease or other instrument related to the production or sale of oil or natural gas is recorded after a mortgage has been recorded, and the oil and gas lease or other instrument is not in default, the oil and gas lease or other instrument will have priority over all other liens on the property and will not be terminated even by the subsequent foreclosure of that mortgage.

This is an important detail for those involved in real estate transactions. Commentators suggest that lawyers, lenders, builders, and others involved in real estate deals should expect to see a new exception in Schedule B of all title insurance commitments and loan policies issued after June 30, 2010, addressing the new priority this statute affords to oil and gas leases and other instruments related to the production or sale of oil or natural gas.[266]

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[265] Ohio Rev. Code § 1509.31.

[266] *Super Priority of Oil and Gas Leases*, *supra* n. 264, http://lookbeforeyoulease.files.wordpress.com/2011/10/oil-and-gas-foreclosure.pdf.

In Pennsylvania, the failure to record an oil and gas lease, or a memorandum of the lease that complies with statutory formalities, may expose the lessee to a superior claim by a subsequent interest holder such as a purchaser, other lessee, mortgagee, or easement holder.[267] Because granting an oil and gas lease affects the rights of a subsequent interest holder, the lease (or a memorandum) must be on record to protect the lessee against the claim of a party that obtains its interest in good faith.[268] If the lease or a memorandum thereof is properly recorded, it puts third parties on constructive notice of the lessee's interest in the leased property, and those rights will be recognized as superior to those of a subsequent interest holder.[269]

Pennsylvania's recording statute enumerates the elements that must be contained in a memorandum of a lease, which include:

- The lessee's and lessor's names;
- The lessee's and lessor's addresses (if contained in the lease);
- The date of the lease;
- A description of the demised premises as set forth in the lease;

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[267] Lisa McManus, *Recording Memoranda of Pipeline Right-of-Way Option Agreements in Pennsylvania* (LexisNexis Emerging Issues Law Community, Sept. 20, 2010), http://www.lexisnexis.com/community/emergingissues/blogs/oilgasandenergylaw/archive/2010/09/20/recording-memoranda-of-pipeline-right-of-way-option-agreements-in-pennsylvania.aspx; Babst Calland Clements Zomnir P.C., *Failure to Properly Record a Memorandum of Oil & Gas Lease Has Potentially Dire Consequences*, Administrative Law Watch, Sept. 2010, http://www.babstcalland.com/legal-resources/documents/failure-to-properly-record-a-memorandum-of-oil-and-gas-lease.pdf.

[268] *See Lesnick v. Chartiers Natural Gas Co.*, 889 A.2d 1282 (Pa. Super. Ct. 2005).

[269] *Failure to Properly Record a Memorandum of Oil & Gas Lease Has Potentially Dire Consequences*, *supra* n. 267, http://www.babstcalland.com/legal-resources/documents/failure-to-properly-record-a-memorandum-of-oil-and-gas-lease.pdf.

- The date the lease commences, if it is a fixed date, and if it is not, the full provision(s) of the lease pursuant to which the commencement date is to be determined;
- The lease term;
- If the lessee has a right to extend or renew the lease term, the date such right expires; and
- If the lessee has a right of purchase or refusal relating to the leased property, a statement of the term during which such right is exercisable.[270]

The Pennsylvania statute also requires that a memorandum of lease be executed by all parties to the lease, and acknowledged by the lessor according to law (e.g., acknowledgement before a notary public that the signing of the memorandum is the lessor's voluntary and willful act).[271]

J. Impact of the Fracking Debate on the Political Process

With such a broad range of fracking-related issues to regulate, lawmakers in some states have often faced difficulties in enacting rules on which both political parties can agree. Ohio is one such state. Republican Governor John Kasich has reached out to the National Resources Defense Council, urging the organization to draft model regulations that states could follow.[272]

The disagreement between Republicans and Democrats is just one source of controversy. The outpouring of campaign contributions from certain influential segments

[270] 21 P.S. § 405.

[271] *Id.*

[272] Malewitz, *supra* n. 173, *States Scramble to Regulate Fracking*, http://www.pewstates.org/projects/stateline/headlines/states-scramble-to-regulate-fracking-85899385716.

has raised some eyebrows in North Carolina.[273] North Carolina Voters for Clean Elections reported that natural gas companies and related political action groups have donated hundreds of thousands of dollars to state lawmakers in recent years, with most of it going to those who last year voted in favor of legislation in support of fast-tracking the study and implementation of hydraulic fracturing.[274]

As mentioned above, the North Carolina Legislature recently passed the Energy Jobs Act, but Governor Bev Perdue vetoed it.[275] Then, in a dramatic turn of events, Rep. Becky Carney, a Democrat who opposes fracking, pushed the wrong button and accidentally voted with Republicans to override the veto. A maneuver by Republican "Skip" Stam prevented Carney from changing her vote, giving the GOP an historic one-vote margin of victory.[276] The Energy Jobs Act is now North Carolina law.

According to the Clean Elections group, between 2009 and 2011 natural gas supporters gave an average of more than $4,300 to the sixty-nine North Carolina House members who voted in favor the bill—nearly twice what was given to the forty-two members who voted against it.[277] The bill's thirty-five supporters in the Senate netted an

[273] Jim Malewitz, *Report: N.C. Fracking Debate Draws Campaign Contributions*, Stateline, June 1, 2012, http://www.pewstates.org/projects/stateline/headlines/report-nc-fracking-debate-draws-campaign-contributions-85899395288.

[274] *Id.*, http://www.pewstates.org/projects/stateline/headlines/report-nc-fracking-debate-draws-campaign-contributions-85899395288.

[275] *Id.*, http://www.pewstates.org/projects/stateline/headlines/report-nc-fracking-debate-draws-campaign-contributions-85899395288.

[276] Murawski, *supra* n. 177, *Carney's Mistaken Vote Is Key in Fracking Override*, http://www.charlotteobserver.com/2012/07/03/3357704/state-senate-overrides-gov-perdues.html.

[277] Malewitz, *supra* n. 272, *Report: N.C. Fracking Debate Draws Campaign Contributions*, http://www.pewstates.org/projects/stateline/headlines/report-nc-fracking-debate-draws-campaign-contributions-85899395288.

average of nearly $6,000 in contributions—about $1,000 a piece more than the ten members who voted "no." The bill's sponsors are said to have fared even better. House Speaker Thom Tillis, who didn't cast a vote but ferried the bill to the House floor, received more than $43,600 from the bill's potential beneficiaries over the same three-year period, and Senator Robert Rucho, who introduced the bill in the Senate, is reported to have received $20,500.[278]

K. Other Fracking-Related Legal Action

While much of the hydraulic fracturing legal activity occurs in state legislatures, municipal chambers, and state board offices, there are also other types of legal actions affecting the practice and impact of hydraulic fracturing. State attorneys general may issue executive orders, for instance, mandating studies of fracking impacts, or initiate fracking-related litigation on behalf of the public.[279] Federal and state environmental agency enforcement actions may result in penalties for oil and gas companies, and/or payouts to private individuals.[280]

Private litigation runs the gamut, from trespass actions by individual property owners, to personal injury lawsuits and ownership disputes involving those claiming to

[278] *Id.*, http://www.pewstates.org/projects/stateline/headlines/report-nc-fracking-debate-draws-campaign-contributions-85899395288.

[279] *See generally Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf.

