Planning for Natural Gas Fracking in the Barnett Shale, Texas: The Legal and Regulatory Framework And the Role for Local Governments

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Hydraulic Fracturing for natural gas is booming in Texas. According to the State's regulatory agency, of the 15, 466 new drilling permits issued in 2010, approximately 85% of those wells were hydraulically fractured. [1] Rigs are literally pulling up in neighborhoods. Faced with minimal state and federal regulation, Texas cities are on the front line in the effort to figure out how best to balance industry, land use and environmental concerns. Serious concerns include chemical toxicity, air and water quality impacts, and correlation to earthquakes, visual blight, traffic and infrastructure concerns, and the adequacy of water in this drought stricken state.

The focus of this study is the Barnett Shale Formation which underlies 5,000 square miles of the Dallas/Fort Worth area of Texas to depths of 6,500 to 8,500 feet.[2] The Barnett Shale in the Fort Worth basin of North Central Texas is by far the most active shale gas play in the United States,[3] and one of the largest drilling programs ever undertaken in an urban area. [4] Although, the effort is not without considerable controversy, the public in the area have been identified by some Texas attorneys as "the most accepting and accommodating of any urban or suburban population concerning drilling," likely due to the fact that many of the citizens own the mineral rights beneath their land. [5] Historically, this area produced oil and gas from conventional reservoirs, but there are now over 8,000 wells producing gas from the Barnett formation. [6] Gas production increased over 3,000% from 1998 to 2007, from 94 million cubic feet per day to over 3 billion cubic feet per day.[7]

Fracturing employs high-pressure jets of water and a mix of chemicals, including carcinogens and endocrine disrupters, to fracture rock and release natural gas. [8] Additives are used to reduce

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[2] Unconventional Gas Shales: Development, Technology, and Policy Issues, Congressional Research Service Report for Congress, 7-5700, R40894 at 4.

[3] Schlumberger, Incl, Shale Gas: When Your Gas Reservoir is Unconventional, So is Our Solution, http://www.pe.tamu.edu/wattenbarger/public_html/Selected_papers/--Shale%20Gas/shale_gas-%20schlumberger.pdf .

[4] Thomas Kurth et al., Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing, the Advocate, Winter 2011 at p. 25.

[5] Id.

[6] Id. at 5.

[7] Id. at 7.

[8] The Endocrine Disruption Exchange, http://www.endocrinedisruption.com/chemicals.introduction.php

friction (as the fluid is injected), to prevent bacterial growth (biocide), to prevent mineral precipitation (scale inhibition), to prevent corrosion, to prevent swelling of expandable clay minerals (clay stabilization), as gelling agents to support proppants, as surfactants to promote fracturing, and as cleaners.[9]

Depending on the properties of the formation, the fracking fluids may be water-based, oil-based or acid-based, and sometimes also include nitrogen and carbon dioxide to help foaming.[10] First, a hydrochloric acid solution is pumped down the well to clean up residue left from cementing the well casing. [11] In the deeper, high-pressure shales, operators then pump slick water (a law-viscosity water-based fluid) and proppant. Nitrogen-foamed fracturing fluids are commonly pumped on shallower shales and shales with low reservoir pressures. [12] The fracturing fluid both opens the fracture and to transports the "propping" agent. [13] The fluid is pumped under pressures up to 8,000 psi, enough to crack shale as much as 3,000 ft. in each direction from the wellbore. Several treatments may be used to produce multiple fractures at different depths, or further out into the formation in the case of horizontal wells. [14]

Fracking fluid chemicals and wastewater can leak or spill from injection wells, flow lines, trucks, tanks and holding pits. Most of the injected fluids, 60-80%, are returned to the surface as "flowback" water which typically contains proppant, chemicals, and trace amounts of naturally occurring radioactive elements from the geologic formation.[15] Concerns include the possibility that chemicals injected, naturally occurring substances disrupted, or toxins spilled at the surface may make their way into drinking water supplies. The USGS estimates about 15,000 gallons of chemical additives of waste in a three million gallon frac job.[16] Storage and transport are both a concern.

One issue of particular concern in the Barnett Shale is the adequacy of water supplies. Increasing water use due to growing population, drought, and Barnett Shale development has heightened concerns about water availability in North-Central Texas.[17] Hydraulic fracturing well can use 1.2 or up to 3.5 million gallons of water for a horizontal well. [18] One fracture treatment can use more than 500,000 gallons of water, almost as much as an Olympic size swimming pool (660,000

[9] http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf at 16.
[10] Id.
[11] Unconventional Gas Shales: Development, Technology, and Policy Issues, Congressional Research Service Report for Congress, 7-5700, R40894 at 24.
[12] Schlumberger, Incl, Shale Gas: When Your Gas Reservoir is Unconventional, So is Our Solution, http://www.pe.tamu.edu/wattenbarger/public_html/Selected_papers/--Shale%20Gas/shale_gas-%20schlumberger.pdf .

[13] Unconventional Gas Shales: Development, Technology, and Policy Issues, Congressional Research Service Report for Congress, 7-5700, R40894 at 23.
[14] Id. at 24.
[15] Id. at 33.
[16] Id. at 34, citing USCS Fact Sheet at 4.
[17] Water Use in the Barnett Shale, Railroad Commission of Texas; http://www.rrc.state.tx.us/barnettshale/wateruse_barnettshale.php
[18] Id. at 33, citing Railroad Commission of Texas, Water Use in the Barnett Shale, July 30, 2008

gallons).[19] Sixty percent of the water used in hydraulic fracking comes from groundwater in the Trinity and Woodbine aquifers. [20] In the Barnette Shale, flowback water is primarily disposed of in underground injection wells.[21] Water is thus removed from the hydraulic cycle. Many rural communities rely on groundwater from the Trinity Aquifer as the sole water source. [22] In 1990, the Texas Natural Resource Conservation Commission designated the Trinity region to be a Priority Groundwater Management Area (PGMA), defined as an area where a critical water shortage is occurring or can be expected to occur in the next 25 years.[23]

Another concern is controlling air quality during both during drilling and fracturing . Emission include nitrogen oxides and volatile organic compounds (VOCs) from wellheads (natural gas leaks), flared gas (gas that escapes from the well during drilling and fracturing and is burned), equipment used for drilling, fracturing, and dehydrating gas (equipment exhaust), pipelines (natural gas leaks), flowback water tanks and pits (evaporating volatile organic compounds), and compressor stations (when natural gas leaves a well, it is sent to a gathering station and the gas is then compressed by an internal combustion engines and conveyed to a processing facility via pipeline).[24]

Drawing lessons for planning practice, this interdisciplinary law and planning paper reviews the status of both the science and the law related to hydraulic fracturing in Texas. Given trends in environmental law, the demand for energy and the importance of oil and gas industries in this state, the regulatory balance is unlikely to favor precautionary measures. This paper will consider the extent to which the risk is known, and whether the law requires industry to internalize the risk and the cost of this vast experiment. This paper will research the common law and regulatory framework at the federal, state and local level governing hydraulic fracturing in order to explore opportunities and constraints for local government.