[280] Warner Norcross & Judd, *Integrated Production Services to Pay $162,000 After Pleading Guilty to Violating the Clean Water Act* (JDSupra, Oct. 14, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=edd188d3-6f8a-442a-b716-253200f5fb3d; Duane Morris LLP, *DEP Aims for More Consistency in Enforcement of Drilling Regulations* (JDSupra, Nov. 30, 2011), http://www.jdsupra.com/post/documentViewer.aspx?fid=cfd01431-fa92-42af-87a1-c11e19c20db9; *see also Select State Laws Governing Hydraulic Fracturing in the Marcellus Shale*, *supra* n. 198, http://www.networkforphl.org/_asset/81s40f/Fracking_State_Law_Summary.pdf.

be affected by hydraulic fracturing.[281] Lawsuits have been filed in several states alleging damages from the health impacts of hydraulic fracturing.[282] Indeed, fracking-related lawsuits are such a hot topic that some lawyers are specifically courting potential clients who have been impacted in one way or another by hydraulic fracturing.[283]

[281] *See, e.g.*, Beverlee E. Silva & Joshua Becker, *Lawsuits Related to Shale Gas Drilling* (2012 AAPL Annual Meeting) (PowerPoint Presentation), http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=3&sqi=2&ved=0CCoQFjAC&url=http%3A%2F%2Fwww.landman.org%2Fdocs%2Fwhite-papers%2F2-joshbecker_beverleesilva.pptx&ei=cBc5UNTlDIaQ8wT70YDgBg&usg=AFQjCNGDiptgC0giPTLxREndZUiqJfVu2w&sig2=RCTkXVVDqgd1haEk4Be7jA; *Is Marcellus Shale a "Mineral," and Who Owns the Natural Gas in the Shale? (*K&L Gates, Sept. 20, 2011), http://www.klgates.com/files/Publication/4cc337e1-87b7-4cb9-b3d7-92631cd5aa1e/Presentation/PublicationAttachment/60721d83-7626-41b6-a9fb-970f131e539b/Alert_Marcellus_Mineral_092011.pdf.

[282] *Trends Emerge on Hydraulic Fracturing Litigation*, Oil & Gas Journal, Dec. 5, 2011, http://www.ogj.com/articles/print/volume-109/issue-49/drilling-production/trends-emerge-on-hydraulic-p1.html (login required).

[283] *See, e.g.*, *Hydraulic Fracturing—Fracking Contamination Lawsuits* (Parker Waichman LLP, Aug. 3, 2011), http://www.yourlawyer.com/topics/overview/hydraulic_fracturing_fracking.

Beware the Rule of Capture

Most landowners assume that they own everything beneath the surface of their property, unless they have formally conveyed it. They may be surprised to learn that a neighbor may be allowed to siphon off the oil and gas from beneath their property without their permission. Unlike static minerals such as iron and coal, oil and gas can move about or migrate while still underground. They are, therefore, considered "fugacious" minerals. This fugacious quality makes it possible to put a well on one piece of property and extract the oil and gas from beneath others. Not only is this practice technically possible, it can be done without much fear of liability, and happens all the time, thanks to the "rule of capture." When gas and oil is produced, it is, in essence, captured by the new owner. Title to oil and gas passes to its producer.

The rule of capture says that you own all of the oil and gas that is produced from a well drilled on your land, even if that oil and gas comes from draining reserves beneath adjoining lands owned by others. The remedy for the adjacent landowner in such circumstances is to drill her own well, called an "offset well."

While the rule of capture may seem unfair in some respects, it has a long judicial history, and is at the foundation of US oil and gas law. The rule does not give the individual producer or operator complete free rein; the effects of the rule are ameliorated, to some extent, by the doctrine of "correlative rights." Largely a product of case law, the correlative-rights doctrine allows enactment of state statutes that limit production. For example, an operator who is producing from a well cannot waste oil, or use a method that is prohibited by a state statute or regulation. States have responded to the threat of plunder posed by the rule by enacting statutes that dictate well spacing, or the minimum distance a well can be drilled from a boundary.

The highest court in Texas held that the rule of capture protected an operator who used hydraulic fracturing against trespass liability, even though fracking moves fluids and proppants across property lines. "The primary issue in this appeal is whether subsurface hydraulic fracturing of a natural gas well that extends into another's property is trespass for which the value of gas drained as a result may be recovered as damages. We hold that the rule of capture bars recovery of such damages." *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W. 3d 1 (Tex. 2008). It will be interesting to see what challenges and rulings are made in other states.

Monitoring the sea of change in the hydraulic-fracturing legal arena is no small feat.[284] From a REALTOR®'s perspective, one of the more relevant areas to watch relates to property ownership interests, which has also seen its share of recent litigation. In *Butler v. Charles Powers Estate*,[285] for instance, the Pennsylvania Superior Court remanded the case to the trial court for further proceedings to determine whether the heirs of a grantor who reserved only "minerals" and "petroleum oils" in a deed also reserved natural gas from the Marcellus Shale formation.[286] The decision potentially opened the door for operators, who had acquired tens of thousands of mineral rights deeds or leases, to be stripped of the opportunity to drill for shale gas. The Pennsylvania Supreme Court denied the Pennsylvania Independent Oil & Gas Association's application for leave to file an amicus statement in support of an appeal of the remand decision, but the Pennsylvania Supreme Court did agree to hear the appeal.[287]

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[284] For a summary recent fracking-related litigation in Texas alone, see Goldman, *Drilling Into Hydraulic Fracturing and Shale Gas Development, supra* n. 33, http://www.jdsupra.com/post/documentViewer.aspx?fid=2ac95e22-736b-4a29-8dfa-4c3a19bb4162.

[285] *Butler v. Charles Powers Estate*, 29 A.3d 35 (Pa. Super Ct. 2011).

[286] *See Is Marcellus Shale a "Mineral," and Who Owns the Natural Gas in the Shale?, supra* n. 280, http://www.klgates.com/files/Publication/4cc337e1-87b7-4cb9-b3d7-92631cd5aa1e/Presentation/PublicationAttachment/60721d83-7626-41b6-a9fb-970f131e539b/Alert_Marcellus_Mineral_092011.pdf; Erik M. Hume, McNees Wallick & Nurick LLC, *Who Owns Shale Gas? PA Superior Court Decision Creates Uncertainty* (JDSupra 2012), http://documents.jdsupra.com/f4db3e28-acaa-40e2-8090-fa116d00faeb.pdf.

[287] *Butler v. Charles Powers Estate*, *supra* n. 285; Sophia Pearson & Mike Lee, *Pennsylvania High Court Takes Appeal on Marcellus Gas Rights*, Bloomberg Businessweek, Apr. 4, 2012, http://www.businessweek.com/news/2012-04-04/pennsylvania-high-court-takes-appeal-on-marcellus-gas-rights. For more information on this Susquehanna County case, see Laura Olson, *Land Deal of 1880s in Center Court Over Shale Rights*, Pittsburgh Post-Gazette, Mar. 30, 2012, http://www.post-gazette.com/stories/local/marcellusshale/land-deal-of-1880s-in-center-court-over-shale-rights-316113/?print=1.