I. Federal and State Regulations: Water

There is no state or federal regulation, nor any requirements for disclosure or testing of the chemicals that can be injected during hydraulic fracturing. Clearing up any confusion on this issue, the U.S, Energy Policy Act of 2005 included a specific amendment to the definition of "underground injection" under the Safe Drinking Water act to exclude "the underground injection of fluids or propping agent (other than diesel fuels) pursuant to hydraulic fracturing operations. [25] The EPA does retain some authority under the Safe Drinking Water Act to order

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[19] Id. at 24.
[20] Id.
[21] Id. at 40.
[22] Id. at 8.
[23] The Edward Aquifer website, The Trinity Aquifer, http://www.edwardsaquifer.net/trinity.html (Inclusion in a PGMA gives county officials some authority to regulate development over the Aquifer by requiring that developers prove there is water available before platting new construction. It can also aid in the formation of a groundwater conservation district, which would have taxing and regulatory power and could regulate water well spacing and production.)
[24] http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf at 65, citing Governor's Marcellus Shale Advisory Commission, *supra* note125, at § 7.3.2
[25] 42 U.S.C. 300h(d)(1)(B)(ii).

remediation. However, as discussed below, there are legal questions concerning EPA's burden of proof that may prove problematic in the context of hydraulic fracturing.

Following intense lobbying from the oil and gas industry,[26] the federal government also exempted wastes from oil and gas exploration and production operations from the Resource Conservation and Recovery Act (RCRA), our "cradle to grave" hazard waste regulatory system which regulations the generation, transportation and disposal of hazardous wastes. [27] The exemption covers all wastes "intrinsic to and uniquely associated with primary E & P operations,"[28] which means all waste that has been brought to the surface during oil and gas exploration and production operations or waste that has "otherwise been generated by contact with the oil and gas production stream during the removal of produced waster or other contaminants from the product." [29]

In the Barnette Shale, flowback water is primarily disposed of in underground injection wells[30] where standards are set by the federal government. [31] The Railroad Commission of Texas operates a federally delegated program to permit underground injection wells which is reviewed by the Environmental Protection Agency every two years.[32] There are also some minimal federal standards that require best management practices to control stormwater during site construction for a well pad and access road that is one acre or greater.[33] The primary responsibility for water resources related to site operations site otherwise falls to the Texas Railroad Commission and local government.[34] However, other than limited disclosure regulations, discussed below, there no regulations established by the Texas Railroad Commission (RRC) that apply uniquely to hydraulic fracturing. [35] There are permit requirements for all oil and gas operations. [36] The RRC also has set standards for casing, cementing, drilling and completion.[37] However, unlike some

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[26] James R. Cox, *Revisiting RCRA's Oilfield Waste Exemption as to Certain Hazardous Oilfield Exploration and Production Wastes*, 14 Vill. Envtl. L. J. 1, 3 (2003).

[27] 42 U.S.C. 6921(b)(2)(A); see also Clarification of the Regulatory Determination for Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy. 58 Fed. Reg. 15, 284 (Mar. 22, 1993). The exception was initially a temporary exemption set by Congress in 1980 followed by an EPA study that concluded that regulation of oil and gas wastes under RCRA was not advisable

[28] Clarification of the Regulatory Determination for Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy, 58 Fed. Reg. 15, 284, 15, 284 (Mar. 22, 1993).

[29] Id. at 15, 285, see also James R. Cox, *Revisiting RCRA's Oilfield Waste Exemption as to Certain Hazardous Oilfield Exploration and Production Wastes*, 14 Vill. Envtl. L. J. 1, 7 (2003).

[30] Id. at 40.

[31] 42 U.S. C. 300(a)(1)(providing that "the Administrator shall publish proposed regulations for State underground injection control programs"); 42 U.S.C . 300h(b)(1)(providing that "regulations under subection (a) of this section for State underground injection programs shall contain minimum requirements for effective programs to prevent underground injection which endangers drinking water sources.")

[32] Sunset Advisory Commission Staff Report, at 12, November 2010, http://images.bimedia.net/documents/rct_sr.pdf

[33] Fact Based Regulation for Environmental Protection in Shale Gas Development, Energy Institute, University of Texas at Austin, February 2012, http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf at 35-36.

[34] Thomas Kurth et al., Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing, The Advocate, Winter 2011 at 34.

[35] Id.

[36] Id.

[37] Id.

other states, Texas has no restrictions on the proximity of drilling to sensitive receptors, and no lining requirements that pits (apparently including flowback water impoundments). [38]
In so far as water supply is concerned, the Texas legislature has recently adopted legislation that requires the RRC to promulgate rules to require fracking operators to provide information on the total amount of water used in the operations.[39] Signs offering oil field water for sale can be seen on the highway and on internet sites that cater to the shale industry. [40]

Surface waters in Texas are governed by a permitting process based on upon a showing that it is not subject to prior appropriation, and it will not impair existing water users or become a detriment to the state or public welfare. [41] Groundwater use, however, remains unrestricted for hydraulic fracturing. The general rule for the use of groundwater resources in Texas is the rule of capture. [42]This rule can be modified through the creation of local groundwater districts with authority to limit groundwater production. However, the Texas legislature has also created an exemption for temporary water supply wells that service oil rigs from any regulation by groundwater districts.[43] The term "rig" is interpreted broadly so as to include workover rigs and other implement of well completion, which includes those related to hydraulic facturing. [44]

II. Texas Railroad Commission: State Law, such as it is, May not be Enforced

The RRC claims that the state rules for well construction have prevented even a single documented case of groundwater contamination from injected fluids.[45] However, according to a 2010 review by the Sunset Commission Advisory Commission, a legislative body that reviews state agencies to identify and eliminate waste, duplication, and inefficiency in government agencies,[46] the RRC has a particularly poor enforcement record and limited enforcement capacity.[47]

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[38] Hannah Wiseman, Regulatory Adaptation in Fractured Apalachia, 21 Vill. Envtl. L. J. 229, 271, 289 (2010).
[39] Tex. Natural Resource Code 91.851.
[40]Thomas Kurth et. Al., *Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing,* the Advocate, Winter 2011, at 21 (citing Texas Water Code 36.101).
[41]Thomas Kurth et. Al., *Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing,* the Advocate, Winter 2011, at 18 (citing Texas Water Code 36.101).
[42] Id. at 19.
[43]Id. at 20 (citing Texas Water Code 36.101).
[44] Id.,(citing "Water Use in Association with Oil and Gas Activities regulated by the Railroad Commission of Texas," http://www.rrc.state.tx.us/barnettshale/wateruse.php).
[45] Id.,(citing email from Ramona Nye, Media Relations Director, Railroad Commission of Texas to J. Austin Frost, Associate, Haynes and Boon, LLP (April 13, 2010).
[46] In 1977, the Texas Legislature created the Sunset Advisory Commission to identify and eliminate waste, duplication, and inefficiency in government agencies. The 12-member Commission is a legislative body that reviews the policies and programs of more than 130 government agencies every 12 years. Sunset Advisory Commission Staff Report, November 2010, http://images.bimedia.net/documents/rct_sr.pdf

[47] Id.

More than 60,000 wells were drilled from 2003 to 2008, representing an increase in production of 75%, however, inspectors and inspections rose only 6%. [48] Of the more than 80,000 oil and natural gas production-related violations found in fiscal year 2009, field staff forwarded less than 4 percent to the agency's central office for enforcement action.[49] There were 18,000 reports of water related violations, but the RRC took enforcement action on less than 1 percent of these violations. [50] Moreover, according to the Sunset Advisory Commission, the RRC was unable to say with certainty that there were no serious violations in the roughly 17,900 water pollution violations that did not go to enforcement. The RRC relies solely on the discretion of each district office to determine which violations should be forwarded for enforcement action,[51] and it fails to track data on operator violations in a way that would reveal the effectiveness of its enforcement efforts.[52] The Sunset Advisory Commission concluded that the Commission's enforcement process is not structured to deter repeat violations.[53]

According to the Sunset Advisory Commission, the RRC has not formally adopted any penalty schedule, and lacks any process to gather public input on what penalty levels should be for violations. [54] Moreover, the Railroad Commission conducts all of its enforcement hearings with in-house staff where the majority of participants (the administrative law judge, the attorneys who bring the charges, and the staff who investigate the violations) are all Commission employees. [55] The relationship between the judges, attorneys, and staff provides the opportunity for inadvertent ex-parte communication and may allow the Commission's staff (a party) to exert an unfair amount of influence over the administrative law judge's decisions.[56] The agency is also arguable compromised by its structure that includes a full time three member elected board (an anomaly in Texas) that relies on campaign contributions from the regulated industry. [57]

III. The Real Job Falls to Local Governments

Given the state of affairs at the federal and state level, most of the work is left up to the local governments. In Texas, concurrent state and municipal oil and gas regulations are widespread and have been recognized by Texas courts since the 1930's. [58] There are two categories of cities in Texas - home rule and general law.[59] General law cities are smaller cities whose powers are limited to those specifically authorized by state statute.[60] The Texas Constitution allows cities

[48] Thomas Kurth et al., Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing, The Advocate, Winter 2011 at 34(citing Pro-Publica Analysis based on Texas Railroad Commission Statistics).
[49] Id. at 33.
[50] Id. 33-34
[51] Id. at 34.
[52] Id.
[53] Id. at 1.
[54] Id. at 35.
[55] Id. at 36-37.
[56] Id. at 36-37.
[57] Id. at 1-2 (most state agencies in Texas have part-time appointed boards).
[58] Perry Pearce, *The Spectrum of Choices: Formulation and Implementation of Regulatory Land Use Decisions affecting Mineral Development*, in 3 Mineral Development and Land Use (1995).
[59] Id.
[60] Id.

with populations of more than 5,000 to adopt their own charters and become "home rule cities."[61] Home rule cities look to the state law only to determine specific limitations on their power.[62] The larger cities over the Barnett Shale have already taken the initiative to regulate many issues related to hydraulic fracturing, including addressing setbacks, well locations, green completions, closed loop systems, compressor locations, pipelines, waste disposal, truck traffic and noise regulation.[63] This paper seeks to identify some specific areas of concern where local governments could fill in the critical issues in the area of on-site water quality and air quality concerns that may be falling through the gaps at the federal level.

IV. Water Well Contamination, Hard to Prove

Allegations of water well contamination due to hydraulic fracking have been among the most prominent . Nationwide, there have been at least 36, and, in Texas, there have been at least seven, most in the Barnett Shale.[64] Most claims involve methane, chemical constituents (iron, manganese, etc.) and physical properties such as color, turbidity, and odor.[65] Proving causation, however, is difficult. The industry stridently denies any problem. According to one shale gas proponent, a university professor, speaking to a Congressional Committee: "the hydraulic fracturing process is safe, already well regulated by the various States" and that "the hysterical outcry over this process is completely unjustified."[66]

According to a University of Texas Energy Institute Report, some of the properties and constituents found in water wells may have been present before shale gas development began, but often there is insufficient baseline (pre-drilling) sampling or monitoring to establish the impacts of drilling, fracturing, and other operations.[67]Iron and manganese are common naturally-occurring constituents in groundwater, and, particularly in areas underlain by gas-producing shales, methane migrates out of the shales under natural conditions and moves upward through overlying formations, including water-bearing strata (aquifers).[68] It is also possible that water quality changes may be due to vibrations and pressure pulses disturbing constituents that were already present in the casing wall and bottom of the well the rather than by hydraulic fracturing fluids or leakage from the well casing.[69]

Another possible explanation, at least for contamination in the Barnett Shale, is that the water wells were drilled into the gas formation (as opposed to gas wells leaking into the water bearing formation). The theory is that the gas in the water wells naturally exists in the shallow Strawn Sand, beneath and intertwined with the Paluxy Sand aquifer in the far South Parker County area. This gas purportedly exists in discontinuous zones or puddles. Some older gas wells purportedly

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[61] Texas Constitution Article XI, Section 5.
[62] Id.
[63] State and Federal Legislation and Regulation of Hydraulic Fracturing, the Advocate, Winter 2011, 31, at 34.
[64] http://switchboard.nrdc.org/blogs/amall/incidents_where_hydraulic_frac.html
[65] http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf at
[66] http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf at8.
[67] Id. at 19.
[68] Id.
[69] Id. at 19.

produced natural gas from relatively shallow depths of 216 to 214 feet before hydraulic fracking begain.[70]

V. Trade Secret Protection Dominates Disclosure Rules

According to a University of Texas Energy Institute Report, "None of the water well claims involve hydraulic fracturing fluid additives, and none of these constituents has been found by chemical testing of water wells."[71] The Report specifically dismisses the "finding of acrylonitrile in a water well in West Virginia," noting "no evidence has been found that this compound has ever been used in fracturing fluid additives."[72] In that case, a resident of rural Wetzel County, W. Va., claimed that the water from her wells smelled like "industrial-strength cleaning solvent" and pointed to nearby hydraulic fracturing in the Marcellus Shale.[73] Tests by the state Department of Environmental Protection identified leaked gasoline as the source of the contamination, not process of drilling the gas wells. However, upon commissioning unofficial tests, she found high concentrations of acrylonitrile, in addition to benzene, and styrene. The local gas company denies that it used acrylonitrile, but has never fully disclosed what chemicals are in its fracking fluid.[74] Another drilling company, Haliburton, has listed as acrylonitrile or a compound including it on two U.S. patents for frack additives.[75]

Some statues, including Texas, have now started requiring some disclosure of fracking fluids. At the end of last year, the Railroad Commission of Texas adopted a limited disclosure rule that applies to fracking treatments of wells in Texas for which the Railroad Commission has issued an initial drilling permit on or after February 1, 2012.[76] The rule generally requires the supplier (the entity who provides additives for use in fracking treatments) or the service company (the entity that performs fracking treatments) to provide the well operator (the person responsible for the physical operation and control of a well) with the identity, the CAS number,[77] and actual or maximum concentration of each chemical ingredient intentionally added to the fracking fluid within 15 days of **c**ompleting fracking treatments.[78]

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[70] Mark McPherson, *Water Use and Water Law in Texas, from an Oil and Gas Perspective*, State Bar of Texas, Environmental Impact of Oil and Gas Production, January 13, 3012, Houston, at 17.