V. CONCLUSION

As this paper demonstrates, there is really only one thing that can be said for certain about hydraulic fracturing: at this point, nothing is really certain. Many questions remain to be answered. While fracking advocates tout the benefits of hydraulic fracturing—job creation, energy security, economic benefits to struggling communities, etc.—the foes of fracking raise concerns about impacts on the environment and the health of humans and wildlife. Those in the middle acknowledge the gains that hydraulic fracturing may bring, but urge caution—a slower approach, taking the time required to conduct studies, answer questions, and address concerns by putting appropriate safeguards in place.

The proliferation of hydraulic fracturing operations across the United States has brought with it changes in both the rural and the urban landscape. Due to the large influx of (primarily male) workers, housing stock in the high-impact areas, particularly of rental housing, is in short supply. Rents have skyrocketed, and some long-term residents have found themselves priced out of the rental market. Infrastructures are put to the test by the unanticipated high-volume traffic caused by sharp population increases, as well as constant truck traffic. On the other hand, those interested in entering into leases with the oil and gas companies stand to make a lot of money as fracking moves into their neighborhoods. And struggling businesses, such as grocery and convenience stores, restaurants and coffee shops, gas stations, and even dry cleaners are now gladly facing the challenge of keeping goods on hand and employees on board, instead of struggling to keep the doors open. Community coffers, too, have

swelled with increased revenues from impact fees and severance taxes resulting from the hydraulic fracturing boom in their towns.

From the perspective of a real estate professional, key issues include those surrounding the recording of leases, the severance of mineral rights from the ownership of the land during a purchase or sale transaction, properly valuing the property in such cases, helping landlords and property managers best serve ever-changing rental market needs, and assisting clients facing new challenges in obtaining mortgages and homeowner's insurance. Local real estate markets may experience a spike in value when fracking comes to town and properties become scarce, or a sharp decline when local wells are tapped out and the frackers move on, leaving a glut of empty properties on the market. Fracking can cause a decline in nearby property values based on concerns about environmental contamination, or even the unsightliness of well towers on the horizon, or it may generate an increase in values based on the proximity of exploitable shales.

Obviously, the hydraulic fracturing story is in its early chapters, and much of the story is yet to unfold. Real estate professionals should listen closely to the telling of the fracking tale, staying abreast of the good, the bad, and the ugly of it, so that they may best serve their clients and communities.

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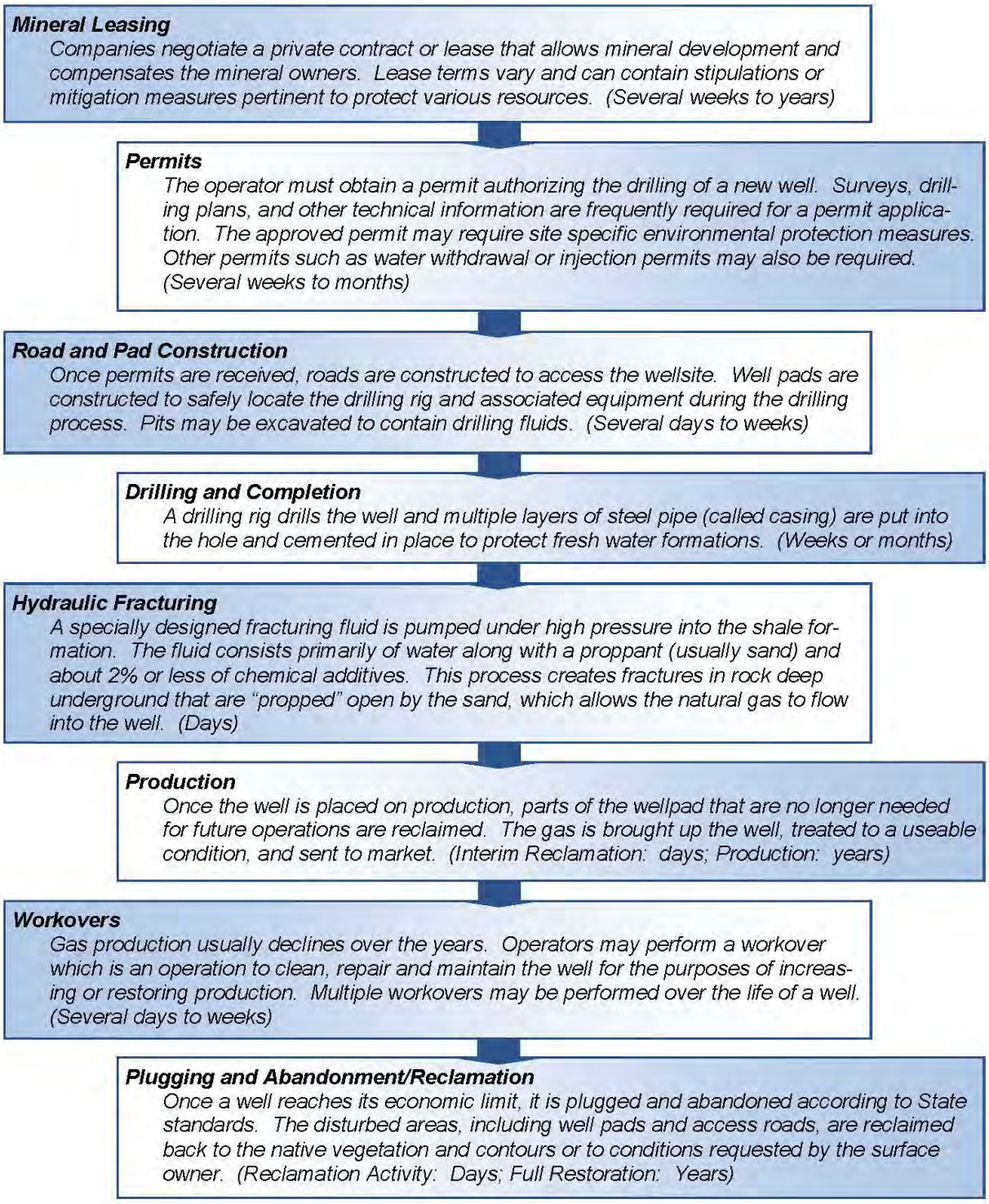
Appendix 1, Process of Shale Gas Development[288]



[288] Flowchart image from US DOE, Office of Fossil Energy, http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf.

Appendix 2, Summary Tables

Table 1. Legislation Proposing Disclosure Requirements (as of May 31, 2012)[289]			
State	**Bill**	**Status**	**Description**
California	A.B. 591	Pending	Would require a person to carry out hydraulic fracturing on behalf of an owner or operator to provide to the owner a list of the chemical constituents used in the fluid. The amount of recovered fracking fluid and other procedural elements also must be recorded. The information must be made available to the public
Illinois	S.B. 2058	Pending	Would require fluid identity by additive type and chemical compound names; the Chemical Abstracts Service (CAS) numbers must be reported to a specified department.
	H.B. 3897	Pending	Would require chemical disclosure information to be posted on FracFocus.
	S.B. 3280	Pending	Would require chemical disclosure information to be posted on a website.
	H.B. 5853	Pending	Would require operators to complete forms that include the total volume of water used in hydraulic fracturing a well and each chemical ingredient. The information would have to be posted on FracFocus.
Indiana	H.B. 1107	House Enrolled Act. No. 1107	Requires the Natural Resources Commission to adopt rules addressing reporting and disclosure of hydraulic fracturing treatments. Requires volumes of additives to be disclosed as a maximum percentage of the total fracturing fluid volume.
Kansas	H.B. 2526	Enrolled-law effective July 1, 2012	Would allow a commission to promulgate rules addressing hydraulic fracturing disclosure.
	H.B. 2642	Pending	Relates to disclosure requirements.
Louisiana	H.B. 957	To Governor	Would provide for the disclosure of the composition of hydraulic fracturing fluids.
Massachusetts	H.B. 3055	Pending	Would require hydraulic fracturing fluids and volumes to be identified and described.