[71] Id. at 19

[72] Id.

[73] Charles Corra, Could Fracking Be the Culprit of Poisoned Water Wells in W.Va.?, http://news.change.org/stories/could-fracking-be-the-culprit-of-poisoned-water-wells-in-w-va

[74] Id.

[75] http://switchboard.nrdc.org/blogs/amall/epa_subpoenas_halliburton_and.html

[76] 16 TAC 3.29 (b), at http://www.rrc.state.tx.us/rules/signed-adopt-3-29-Dec13-2011.PDF.

[77] The unique identification number assigned by the Chemical Abstracts Service, the division of the Americal Chemical Society that is the globally recognized authority for information on chemical substances. Id. at (a)(5), (6).

[78] Id. at 3.29(c).

On or before the date a well completion report is submitted to the Railroad Commission, the operator must then complete a Chemical Disclosure Registry form and upload it on the Chemical Disclosure Registry, known as FracFocus, a publicly accessible national fracking chemical registry website.[79] This form requires information on each additive that includes the trade name, supplier and intended use, as well as each chemical ingredient, the CAS number, and the maximum concentration of each chemical used in the hydraulic fracturing treatments that has a Material Safety Data Sheet (MSDS, pursuant to federal regulatory requirements), but only a simple list of chemicals that do not have a MSDS.[80] However, there are four categories of chemicals for which disclosure is not required, chemicals:

(1) not disclosed to the supplier, service company or operator; (2) not intentionally added to the fracking treatment; (3) that occur incidentally or are otherwise unintentionally present; and (4) eligible for trade secret protection.[81]

The trade secret exception is particularly problematic. A supplier, service company or operator can simply elect to claim trade secret and will not be required to publicly disclose detailed information on the fracking chemicals unless their claim is challenged and the Texas Attorney General or a court determines that the information is not entitled to protection.[82] If an entity withholds information about a chemical ingredient, it is only required to disclose limited information to the Commission on the chemical family and the properties and effects of the chemical. Only landowners on or adjacent to the property where the wellhead is located, or a department or agency of the state[83] may challenge a claim of trade secret protection. In commenting on the draft rule, the City of Dallas unsuccessfully requested changes that would also allow municipalities to appeal a claim of trade secrets.[84] The City did note, however, that municipalities may generally fall under the category of "adjacent land owner" in light of adjoining public rights of way.[85]

There is a limited exception requiring the disclosure of trade secrets to health professional or emergency responder (specifically defined as someone who needs information in order to provide medical or other health services to a person exposed to a chemical ingredient)[86], who must then keep the information confidential, with limited exceptions for diagnostic or treatment purposes.[87] As explained by the City of Dallas, this provision does not include any exceptions for

[79] Id. at 329(2)
[80] Id. at (c)(2)(x).
[81] Id. at 4(d).
[82] Id.
[83] (with jurisdiction over a mater to which the claimed trade secret information is relevant). Id. at 4(f).
[84] Letter dated October 10, 2011from Jill Jordan, Assistant City Manager to the Rules Coordinator)
[85] Id.
[86] Id. at (15).
[87] Id. at (c)(4).

incidents where hydraulic fracturing chemicals are spilled on property. [88] The City of Dallas also raised concerns about the timing of the disclosures, noting that providing notice only after the hydraulic fracturing process has been completed is not an effective tool for dealing with incidents that occur during the hydraulic fracturing process. [89]

Not only does the rule severely circumscribe the possible challengers to claims of trade secret, but any challenge is subject only to consideration of industry concerns, with no weighing of the public interest. "Trade secret" is defined as any "formula, pattern, device, or compilation of information that is used in a person's business, and that gives the person an opportunity to obtain an advantage over competitors who do not know or use it."[90] The following six factors are to be considered in determining whether information qualifies as "trade secret:"

(A) The extent to which the information is known outside the company,
(B) The extent to which it is known by employees and others involved in the company's business;
(C) The extent of measures taken by the company to guard the secrecy of the information;
(D) The value of the information to the company and its competitors;
(E) The amount of effort or money expended by the company in developing the information, and
(F) The ease or difficulty with which the information could be properly acquired or duplicated by others.

VI. Local Government Act Could Assist EPA, Shore-up Common Law, and Expand Disclosure Requirements

EPA Administrative Orders, Range Resources

In the Barnett Shale, there has been one loud and particularly fierce debate, including a tussle between the state and federal government, over cause of methane and other contaminants found in drinking water near hydraulic fracking by Range Resources (the company). In late 2010, homeowners who lived near drilling complained that their tap water was bubbling and even flammable.[91] EPA specifically noted that the well (drilled in 2005) did not begin to show signs of natural gas contamination until after the conclusion of drilling and hydraulic fracturing activities.[92] EPA was also aware of at least one instance in which a private water well drilled into the Trinity Aquifer produced some gas during or shortly following drilling operations.

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[88] Letter dated October 10, 2011from Jill Jordan, Assistant City Manager to the Rules Coordinator)
[89] Id.
[90] Id. at (26).
[91] EPA website, Resources Imminent and Substantial Endangerment Order, Parker County, TX homeowners. http://www.epa.gov/region6/region-6/tx/tx005.html

[92]United States' Memorandum in Opposition to Defendants' Motion to Dismiss, at 3, http://www.epa.gov/region6/6xa/pdf/2011-05-09_range_plaintiffs_memorandum_%20in_opposition.pdf

Later, EPA also learned of elevated levels of methane, ethane, and propane in another nearby residential water supply well and earlier signs of effervescence in the water.[93] Initial water samples showed elevated levels of benzene, toluene, ethane, and a high level of methane, measured initially at that time at 7,810 μg/L, and later at even higher levels, 20,100 μg/L. EPA also sampled the production gas from the gas well, and performed compositional and isotopic fingerprinting analyses. [94] Isotopic fingerprinting is a method for determining the ratio of different isotopes of a particular element in a material such as gas.[95] Based on the results of the investigation, EPA determined that the presence of gas in the well is likely to be due to impacts from gas development and production activities in the area." [96]