[289] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf

Table 1. Legislation Proposing Disclosure Requirements (as of May 31, 2012)[289]			
State	**Bill**	**Status**	**Description**
New York	S.B. 425 and A.B. 2922	Pending	Would require disclosure of all fluid chemicals used in hydraulic fracturing.
	S.B. 1234	Pending	Would require disclosure of components in fracking fluid.
	S.B. 3765	Pending	Would prohibit contracts that refer to hydraulic fracturing from containing provisions would prohibit disclosure of chemicals used in the process.
	A.B. 6426	Pending	Would require disclosure of hydraulic fracturing materials.
	S.B. 5879 and A.B. 8805	Pending	Would require disclosure of the composition of hydraulic fracturing fluids to the Department of Environmental Conservation. Additive and chemical concentrations must be disclosed and expressed as pounds per 1,000 gallons or gallons per 1,000 gallons, and expressed as a percentage by volume of the fracturing fluid used.
Ohio	S.B. 212	Pending	Would require lists of all chemicals used in hydraulic fracturing to be disclosed to the Board of Health where the well is located.
	S.B. 318	Pending	Would require disclosure of all chemicals and substances used in hydraulic fracturing.
Pennsylvania	S.B. 127	Pending	Would require operators to file a report to specified departments within 30 days of well completion, including a list of chemicals and compounds. Volumes of fluids used in each operation, along with the Chemical Abstract Service (CAS) registry numbers, must be provided and available to the public on the department's website.
	S.B. 425 and H.B. 971	Pending	Would require fluid volumes to be reported to a department that must make the report available to the public upon written request.
	H.B. 1680	Pending	Would require fracking fluid disclosure to a specified department. Chemical constituents must be disclosed, but not proprietary chemical formulas. The information must be made available to the public. If a medical emergency exists and the proprietary chemical formula or specific identity is necessary for treatment, then it must be disclosed.

Table 1. Legislation Proposing Disclosure Requirements (as of May 31, 2012)[289]			
State	**Bill**	**Status**	**Description**
Pennsylvania (continued)	S.B. 1226	Pending	Would provide for disclosure of the composition of hydraulic fracturing fluids and would require the information to be posted on FracFocus.
	H.B. 24	Pending	Would require chemical ingredients to be disclosed.
	H.B. 1950	Enacted	Requires disclosure of the chemicals used in hydraulic fracturing a well within 60 days of finishing a procedure. Chemicals must be publicly disclosed on a website and posted in a form that does not link the chemicals to their respective hydraulic fracturing additive. Information will be published on FracFocus.

Table 2. Water Quality Protection – Casing Requirements, Well Spacing, Setbacks, Water Withdrawals, Flowback, Waste Regulation and More (as of May 31, 2012)[290]			
State	**Bill**	**Status**	**Description**
California	A.B. 591	Pending	Would require the amount and source of water used to be recorded, as well as radiological components or tracers. The amount and disposition of water and hydraulic fracturing fluid recovered would have to be recorded.
Illinois	H.B. 3897	Pending	Addresses disposal and reuse of well stimulation fluid recovered during flowback. Would require integrity tests of casing or of casing-tubing annulus, or other mechanical testing prior to hydraulic fracturing.
	S.B. 3280	Pending	Would require mechanical integrity tests prior to drilling. Addresses disposal of flowback and storage of fluids.
	S.B. 3534	Pending	Would require the total volume of water used to be posted on FracFocus.
Maryland	H.B. 1123	Enacted	Establishes a presumptive impact area around gas wells and require certain water supplies to be replaced. Generally relates to contamination caused by certain gas exploration and production activities.
Michigan	H.B. 4736	Pending-Carryover	Would create presumption of liability for contamination of groundwater caused by hydraulic fracturing fluids.
New Jersey	A.B. 575	Pending	Would prohibit treatment, discharge, disposal or storage of hydraulic fracturing wastewater in the state.
	S.B. 253	Pending	Would prohibit shipment, transport or treatment of hydraulic fracturing wastewater in the state.
New York	S.B. 425 and A.B. 2922	Pending	Would prohibit use of fluids that contain a chemical substance that poses a risk to human health and would require disclosure of all fracking fluid chemicals.
	S.B. 1234	Pending	Would aim to protect local resources, regulate water withdrawals and prohibit certain activities near watersheds.
	A.B. 2108 and S.B. 893	Pending	Would establish the natural Gas Exploration and Extraction Exploration and Extraction Liability Act of 2011.

[290] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

Table 2. Water Quality Protection – Casing Requirements, Well Spacing, Setbacks, Water Withdrawals, Flowback, Waste Regulation and More (as of May 31, 2012)[290]			
State	**Bill**	**Status**	**Description**
New York (continued)	A.B. 3579	Pending	Would address water use, potential water conservation measures, fluid storage and disposal measures, and site-specific biological and water quality data.
	A.B. 4237 and S.B. 1230	Pending	Would prohibit drilling within 10 miles of the New York City water supply infrastructure.
	S.B. 3483 and A.B. 7986	Pending	Would require groundwater testing prior to and after drilling wells for oil and gas.
	A.B. 6426	Pending	Would prohibit natural gas drilling near watersheds and would require permits for water withdrawals exceeding 5,000 gallons. Would also require inspections and annual audits.
	A.B. 6488	Pending	Would require treatment works to refuse industrial waste from fracking operations that contain high levels of radium. Would require testing for radioactive containments and provide for scheduled discharges of wastewater.
	S.B. 4251 and A.B. 7283	Pending	Would require promulgation of regulations to require treatment works to test fracking waste and to test for radioactivity.
	A.B. 7071	Pending	Would direct the commissioner of the Department of Environmental Conservation to promulgate rules and regulations requiring that wastewater screening not harm sewage treatment works.
	A.B. 6540	Pending	Would require certificates of competence for using a derrick or other drilling equipment.
	A.B. 7987	Pending	Would prohibit wastewater treatment facilities from accepting wastewater from hydraulic fracturing operations unless they meet certain performance requirements.
	S.B. 6891	Pending	Would require notification within two hours by any person causing a natural gas production discharge from high-volume hydraulic fracturing. The designated department would have to notify the public within 48 hours.