Concluding that "methane in the levels found by EPA are potentially explosive or flammable, and benzene if ingested or inhaled could cause cancer, anemia, neurological impairment and other adverse health impacts," and that the contaminants "may present an imminent and substantial endangerment to the health of persons," EPA issued an Emergency Order on December 7, 2010[97] to the company to:

> (i) to notify EPA whether it intended to comply, (ii) to provide potable water to two residences, (iii) to install explosivity meters in two residences, (iv) to conduct a survey and limited sampling of water supply wells in the area, (v) to submit plans for additional soil gas surveys and indoor air concentration analyses of two residences, and (vi) to submit plans to identify gas flow pathways, plans to eliminate gas flow if possible, and plans to remediate impacted areas. [98]

The company denied culpability and the very next day, the Railroad Commission of Texas scheduled a hearing to evaluate whether the operations were causing or contributing to the contamination of the wells. Range maintains that their activities did not cause the contamination in the affected wells because they were drilling to depths of five thousand feet and the wells terminate about two hundred feet below the ground. [99] On January 19-20, 2011, the Railroad Commission of Texas (RRC) held hearings (during which EPA and the well owners refused to participate) and issued a final order on March 22, 2011 concluding that the hydraulic fracking operations had not and were not causing or contributing to contamination of any domestic water wells. [100]

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[93] Id.
[94] Id.
[95] Id. at 4.
[96] Id.
[97] Id. at 3-4.
[98] Id. at 15.
[99] Thomas Kurth et al., Shaking Up Established Case Law and Regulation: The Impacts of Hydraulic Fracturing, the Advocate, Winter 2011 at p. 25.
[100] Brenda Clayton, *The Future of Regulation in Hydraulic Fracturing*, 7th Annual Texas Energy Symposium, February 10, 2012, at p.11.

EPA's position was that it may exercise special emergency authority upon receipt of information that a contaminant "may present an imminent and substantial endangerment,"[101] and that there was no requirement that EPA demonstrate that a respondent caused or contributed to the endangerment as a prerequisite to issuing an Emergency Order.[102] EPA took the position that it did not have to prove causation to the same extent as would be required in a common law action. EPA relied on its emergency powers under Section 1431 of the Safe Drinking Water Act, 42 U.S.C. §§ 300f – 300j-26 (the "Act") and argued that the claim is complete without any assertion of violation of some statutory or regulatory provision or ongoing harm to a particular individual. EPA explained that this authority allows EPA to issue orders to "any other person whose action or inaction requires prompt regulation to protect the public health," id., and is intended to reach beyond those who violated the particular statute or who failed to comply with a regulation.[103]

In response the company's claims of a violation of procedural due process, EPA explained that the company was not without recourse. It may seek immediate federal judicial review by filing a petition under the arbitrary and capricious stand for review in the United States Court of Appeals.[104] However, the arbitrary and capricious standard of a review is a "highly deferential" standard of review, and EPA may need only to plead "a rational nexus" between the company's conduct and the potential endangerment in this case,[105] not actual causation.

Following an unfavorable, but not directly related, Supreme Court decision concerning a challenge to an EPA compliance order issued under a different federal statute, the Clean Water Act,[106] in March 2012, the EPA decided to drop it's case against Range Resources. In exchange, the company agreed to monitor groundwater. [107] Politically, the case was further complicated by antics on the part of the a landowner who created a deceptive video for the news media and the EPA where he hooked a water hose up to a gas vent (not a water line) and lit it on fire. [108]

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[101] United States' Memorandum in Opposition to Defendants' Motion to Dismiss, at 6 (http://www.epa.gov/region6/6xa/pdf/2011-05-09_range_plaintiffs_memorandum_%20in_opposition.pdf

[102] Id. at 6 (except as a narrow limitation in those situations in which an order requires the provisionof alternative water supplies).

[103] Id. at 8, citing See Hooker Chem., 749 F.2d at 988

[104] Id. at 8, citing 42 U.S.C. § 300j-7(a)(2); Trinity Am., 150 F.3d at 394.

[105] Id. at p.23, fn 15.

[106] *Sackett v. EPA,* (concluding that a civil action may be brought under the Administrative Procedure Act, 5 U. S. C. §500 *et seq.*, to challenge, on a jurisdictional basis, an EPA administrative compliance order under §309 of the Clean Water Act, 33 U. S. C. §1319)

[107] EPA Drops Pollution Case Against Range Resources, Dallas Morning News, March 30, 2012, http://www.dallasnews.com/news/local-news/20120330-epa-drops-pollution-case-against-range-resources.ece

[108] Cause No. CV11-0798, Order Denying Plaintiff's Section 27 Anti-Slapp Motion to Dismiss Range's Counter Claims, February 15, 2012.

VII. In Depth Study, still mired in Politics and Uncertainty

Pavillion, Wyoming

The U.S. Environmental Protection Agency's (EPA) first report firmly linking hydraulic fracking to drinking water contamination was filed in December 2011[109], but only in "draft form," for public comment and submission to an independent scientific panel. The research was prepared in response to a request residents in Pavillion, Wyoming. EPA detected synthetic chemicals, like gylcols and alcohols consistent with gas production and hydraulic fracturing fluids, benzene concentrations well above Safe Drinking Water Act standards and high methane levels in deep monitoring wells. EPA also re-tested private and public drinking water wells in the community which it generally found to meet established health and safety standards. However, given the area's complex geology and the proximity of drinking water wells to ground water contamination, EPA expressed concern about the movement of contaminants within the aquifer and the safety of drinking water wells over time.

EPA cautiously noted that the chemicals in the water wells and that the conditions may be unique in that the fracturing is taking place "in close proximity to drinking water wells," and that production conditions are different than in many other areas. Nevertheless, the results are hotly contested with industry arguing that EPA's study did not "adequately distinguish between potential natural impacts and those from gas drilling activities."[110] Obviously wary of political ramification, in March of 2012, the EPA committed to additional investigation together "with a group of stakeholders." [111]

Although largely ignored in the public controversy, also identified were contaminants in the shallow portions of the aquifer, including benzene, xylenes, gasoline-range organics (GROs), and diesel-range organics (DROs). The report identifies at least 33 surface pits as likely sources for the contaminants detected in shallow groundwater. The pits were used for disposal of drilling cuttings, hydraulic fracturing flowback, and water produced from the formation.[112]

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[109] http://www.npr.org/blogs/thetwo-way/2011/12/08/143381365/epa-report-links-fracking-to-water-pollution

[110] http://trib.com/news/state-and-regional/studies-present-differing-views-on-epa-fracking-report/article_eb1d9e24-eec2-5c49-a63b-67307789a2a1.html

[111] http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/17640d44f5be4cef852579bb006432de!OpenDocument ("Together with the Tribes, the EPA and the State will convene a group of stakeholders and experts to develop and carry out a plan for further investigation of the Pavillion gas field to identify potential risks to drinking water, including possible sources and pathways for the migration of contaminants.")