Table 2. Water Quality Protection – Casing Requirements, Well Spacing, Setbacks, Water Withdrawals, Flowback, Waste Regulation and More (as of May 31, 2012)[290]			
State	**Bill**	**Status**	**Description**
New York (continued)	S.B. 6892	Pending	Would create a High-Volume Hydraulic Fracturing Waste Tracking Program. Would require the commissioner of environmental conservation to track the generation, transportation and receipt of wastewater that is associated with oil and gas production.
	S.B. 6893	Pending	Would prohibit publicly-owned treatment works from accepting wastewater that is associated with high-volume hydraulic fracturing.
	S.B. 6894	Pending	Would authorize the creation of a geographic information system-based display that would provide high-volume hydraulic fracturing information to the public, such as locations of wells, location of public water supply wells and intakes, and the stage of the operation for each well.
	S.B. 6895	Pending	Would prohibit the use of high-volume hydraulic fracturing wastewater for road and land spreading, or for dust control and de-icing.
	S.B. 7012	Pending	Would prohibit the purchase, use, or sale of any liquid waste from hydraulic fracturing and would require the Department of Environmental Conservation to establish regulations for proper disposal of waste products generated from hydraulic fracturing.
Ohio	S.B. 212	Pending	Would address brine disposal, water use in state land drilling, royalties, waste documentation, and baseline testing of surface and groundwater before well drilling.
	S.B. 318	Pending	Would revise setback distances of a well from occupied dwellings.
Pennsylvania	S.B. 127	Pending	Would address fracturing chemicals, surface impoundments and fluid monitoring. Would require operators to maintain records of the volume of fracturing fluids used for operations and the volume of fluids returned to the surface.
	H.B. 234	Pending	Would require the amount of production and waste generated by each well to be reported.
	S.B. 680	Pending	Would provide for location restrictions, water protection, use of surface impoundments for temporary flowback storage, well reporting requirements, and more.

Table 2. Water Quality Protection – Casing Requirements, Well Spacing, Setbacks, Water Withdrawals, Flowback, Waste Regulation and More (as of May 31, 2012)[290]			
State	**Bill**	**Status**	**Description**
Pennsylvania (continued)	S.B. 1346	Pending	Would provide for the use of mine drainage water in hydraulic fracturing procedures.
	H.B. 1346	Pending	Would provide for well location restrictions and emergency preparedness plans.
	H.B. 1565	Pending	Would provide for chemical analysis of recycled wastewater during storage and of wastewater generated by oil and gas activities, and for electronic tracking of wastewater from oil and gas activities.
	H.B. 1741	Pending	Would address hydraulic fracturing wastewater transportation and require any vehicle carrying fracking wastewater to show placard outside of the vehicle.
	H.B. 1800	Pending	Would address water protection, use of surface impoundments and fracking fluids, emergency response, well reporting, bonding and a severance tax.
	H.B. 1887	Pending	Would address well location restrictions, groundwater protection, casing requirements, well reporting and more.
	H.B. 24	Pending	Would require operators to disclose total volume of water used and the chemical ingredients.
	H.B. 230	Pending	Would prohibit wells from being drilled within the surface or subsurface area of, or using hydraulic fracturing or horizontal drilling within 2,500 feet of a water well, lake, reservoir, impoundment, spring, etc. or anything that is the primary source for a community water system.
	H.B. 232	Pending	Would provide for well permits, well location restrictions, and disposal of wastewater requirements.
	H.B. 1211	Pending	Would provide for well spacing requirements.
	H.B. 1975	Pending	Would address water supply protection, wastewater, etc.
	S.B. 425 and H.B. 971	Pending	Would address well permits, well location restrictions, groundwater protection and casing requirements. Would also provide for fracking chemicals and surface impoundments for temporary flowback storage. Further, this bill would provide for bonding, penalties and well plugging funds.

Table 2. Water Quality Protection – Casing Requirements, Well Spacing, Setbacks, Water Withdrawals, Flowback, Waste Regulation and More (as of May 31, 2012)[290]			
State	**Bill**	**Status**	**Description**
Pennsylvania (continued)	H.B. 1645	Pending	Would aim to protect fresh groundwater and water supplies and provide for casing requirements.
	H.B. 2350	Pending	Would provide for the Injection Well Safe Water Act and the disposal of waste in injection wells.
	H.B. 1100	Pending	Would amend impact fees, severance taxes, well restrictions, water supply protections, well reporting requirements, bonding, penalties, civil penalties, containment, emergency response, and more.
	H.B. 1950	Pending	Enacted new requirements addressing well location restrictions. Water supply protections, well reporting requirements, bonding, penalties, civil penalties, containment, emergency response, and more.

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
Alabama	Oil and Gas Privilege Tax on Production	▪ 8 percent of gross value at point of production ▪ 4 percent of gross value at point of incremental production for enhanced recovery projects ▪ 4 percent if oil wells produce 25 barrels or less per day or if gas wells produce 200,000 cubic feet or less gas per day ▪ 6 percent of gross value at point of production for certain on-shore and off-shore wells. ▪ 50 percent rate reduction for wells permitted by the oil and gas board on or after July 1, 1996 and before July 1, 2002 for 5 years from initial production, except for replacement wells for which the initial permit was dated before July 1, 1996.
Alaska	Petroleum Profits Tax (PPT)	▪ Ranges from 25 percent to 50 percent depending on net value of oil and gas, which is the value at point of production minus certain lease expenditures ▪ 22.5 percent net value at wellhead ▪ There is an additional surcharge for each dollar

[291] Jacquelyn Pless, *Oil and Gas Severance Taxes: States Work to Alleviate Fiscal Pressures Amid the Natural Gas Boom,* National Conference of State Legislatures (updated Feb. 2012), http://www.ncsl.org/issues-research/energyhome/oil-and-gas-severance-taxes.aspx (citing various state websites and the Council of State Governments).

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
		when net value exceeds $40 per barrel. This cannot exceed 25 percent of the monthly production tax value of taxable oil and gas. ▪ Conservation surcharge of 4 cents per barrel and an additional 1 cent per barrel if there is less than $50 million in the Hazardous Release Fund
Arizona	Severance Tax	▪ 3.125 percent for oil and gas production and nonmetal mining
Arkansas	Oil and Gas Conservation Tax	▪ 0.3 of $0.01 cent per MCF for natural gas ▪ Four percent to five percent depending on production levels for crude oil
California	Oil and Gas Production Assessment	▪ Rate determined annually by Department of Conservation
Colorado	Severance Tax	▪ Two to five percent based on gross income for oil, gas, carbon dioxide and coalbed methane ▪ Four percent of gross proceeds on production exceeding 15,000 tons per day for oil shal
	Oil and Gas Conservation Levy	▪ Maximum 1.5 mills/$1 of market value at wellhead
Florida	Oil, Gas and Sulfur Production Tax	▪ Five percent of gross value for small well oil ▪ Eight percent of gross value for all other and an additional 12.5 percent for

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
		escaped oil ▪ For gas, the gas base rate times the gas base adjustment rate each fiscal yea
Idaho	Oil and Gas Production Tax	▪ Maximum of five mills/bbl. of oil and five mills/50,000 cubic feet of gas
	Additional Oil and Gas Production Tax	▪ Two percent of market value at site of production
Indiana	Petroleum Production Tax	▪ One percent of value or $0.24 per barrel for oil, or $0.03 per 1,000 cubic feet of gas (whichever is greater)
Kansas	Severance Tax	▪ Eight percent of gross value of oil and gas, less property tax credit of 3.67 percent
	Oil and Gas Conservation Tax	▪ 91 mills/bbl crude oil or petroleum marketed or used each month ▪ 12.9 mills/1,000 cubic feet of gas sold or marketed each mont
Kentucky	Oil Production Tax	▪ 4.5 percent of market value
	Natural Resource Severance Tax	▪ 4.5 percent of gross value, less transportation expenses
Louisiana	Natural Resources Severance Tax	▪ Varies according to substance
	Oil Field Restoration Fee	▪ Varies according to type of well and production
Michigan	Gas and Oil Severance Tax	▪ Five percent for gas ▪ 6.6 percent for oil ▪ Four percent (oil from stripper wells and marginal properties) of gross cash market value of the total