[112] The EPA Draft Report of Groundwater Contamination Near Pavillion, Wyoming: Main Findings and Stakeholder Responses, January 25, 2012, CRS 7-5700, R42327, http://wyofile.com/wp-content/uploads/2012/01/R42327-2.pdf at 4-5.

VIII. Common Law, and the Burden of Proof

In Texas, there are multiple lawsuits arising from fracking operations in the Barnett Shale involving alleged contamination of water wells. [113] Potential difficulties in relying on the common law in the context of hydraulic fracking include the ability to track chemicals to the source, and standards of care that incorporate forseeability. Claims typically include nuisance, trespass, negligence, and sometimes strict liablity. [114]

Texas courts have defined a nuisance as "a condition which substantially interferes with the use and enjoyment of land by causing unreasonable discomfort or annoyance to persons of ordinary sensibilities attempting to use and enjoy it." [115] Three types of conduct may be considered a nuisance: 1) intentional invasion of another's interests; 2) negligent invasion of another's interests; or 3) other conduct, culpable because abnormal and out of place in its surroundings, that invades another's interests. [116]

Where the tort is "intentional," the defendant will only be charged with responsibility for the "substantially certain" consequences of any actions that the defendant intended to take (even if the defendant did not desire that those actions would result in harmful consequences).[117] A trespass is also usually regarded as an intentional tort in the sense that it involves an intent to commit an act which violates a property right, or would be practically certain to have that effect, although the actor may not know that the act he intends to commit is such a violation. [118] The obvious difficultly for plaintiffs bringing intentional tort claims for damages associated with drinking water contamination is that defendants will be able to argue that hydraulic fracturing is not (yet anyway) known to cause drinking water contamination. Negligence is no easier. A person can be liable for negligence if he causes harm to another by failing to exercise the care of

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[113] Holly A. Vandrovec, The Fight over Fracking: Recent Hydraulic Fracturing Litigation in Texas, Texas Bar Journal, May 2011, http://www.texasbar.com/AM/Template.cfm?Section=Texas_Bar_Journal&Template=/CM/ContentDisplay.cfm&ContentID=13928

[114] Id.

[115] *Watson v. Brazos Electric Power Cooperative, Inc*., 918 S.W. 2d 639 (Waco 1996), citing *Village of Euclid, Ohio v. Ambler Realty Co.*, 272 U.S. 365, 388, 47 S. Ct. 114, 118, 71 L. Ed. 303 (1926) (citations omitted).

[116] Id.

[117] Plater et. al, Environmental Law and Policy, Nature, Law and Society, 4th Edition, 2010, page 71.

[118] *Malouf v. Dallas Athletic Country Club*, 837 S.W.2d 674, 675 (Tex. App.--Dallas 1992, writ dism'd w.o.j.).

a reasonable person. [119]Again if the risk is unknown to the "reasonable person," the defendant can hide behind the current state of knowledge. Other claims, such as for the storage and disposal of drilling wastes, noise or air pollution should not prove as difficult. [120]

Strict liability is more promising, but it is unlikely to be available in Texas. The common law has historically recognized a theory of strict liability for defendants who engage in "ultrahazardous" or "abnormally dangerous" activities. The doctrine can be traced back to Rylands v. Fletcher, 3 H.L. 330 (1868), an English case where the defendants were mill owners who had constructed a large reservoir in which they stored water on their land. The water broke through material used to poly an abandoned mine shaft and flooded the plaintiff's coal mine. The House of Lords ruled that the plaintiffs did not have to prove negligence and held that the defendant can be held strictly liable for an abnormal and inappropriate use of his property. However, the Texas Supreme Court refused to follow the doctrine and required proof of negligence in a case where an oil company had constructed large, artificial earthen ponds to store polluted salt water generated by oil wells. The water escaped the ponds and flowed about six miles onto the landowners' property and into the water sources the landowners used to water their livestock. The court reasoned:

> [I]n England there are no oil wells, no necessity for using surface storage facilities for impounding and evaporating salt waters therefore. In Texas the situation is different. Texas has many great oil fields, tens of thousands of wells in almost every part of the State. Producing oil is one of our major industries. One of the by-products of oil production is salt water. Which must be disposed of without injury to property or the pollution of streams. The construction of basins or pounds to hold this salt water is a necessary part of the oil business. In Texas much of our land was granted without mineral reservation to the State . . . the right to mine in the usual and appropriate way, as for example, by the construction and maintenance of salt water pools . . . incident to the production of oil, were contemplated by the State and all of its grantees and mineral lessees, that being a use of the surface incident and necessary to the right to produce oil.

Despite this case, and its progeny,[121] however, the Texas Supreme Court has never ruled on whether hydraulic fracturing could be considered an abnormally dangerous activity, and there are plaintiffs are pushing forward with this theory in ongoing cases. [122] According to the modern abnormally dangerous activity doctrine, as "restated" in § 520 and of the Restatement (Second) of Torts, in determining whether an activity is abnormally dangerous, the following factors are to be considered:

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[119] See Restatement (Second) Torts §283.

[120] Plater et. al, Environmental Law and Policy, Nature, Law and Society, 4th Edition, 2010, page97..

[121] Doddy v. Oxy USA, Inc. 101 F. 3d 448, 461 – 462 (5th Cir. 1996)(allagedmigration of toxic chemicals from oil and gas well); see also Hall v. Amoco Oil Co., 671 F. Supp. 111, 112 -113 (S.D. Tex. 1984) (operation of oil refineries).

[122] Barclay Nicholson and Kadian Blanson, Tracting Fracking Case Law: Hydraulic Fracturing Litigation, Natural Resources & Environment volume 26, Number 2, Fall 2011, citing Harris v. Devon Energy Prod. Co., L.P., No. 3:10-cv-02554 (E.D. Tex., December 22, 2010); Holly Vandrovec, The Fight over Fracking: Recent Hydraulic Fracturing Litigation in Texas, Texas Bar Journal – May 2011, citing also Mitchell v. Encana Oil & Gas (USA), Inc., Parr v. Aruba Petroleum, Inc., et al.

(a) existence of a high degree of risk of some harm to the person, land or chattels of others;

(b) likelihood that the harm that results from it will be great;

(c) inability to eliminate the risk by the exercise of reasonable care;

(d) extent to which the activity is not a matter of common usage;

(e) inappropriateness of the activity to the place where it is carried; and

(f) extent to which its value to the community is outweighed by its dangerous attributes.