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
		production ▪ Maximum additional fee of 1 percent gross cash market value on all oil and gas produced in state in previous year
Mississippi	Oil and Gas Severance Tax	▪ Six percent of the value at point of gas production ▪ Three percent of gross value of occluded natural gas from coal seams at point of production for the well's first five years ▪ Maximum 35 mills/bbl. oil or four mills/1,000 cubic feet of gas (Oil and Gas Board maintenance tax) ▪ Six percent of value at the point of oil production ▪ Three percent of value at production when enhanced oil recovery is used
Montana	Oil or Gas Conservation Tax	▪ Maximum of 0.3 percent on the market value of each barrel of crude petroleum oil or 10,000 cubic feet of natural gas produced, saved and marketed or stored within or exported from the state
	Oil or Natural Gas Production Tax	▪ Varies from 0.5 percent to 14.8 percent according to the well and type of production
Nebraska	Oil and Gas Severance Tax	▪ Three percent of value of nonstripper oil and natural gas

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
	Oil and Gas Conservation Tax	▪ Two percent of value of stripper oil. Maximum of 15 mills/$1 of value at wellhead
Nevada	Oil and Gas Conservation Tax	▪ $50/mills/bbl of oil and 50 mills/50,000 cubic feet of gas
New Hampshire	Refined Petroleum Products Tax	▪ 0.1 percent of fair market value
	Excavation Tax	▪ $0.02 per cubic yard of earth excavated
New Mexico	Oil and Gas Severance Tax	▪ 3.75 percent of value of oil, other liquid hydrocarbons, natural gas and carbon dioxide
	Oil and Gas Emergency School Tax	• 3.15 percent of value of oil, other liquid hydrocarbons and carbon dioxide; Four percent of the value of natural gas
	Natural Gas Processor's Tax	▪ $0.0220/mmBtu tax on the volume
	Oil and Gas Ad Valorem Production Tax	▪ Based on property tax in the district of production
	Oil and Gas Conservation Tax	▪ 0.19 percent of value
North Carolina	Oil and Gas Conservation Tax	▪ Maximum of five mills/barrel of oil and 0.5 mill/1,000 cubic feet of gas
North Dakota	Oil Gross Production Tax	▪ Five percent of gross value at the well
	Gas Gross Production Tax	▪ $0.04 per 1,000 cubic feet of gas produced. The rate is subject to a gas rate adjustment each fiscal year.
	Oil Extraction Tax	▪ 6.5 percent of gross value at the well. Exceptions exist for certain production volumes and incentives for enhanced recovery projects.

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
Ohio	Resource Severance Tax	▪ $0.10/bbl of oil ▪ $0.025/1,000 cubic feet of natural gas
Oklahoma	Oil, Gas and Mineral Gross Production Tax and Petroleum Excise Tax	▪ Seven percent if greater than $2.10 mcf; four percent if greater than $1.75 mcf but less than $2.10 mcf; and one percent if less than $1.75 mcf natural gas and casinghead gas (a byproduct of natural gas extraction), and 0.95 percent levied on crude oil, casinghead gas and natural gas. ▪ Oil Gross Production Tax is variable based on the average price of Oklahoma oil. The tax rate is seven percent if average price is equal to or exceeds $17/bbl; four percent if the average price is less than $17/bbl but equal to or exceeds $14/bbl; and one percent if the average price is less than $14/bbl.
Oregon	Oil and Gas Production Tax	▪ Six percent of gross value at well
South Dakota	Energy Minerals Severance Tax	▪ 4.5 percent of taxable value of all energy minerals
	Conservation Tax	▪ 2.4 mills of taxable value of all energy minerals
Tennessee	Oil and Gas Severance Tax	▪ Three percent of sales price
Texas	Natural Gas Production Tax	▪ 7.5 percent of market value of gas ▪ Condensate Production Tax

Table 3. Oil and Gas State Severance Taxes as of 2012[291]		
State	**Type of Tax**	**Description of Tax Rates**
		is 4.6 percent of market value of gas
	Oil-Field Cleanup Regulatory Fees	▪ 5/8 of $0.01/barrel ▪ 1/15 of $0.01/1,000 cubic feet of gas
Utah	Oil and Gas Severance Tax	▪ Three percent of value for the first $13 per barrel of oil and five percent if the value is $13.01 or higher ▪ Three percent of value for the first $1.50/mcf and five percent if the value is $1.51 or higher ▪ Four percent of taxable value of natural gas liquids
	Oil and Gas Conservation Fee	▪ 0.002 percent of market value at the wellhead
West Virginia	Natural Resource Severance Taxes	▪ Five percent of gross value for natural gas; ten percent of net tax is distributed to local governments ▪ Five percent of gross value for oil; ten percent of net tax is distributed to local governments ▪ Additional tax for workers' compensation debt reduction rate of $0.047/mcf of natural gas produced
Wisconsin	Oil and Gas Severance Tax	▪ Seven percent of market value of oil or gas at the mouth of the well
Wyoming	Severance Taxes	▪ Six percent on crude oil, lease condensate or natural gas ▪ Four percent for stripper oil

Table 4. Key Pending/Enacted Legislation This Session Addressing Oil and Gas Severance Taxes[292]		
State	**Bill Number and Status**	**Description**
Alaska	House Bill 17 - pending	Provides for different rates for the Oil and Gas Production Tax based on the average production tax value of oil and gas produced during a calendar year. Relates to the tax credit for a carried forward annual loss applicable to the tax on oil and gas production.
	House Bill 66 - pending	Makes the tax of the production of natural gas used in the state applicable to fuel or feedstock in producing a manufactured end product.
	Senate Bill 49 - pending	Relates to the oil and gas production tax rate and monthly installment payments of estimated oil and gas production tax. Also relates to oil and gas production tax credits for expenditures such as qualified capital credits for exploration, development, and production.
	Senate Bill 112 - pending	Relates to a credit against the oil and gas production tax for drilling certain exploration wells using a jack-up rig in the Cook Inlet sedimentary basin.
	House Bill 110 - pending	Relates to the oil and gas production tax rate and monthly installment payments of estimated oil and gas production tax. Also relates to oil and gas production tax credits for expenditures such as qualified capital credits for exploration, development, an
	House Bill 231 - pending	Relates to tax credits applicable to the oil and gas production tax based on capital expenditures, including those incurred for a production facility for new oil and gas production.
	Senate Bill 124 - pending	Provides a tax credit applicable to the oil and gas production tax based on the cost of building a year-round road to access an area of oil and gas exploration and development.
	House Bill 276 and Senate Bill 145 - pending	Provides for a credit against the oil and gas production tax for costs incurred in drilling certain oil or natural gas exploration wells in the Nenana Basin.

[292] *See id.* Legislation that addresses only the allocation of tax revenue is not included.