In Doddy v. Oxy USA, Inc., a concerning alleged health problems of landowners who lived near an oil well, the 5th Circuit Court of Appeals, reasoned that it is "somewhat unclear whether *Turner* can be read broadly to reject strict liability for abnormally dangerous activities. For one thing, *Turner* relied heavily on an earlier case, *Gulf, C. & S.F. Ry. Co. v. Oakes,* 94 Tex. 155, 58 S.W. 999 (1900), which involved the spread of the defendant's Bermuda grass to the plaintiff's land. It is doubtful that the escape of (apparently oil-contaminated) saltwater or the spread of Bermuda grass are "abnormally dangerous," at least as contemplated by the classic formulation in § 520 of the second Restatement of Torts." Doddy v. Oxy USA, Inc., 101 F. 3d 448, 462 (5th Cir. 1996). The Court further explained that it had previously interpreted *Fletcher v. Rylands* as a repudiation of strict liability in "cases where substances that are harmless and unobnoxious within themselves are stored or impounded upon one's land;" [123]and a repudiation of the "doctrine of strict liability for damages from impounded waters."[124] However, after examining other Texas Supreme Court Opinions, the 5th Circuit ultimately concluded that the Texas Court *has* rejected the abnormally dangerous strict liability tort.[125] The 5th Circuit also noted that the lower state courts have consistently refused to create strict liability for abnormally dangerous activities.[126]

Even if Texas were to apply the doctrine of strict liability for abnormally dangerous activities to hydraulic fracturing, liability may still be somewhat complicated by forseeability as strict liability is limited to the kind of harm, the risk of which makes the activity abnormally

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[123] Id. at fn. 12, citing *King v. Columbian Carbon Co.,* 152 F.2d 636, 639-40 (5th Cir.1945) (emphasis added).
[124] Id., citing *Ford Motor Co. v. Dallas Power & Light Co.*, 499 F.2d 400, 408 (5th Cir. 1974).
[125] Id., citing *Galveston, H. & S.A. Ry. Co. v. Currie,* 100 Tex. 136, 96 S.W. 1073 (1906)(a case involving the introduction of compressed air into a railroad roundhouse where the court noted that while "some of the older cases in England seem to assert the absolute liability of an insurer, … it is settled in this state that the question is one of negligence."); and *Kelly v. McKay,* 149 Tex. 343, 233 S.W.2d 121, 122 (1950) (applying negligence principles in the context of the use of explosives); and *Elliff v. Texon Drilling Co.,* 146 Tex. 575, 210 S.W.2d 558, 584 (1948)(suggesting that with regard to "the nature of oil and gas and the risks involved in their production [such as the possibility of an oil well "blowout"]," "in the conduct of one's business or in the use and exploitation of one's property, the law imposes upon all persons the duty to exercise ordinary care to avoid injury or damage to the property of others.")
[126] Id., citing *Barras v. Monsanto Co.,* 831 S.W.2d 859, 865 (Tex.App.1992); *Robertson v. Grogan Investment Co.,* 710 S.W.2d 678, 679-80 (Tex.App.1986); *Day & Zimmermann v. Strickland,* 483 S.W.2d 541, 548 (Tex.Civ.App.1972); *Roskey v. Gulf Oil Corp.,* 387 S.W.2d 915, 919 (Tex.Civ.App.1965); *Klostermann v. Houston Geophysical Co.,* 315 S.W.2d 664, 665 (Tex.Civ.App.); *Dellinger v. Skelly Oil Co.,* 236 S.W.2d 675, 677 (Tex.Civ.App.1951); *Stanolind Oil & Gas Co. v. Lambert,* 222 S.W.2d 125, 126 (Tex.Civ.App.1949)

dangerous. [127] The industry may still argue that water well contamination from hydraulic fracturing activity was not foreseeable at the time of the claim. A more viable option may be negligence per se, a concept in which a legislatively imposed standard is adopted by the civil courts as defining the conduct of a reasonable and prudent person.[128] An administrative rule or regulation can also be used to create the standard for negligence where the purpose of the rule is to afford protection to the class of person to which the injured party belongs from the hazard involved in a particular case. [129]

IX. Needed are Local, Site-Specific Regulations for Water

One proposal to deal with the difficult burden of proof is to require a "pre-permit" application process that involves an in-depth analysis of site specific conditions including sampling and chemical analysis of area wells both before and after a fracturing operation.[130] Home rule cities in Texas could follow Pennsylvania's lead. Pennsylvania reverses the burden of proof by establishing liability for water contamination by creating a rebuttable presumption that the well operator caused the contamination within 1,000 feet of the well and requires the operator to replace water supplies.[131] The operators must ensure that the new supply is as "reliable" and "permanent" as the previous water supply, and that it not require "excessive maintenance."[132] Also requires are "pluming, conveyance, pumping or auxillary equipment and facilities necessary for the surface landowner or water purveyor to utilize the water supply." [133]

Other regulatory measures in effect in other states include time limits on how long flowback water may remain on the site, specific limitations on the disposal of flow-back water, reuse and recycling, distance requirements from sensitive receptors, waste disposal plans, restrictions on roadspreading or landspreading, and design, maintenance and pit lining requirements. [134]
Some cities overlying the Barnett Shale have already adopted some regulations to deal with surface contamination. Fort Worth requires a "closed-loop" system wherein wastes from drilling and fracturing are stored within tanks, although it allows earthen lined pits for operations that are on open space of at least 25 acres and not within 1,000 feet of a "protected use." [135]Arlington requires a similar closed loop system with above-ground steel tanks for waste for gas drilling operations unless the Texas Railroad Commission provides a different directive.[136] Further

[127] Restatement 2d of Torts, Chapter 21, §519.
[128] Carter v. Wiliam Sommerville & Son, Inc., 584S.W. 2d 274, 278 (Tex. 1979).
[129] Cont'l Oil Co. v. Simpson, 604 S.W. 2d 530, 534 (Tex. Civ. App. – Amarillo 1980, writ ref's n.r.e.).
[130] UT Energy Institute, http://energy.utexas.edu/images/ei_shale_gas_regulation120215.pdf, citing, Ubinger J. W., Walliser J. J., Hall C., and Oltmans R., 2010, *Developing Marcellus Shale: Environmental Policy and Planning Recommendations for the Development of the Marcellus Shale Play in Pennsylvania.* Harrisburg: Pennsylvania Environmental Council. http://marcellus.pecpa.org/wp-content/uploads/2011/06/Developing-the-Marcellus-Shale.pdf

[131]58 P.S. 601 208 (2011).
[132] 25 Pa. Code 78.51.
[133] Id.
[134] Hannah Wiseman, Regulatory Adaptation in Fractured Apalachia, 21 Vill. Envtl. L. J. 229 (2010).
[135] Id. at 289
[136] Id.

analysis is necessary to evaluate the adequacy of these regulations. Enforcement is, of course, also a concern.

Local government should also expand the disclosure requirements to minimize uncertain as to the source of any chemical contamination. Local governments could ask for more but must be wary of property rights arguments (this issue warrants further discussion and analysis, but is currently beyond the scope of this paper). Local governments could also engage in water supply planning and consider any limitations as may be necessary.