Table 4. Key Pending/Enacted Legislation This Session Addressing Oil and Gas Severance Taxes[292]		
State	**Bill Number and Status**	**Description**
Alaska (continued)	House Bill 280 and Senate Bill 164 - pending	Provides for a credit against the oil and gas production tax for costs incurred in drilling certain oil and gas wells in the Kotzebue Basin or the Selawik Basin.
	Senate Bill 167 - pending	Provides for an increase in the rate of tax on the production of gas as the average production tax value on a BTU equivalent barrel basis of gas produced outside of the Cook Inlet sedimentary basin.
	House Bill 306 - pending	Provides for a specified tax rate for the production of oil and increases the rate of tax on the production of gas.
	Senate Bill 192 - pending	Proposes changes to the oil and gas production tax.
Florida	Senate Bill 1188 - pending	Defines the term "mature field recovery oil" and the tiered severance tax rates applicable to tertiary oil to mature field recovery oil.
	House Bill 87 - pending	Provides exemptions from tax on severance and production to certain wells that produce oil or gas on or after a specified date. Limits the duration of the exemptions.
Idaho	House Bill 379 - pending	Changes the oil and gas conservation tax to 2.5 percent of the market value of the oil or gas produced at the site of production and repeals provisions that establish a tax not to exceed five mills per barrel of oil or per 50,000 cubic feet of gas.
Maryland	Senate Bill 768 - pending	Imposes a natural gas severance tax of 2.5 percent of the wholesale market value on the date the gas is produced at the wellhead.
	House Bill 907 - pending	Imposes a natural gas severance tax of 15 percent of the wholesale market value on the date the gas is produced at the wellhead.
Mississippi	Senate Bill 2282 - pending	Revises the manner in which oil severance taxes are distributed.
North Carolina	House Bill 242 - enacted June 2011	Directs the Department of Environment and Natural Resources to study oil and gas exploration in the state, including the potential economic impacts and taxes

Table 4. Key Pending/Enacted Legislation This Session Addressing Oil and Gas Severance Taxes[292]		
State	**Bill Number and Status**	**Description**
New Jersey	Senate Concurrent Resolution 80 - pending	Memorializes the President and the U.S. Congress to enact legislation that would eliminate preferential tax treatment for oil and natural gas companies.
New Mexico	House Bill 142 - pending	Adjusts the rates of certain severance and natural resources taxes.
	House Bill 174 - pending	Reduces certain deductions, credits, and rate differentials by ten percent for oil, natural gas and mineral taxes.
Ohio	House Concurrent Resolution 12 - pending	Urges the President to reconsider proposals to increase taxes on producers of coal, natural gas, and petroleum and instead commit to adopting policies that encourage domestic production of these resources.
Oklahoma	Senate Bill 587 - enacted May 2011	Relates to the excise tax on oil and gas and extends the termination date of the gross production tax and certain other taxes on barrels of petroleum and natural and casinghead gas.
	Senate Bill 885 - enacted	Provides for application of a tax rate on certain horizontally-drilled wells.
	House Bill 1488 - enacted	Extends the duration of certain incentives for tertiary and secondary recovery projects, production enhancement projects and other certain wells.
Pennsylvania	Senate Bill 352 - pending	Imposes a natural gas severance tax of five percent tax on the gross value of units severed at the wellhead, plus 4.6 cents per unit severed.
	House Bill 33 - pending	Imposes a natural gas severance tax of five percent tax on the gross value of units severed at the wellhead, plus 4.6 cents per unit severed.
	House Bill 833 - pending	Imposes a natural gas severance tax of 30 cents per unit severed at the wellhead and provides for an annual adjustment.
	Senate Bill 680 - pending	Establishes a natural gas severance tax of 24 cents per unit severed at the wellhead and provides for an annual adjustment.

Table 4. Key Pending/Enacted Legislation This Session Addressing Oil and Gas Severance Taxes[292]		
State	**Bill Number and Status**	**Description**
Pennsylvania (continued)	Senate Bill 905 - pending	Imposes a natural gas severance tax of 2 percent of the gross value of units severed at the wellhead for the first three years of production. If the well has been in production for more than three years on or after July 1, 2011, the tax rate will be 5 percent of the gross value of the units severed at the wellhead during a reporting period. The tax rate is 2 percent of the gross value of the units severed at the wellhead if the rate of production from the well is less than 150,000 cubic feet of natural gas per day and more than 60,000 cubic feet of natural gas per day.
	House Bill 1406 - pending	Imposes a natural gas severance tax of 1.5 percent of the gross value of units severed at the wellhead for the first 60 months of production and five percent of the gross value of units severed at the wellhead thereafter.
	House Bill 1671 - pending	Imposes a natural gas severance tax of three percent of the gross value of units severed at the wellhead for the first 24 months of production and five percent of the gross value of units severed at the wellhead thereafter.
	House Bill 1705 - pending	Imposes a natural gas severance tax of 1.5 percent of the gross value of units severed at the wellhead for the first 60 months of production and five percent of the gross value of units severed at the wellhead thereafter.
	Senate Bill 1176 - pending	Imposes a natural gas severance tax of three percent of the gross value of the units severed at the wellhead of an unconventional well.
	House Bill 1800 - pending	Establishes a natural gas severance tax of 30 cents per unit severed at the wellhead and provides for an annual adjustment
	House Bill 1804 - pending	Imposes a natural gas severance tax of five percent tax on the gross value of units severed at the wellhead, plus 4.6 cents per unit severed.
	Senate Bill 1286 - pending	Imposes a natural gas severance tax of 29 cents per unit severed at the wellhead and provides for an annual adjustment.

Table 4. Key Pending/Enacted Legislation This Session Addressing Oil and Gas Severance Taxes[292]		
State	**Bill Number and Status**	**Description**
Pennsylvania (continued)	House Bill 1863 - pending	Imposes a natural gas severance tax of 4.9 percent of the gross value of units severed at the wellhead.
	House Bill 1950 - enacted	Allows counties to choose whether or not to enact a severance tax.
Virginia	Senate Bill 658 - pending	Requires counties and cities that imposed or are imposing local severance taxes for the 2008 license year or thereafter to amend their local ordinances to adopt or include local license tax uniform ordinance provisions, and to make it retroactive to the 2008 license year.
	House Bill 1233 - pending	Requires counties and cities that imposed or are imposing local severance taxes for the 2008 license year or thereafter to amend their local ordinances to adopt or include local license tax uniform ordinance provisions, and to make it retroactive to the 2008 license year.
Wisconsin	Senate Joint Resolution 31 - pending	Memorializes Congress to reintroduce and pass the Oil Industry Tax Break Repeal Act
West Virginia	Senate Bill 39 - pending	Increases the severance tax by ten percent on gas from Marcellus Shale or by fracturing if sold or transported out of state.

Table 5. Legislation Proposing Morotoria or Impact Studies (as of May 31, 2012)[293]			
State	**Bill**	**Status**	**Description**
Illinois	H.B. 3939	Pending	Would direct a department to adopt rules that prohibit hydraulic fracturing in designated state areas.
Michigan	H.B. 5150	Pending – Carryover	Would prohibit hydraulic fracturing under certain circumstances until the advisory committee makes recommendations.
	H.B. 5151	Pending – Carryover	Would provide for a study of hydraulic fracturing by the Department of Environmental Quality.
New Jersey	A.B. 567 and S.B. 246	Pending	Would prohibit hydraulic fracturing.
	S.B. 247	Pending	Would establish a moratorium on hydraulic fracturing until certain conditions are met.
	S.B. 2576	Enacted	Imposed a one-year moratorium on hydraulic fracturing to conduct an investigation into the impacts of hydraulic fracturing on air and water quality in the state.
New York	A.B. 2924	Pending	Would require an Environmental Impact Statement to be prepared for any natural gas or oil drilling involving use of hydraulic fracturing.
	A.B. 9409	Pending	Would require an assessment by a geologist prior to issuing a permit for a well that will be hydraulically fractured.
	A.B. 4237 and S.B. 1230	Pending	Would establish a moratorium on permits for the drilling of wells.
	A.B. 5547	Pending	Would establish a moratorium until 120 days after the U.S. EPA issues its report on the effects of fracking.
	A.B. 5677	Pending	Would prohibit fracturing and horizontal drilling on land operated by the Office of Parks, Recreation and Historic Preservation and within one mile thereof.
	A.B. 6541	Pending	Would establish the Look Before You Leap Act of 2011, which would set a five-year moratorium on high-volume hydraulic fracturing and provide for an investigation.
	A.B. 300 and S.B. 6097	Pending	Would establish a moratorium on the disposal of fluids until 120 days after the U.S. EPA issues its report.
	A.B. 7172	Pending	Would create a temporary state commission on

[293] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

Table 5. Legislation Proposing Morotoria or Impact Studies (as of May 31, 2012)[293]			
State	**Bill**	**Status**	**Description**
			the economic benefits and costs of hydraulic fracturing in New York.
	S.B. 5592, A.B.7400 and S.B. 6261	Pending	Would suspend hydraulic fracturing.
	S.B.4220 and A.B. 7218	Pending	Would prohibit hydraulic fracturing.
	A.B. 9419	Pending	Would prohibit high-volume hydraulic fracturing in reforestation areas.
	S.B. 6703 and A.B. 6541	Pending	Would enact a "Look Before You Leap Act of 2012" which would establish a 5-year moratorium on high-volume hydraulic fracturing.
	S.B. 6772.	Pending	Would require a health impact assessment for horizontal drilling and high-volume hydraulic fracturing. Would also establish a moratorium on these activities until a final health impact assessment is implemented.
North Carolina	H.B. 773	Pending – Carryover	Relates to statutory oversight studies, including hydraulic fracturing.
Ohio	H.B. 345 and S.B. 213	Pending	Would establish a moratorium on horizontal stimulation of wells until the U.S. EPA publishes its report and the chief of the Division of Oil and Gas Resources Management issues a report analyzing how Ohio's rules address the issues that are raised in the EPA report.
Pennsylvania	H.B. 232	Pending	Would provide for a cumulative impacts study.
Vermont	H.B. 464	Enacted	Prohibits hydraulic fracturing in the state and prohibits collection, storage or treatment of wastewater from hydraulic fracturing within the state.

Table 6. Legislation Addressing Authority to Regulate (as of May 31, 2012)[294]			
State	**Bill**	**Status**	**Description**
Idaho	H.B. 464	Enacted	Imposes local restrictions noting that it is the intent of the legislature to occupy oil and gas exploration and production regulation. No city, country, or political subdivision, except a state agency with authority, can prohibit the extraction of oil and gas. The extraction may be subject to reasonable local ordinance provisions.
Kansas	HCR 5023	Pending – Carryover	Would urge Congress to permit Kansas Corporation Commission to regulate hydraulic fracturing.
New Jersey	AR 112 and SR 98	Adopted	Urged enactment of the federal FRAC Act.
	SJR 13	Pending	Would urge Delaware, New York and Pennsylvania to enact moratoria against hydraulic fracturing until the U.S. EPA conducts its study and issues findings.
	SJR 22	Pending	Would urge Delaware, New York and Pennsylvania to join New Jersey in disapproving requests for withdrawing water for hydraulic fracturing and would enact bans on such practices.
North Dakota	HCR 3053a	Adopted	Urged Congress to clearly limit U.S. EPA regulation of hydraulic fracturing, under the Safe Drinking Water Act, to well stimulation treatments that use diesel fuel as the primary constituent of hydraulic fracturing fluid.
Pennsylvania	H.R. 296	Pending	Urges Congress to pass the FRAC Act.
	H.B. 1950	Enacted	Placed restrictions on local governments' ability to zone and regulate natural gas drilling. Municipalities lose impact fee revenue if they pass ordinances and zoning requirements.
Ohio	S.B. 318	Pending	Would prohibit wells to be drilled in an urbanized area unless it will comply with zooming requirements of the municipal corporation or township in which the well will be located.
South Dakota	HCR 1005	Adopted	Urged Congress to clearly delegate responsibility for regulating hydraulic fracturing to the states.

[294] Pless, *supra* n. 174, *Natural Gas Development and Hydraulic Fracturing, A Policymaker's Guide*, http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

Table 6. Legislation Addressing Authority to Regulate (as of May 31, 2012)[294]			
State	**Bill**	**Status**	**Description**
Tennessee	HR 98	Adopted	Encouraged meeting to propose regulations that would provide oversight for use of fracking as a method of modern natural gas extraction. The goal of the meeting would be to protect groundwater quality and drinking water supplies and land and mineral rights.
Utah	SCR 12	Enacted	Urged Congress to clearly delegate responsibility for regulating hydraulic fracturing to the states.

Appendix 3, Oil and Gas Regulatory Agencies in Shale Gas States[295]

Alabama Geological Survey of Alabama, State Oil and Gas Board, http://www.ogb.state.al.us/ogb/ogb.html

Arkansas Oil and Gas Commission, http://www.aogc.state.ar.us/

Colorado Department of Natural Resources, Oil and Gas Conservation Commission, http://cogcc.state.co.us/

Illinois Department of Natural Resources, Division of Oil and Gas, http://dnr.state.il.us/mines/dog/index.htm

Indiana Department of Natural Resources, Division of Oil and Gas, http://www.in.gov/dnr/dnroil/

Kentucky Department for Energy Development and Independence, Division of Oil and Gas Conservation, http://www.dogc.ky.gov/

Louisiana Department of Natural Resources, Office of Conservation, http://dnr.louisiana.gov/cons/conserv.ssi

Michigan Department of Environmental Quality, Office of Geological Survey, http://www.michigan.gov/deq/0,1607,7-135-3306_28607---,00.html

Mississippi State Oil and Gas Board, http://www.ogb.state.ms.us/

Montana Department of Natural Resources and Conservation, Board of Oil and Gas http://bogc.dnrc.mt.gov/default.asp

New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division, http://www.emnrd.state.nm.us/OCD/

New York Department of Environmental Conservation, Division of Mineral Resources, http://www.dec.ny.gov/energy/205.html

North Dakota Industrial Commission, Department of Mineral Resources Oil and Gas Division, https://www.dmr.nd.gov/oilgas/

Ohio Department of Natural Resources, Division of Mineral Resources Management, http://www.ohiodnr.com/mineral/default/tabid/10352/Default.aspx

[295] FracFocus, *supra* n. 33, *Modern Shale Gas Development in the United States: A Primer*, http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf

Oklahoma Corporation Commission, Oil and Gas Conservation Division, http://www.occ.state.ok.us/Divisions/OG/newweb/og.htm

Pennsylvania Department of Environmental Protection, Bureau of Oil and Gas Management, http://www.dep.state.pa.us/dep/DEPUTATE/MINRES/OILGAS/oilgas.htm

Tennessee Department of Environment and Conservation, State Oil and Gas Board, http://www.tennessee.gov/environment/boards/oilandgas.shtml

Railroad Commission of Texas, http://www.rrc.state.tx.us/index.html[296]

West Virginia Department of Environmental Protection, Office of Oil and Gas, http://www.dep.wv.gov/oil-and-gas/Pages/default.aspx

[296] Certain aspects of oil and gas operations in Texas, such as air emissions, are regulated by the Texas Commission on Environmental Quality.