X. Air Quality, Federal and State Regulation

When an oil or gas operator drills and fractures a well, air pollutants, including nitrogen oxides and volatile organic compounds (VOCs), may arise from the following sources:

- wellhead (natural gas leaks)
- flared gas (gas that escapes from the well during drilling and fracturing and is burned)
- equipment used for drilling, fracturing, and dehydrating gas (equipment exhaust)
- pipelines (natural gas leaks);
- flowback water tanks and pits (evaporating volatile organic compounds); and
- compressor stations ("When natural gas leaves a well, it is sent to a gathering station and the gas is then compressed by an internal combustion . . . engine(s) and conveyed to a processing facility via pipeline."[137]

Pursuant to a 2010 Court entered consent degree, following a lawsuit filed by Wildearth and San Juan Citizens, [138] EPA recently adopted new standards for operators of new fractured and re-fractured natural gas wells that will require that they use technology capable of meeting the emission standards. The standards include both "new source performance standards" for criteria pollutants (a few common pollutants), and national emissions standards for hazardous air pollutants.[139] Under the Clean Air Act, oil and gas, like other industries, may also be subject to regulation through State Implementation Plans, as the discretion of the state, as may be necessary to meet health based National Ambient Air Quality standards established by the federal EPA.

Heath Based National Ambient Air Quality Standards are established only for a few common "criteria" pollutants - particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead - these are monitored on an area-wide basis.[140] The Fort Worth area in the Barnett shale has been designated "non-attainment" for ozone under the CAA, which means that the National Ambient Air Quality

[137] UT Energy Institute Report at 193.

[138] Proposed Rules Vol. 76 Federal Register 52738, 52743, Tuesday, August 23, 2011

[139] EPA final rule, published on 4/17/2012, http://www.epa.gov/airquality/oilandgas/pdfs/20120417finalrule.pdf

[140] EPA website, http://www.epa.gov/air/urbanair/

standard is not met for concentration in the atmosphere. The role of VOCs in forming smog and their contribution to the elevated levels of ozone one the reason for the focus on VOC emissions from shale gas activities.[141]

Oil and gas production facilities can also release more than 50 toxic air pollutants from a variety of sources, including "venting, dehydration, gas processing, compression, leaks from equipment (fugitive emissions), open-pit waste ponds, and land application of volatile wastes."[142] EPA originally tried to regulate "hazardous air pollutants," pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects through health based standards, [143] but the experience was a failure. EPA explains that the health effects of hazardous air pollutants are potentially very serious:

> People exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing air toxics, some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.[144]

In its original attempt to promulgate health based standards for these pollutants, EPA managed to develop standards for only seven hazardous air pollutants. Difficulties in standard setting were complicated by the fact that these pollutants threaten to cause very grave health effects at minimal exposure levels.[145] Many are considered to be "nonthresold" pollutants, meaning that no human exposure to them is safe, and there is limited data and high uncertainty in determining a "safe" exposure. [146] Moreover, some ambient standards must be so stringent that the controls may be exceedingly expensive, and, in some cases, not yet known. [147]In 1990, Congress largely abandoned the harm-based approach to HAP's and substituted a technology-based approach that called for the employment of MACT. The legislation identified some 180 substances to be regulated by that method.[148]

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[141] UT Energy Institute Report

[142] Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division, "Hazardous Air Pollutants from Oil and Gas Exploration and Production" (October 2006), http://www.cdphe.state.co.us/ap/uat/atoilgas.pdf

[143] EPA website, About Air Toxics, http://www.epa.gov/oar/toxicair/newtoxics.html

[144] Id.

[145] Plater et al., Environmental Law, Natural, Law and Society, 3rd edition 2004, at p. 575.

[146] Id.

[147] Id.

[148] Id.

Under section 112 of the Clean Air Act, EPA publishes emission standards for hazardous air pollutants (NESHAPS) for "major sources," that is sources that emit or have the potential to emit 10 tons per year or more of a single HAP or 25 tons per year of more or any combination of these HAP. For major sources,[149] these technology-based standards must reflect the maximum degree of emission reductions of HAP achievable (after considering cost, energy requirements and nonair quality health and environmental impacts) and are commonly referred to as maximum achievable control technology (MACT) standards. [150] MACT standards are to reflect application of measures, processes, methods, systems or techniques, including, but not limited to, measures which, (1) reduce the volume of or eliminate pollutants through process changes, substitution of materials or other modifications, (2) enclose systems or processes to eliminate emissions, (3) capture or treat pollutants when released from a process, stack, storage or fugitive emissions point, (4) are design, equipment, work practice or operational standards (including requirements for operator training or certification) or (5) are a combination of the above.[151] CAA section 112(d)(2)(A)–(E). For new sources, the MACT floor cannot be less stringent than the emission control that is achieved in practice by the bestcontrolled similar source. [152]
The MACT floors for existing sources can be less stringent than floors for new sources,
but they cannot be less stringent than the average emission limitation achieved by the best-performing 12 percent of existing sources in the category or subcategory (or the bestperforming five sources for categories or subcategories with fewer than 30 sources). [153]

Especially given that the federal standards for hazardous air pollutants are not based on any determination of "safe" levels of pollutants, and that they can be affected by cost considerations, cities should think carefully about distance limitations between these hydraulic fracturing operations and housing, schools, daycares and other sensitive receptors. Some municipalities have established setback requirements, others, like Fort Worth, have also imposed air quality requirements on gas wells and their associated facilities, such as pits and tanks.

XI. Conclusion

If local governments are to protect their citizens, they must adopt regulatory measures. When it comes to protecting public health both federal and state standards fall short. There is no state or federal regulation, that regulates the chemicals that can be injected during hydraulic fracturing. Texas has adopted chemical disclosure requirements, but unless trade secret claims are challenged by a landowner, they are largely optional. Texas does have some regulations that govern oil and gas drilling, but given the dismal enforcement record of the state agency in charge, they cannot be relied upon to protect the citizens of Texas. Since there is generally no testing to establish baseline conditions, it is very difficult to hold the industry responsible for

[149] A major source includes "any group of stationary sources located within a contiguous area and under common control" that emits a certain number of tons of regulated pollutant annually
[150] Proposed Rules Vol. 76 Federal Register 52738, 52741 Tuesday, August 23, 2011, http://www.epa.gov/ttn/atw/oilgas/fr23au11.pdf

[151] Id.
[152] Citing section 112(d)(3),
[153] Citing section 112(d)(3),

contamination. Unless local governments establish testing standards, their citizens will likely bear the cost of any contamination. Given that Texas courts are unlikely to classify hydraulic fracturing as an abnormally dangerous activity subject to strict liability, it may also be particularly useful for local governments to adopt standards of care that can be used to establish negligence per se. Given uncertainties in the state of the science, it will nevertheless be very difficult for citizens to win a legal action under the common law. If local governments want to ensure that hydraulic fracturing does not suck them dry, it will also be up to them to establish water use restrictions. Finally, given that federal air quality regulations for the most hazardous of pollutants are not determined on the basis of safety to protect public health, local governments should establish as much distance as possible between hydraulic fracturing and the place people live work and play.