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Mitigating the Adverse Impacts of Hydraulic Fracturing: A Role for Local Zoning?

Jessica A. Bacher and John R. Nolon¹

(Zoning and Planning Law Report, forthcoming)

I. Hydraulic Fracturing's Progress and the Role of Local Governments

A. The Progress of Hydraulic Fracturing and Governmental Regulation

Horizontal gas exploration is an ongoing enterprise in many states. Existing federal and state regulations leave many adverse local impacts of drilling operations unaddressed. This governance gap is a call to local governments to adopt standards and practices to supplement state and federal requirements. In the absence of sound models for mitigating these impacts, many local governments will not regulate hydraulic fracturing, or hydrofracking, for a variety of reasons including their lack of capacity to manage this complex technology and the absence of model zoning regulations to emulate. As a result, many local governments default to either banning the practice or allowing it to proceed in anticipation of the positive economic impacts of this form of local economic development and the hope of adequate regulation at the federal and state levels.

This article will explain the traditional role of local governments in regulating heavy industrial operations such as those associated with hydrofracking, explore impacts at the local level, show that federal and state regulations leave many local impacts unmitigated, identify and describe several of the zoning laws and other practices that local governments are adopting, and

¹ Jessica A. Bacher is Adjunct Professor and the Executive Director of the Land Use Law Center at Pace Law School; John R. Nolon is Professor of Law at Pace Law School, Counsel to the Land Use Law Center, and has been Visiting Professor of Land Use Law and Policy at the Yale School of Forestry and Environmental Studies since 2001. The authors thank Pace Law School students Vittoria Fiorenza, Allison Sloto, Kelly Nishikawa, Louis Fernandez, and Steven Gavin and Yale School of Forestry and Environmental Studies students Rebecca Gallagher, Christopher Halfnight, and Avana Andrade for their contributions.

demonstrate why it is a bad idea for states to preempt the traditional role of local governments in regulating this particular heavy industrial activity.²

B. The Role of Local Governments

Normally, local governments protect themselves from the adverse impacts of intense industrial activities, like those associated with hydrofracking, through comprehensive planning, zoning, subdivision and site plan regulations, and negotiations and non-regulatory agreements with the private sector. Following this traditional path, localities would have a hydrofracking component of their comprehensive plan adopted after a full community discussion of the facts, impacts, benefits, and concerns about the technology. That plan would identify critical environmental areas, perhaps agricultural areas, and residential and commercial neighborhoods where hydrofracking would be inappropriate. It would also identify industrial zones where hydrofracking, like other industrial operations, are permitted.

Employing these traditional land use controls, as drilling projects were proposed, they would be limited by zoning restrictions and subject to local special use permits and site plan regulations that account for the unique adverse impacts of unconventional gas exploration on neighbors and the community. Under these regulations, gas drilling companies with permits from, or pending from, state agencies would be subject to these local regulations and be required to receive a site plan or special use permit approval from the local planning board.

There are three factors, however, that inhibit traditional land use regulation when it comes to hydrofracking. First, there is the impression that regulating unconventional gas operations is the

² The authors are members of an interdisciplinary team with the Yale Center for Environmental Law and Policy, led by Professor Josh Galperin, and the Land Use Law Center at Pace Law School. This team is conducting a long-term project that will engage industry representatives, regulators, scientists, and local leaders in a process of identifying unregulated local impacts and developing sound local planning, regulatory, and non-regulatory practices that localities can adopt. For more project information, visit <http://envirocenter.yale.edu/programs/local-gas-impacts>.

province of the federal government under numerous federal environmental protection statutes, and of the state government, which has traditionally regulated oil and gas operations. Second, some believe that local governments are preempted by state law in some jurisdictions from regulating the practice, or that the extent of local legal authority is unclear. Third, hydrofracking, in all of its dimensions, is a new and complex technology about which much is unknown and it takes great capacity at the local level to understand it and decide how to react. As a consequence of these inhibiting factors, many local governments either do not adopt plans and regulations or simply ban the practice in the absence of a better idea about how to deal with it.

II. **The Impacts of Hydrofracking**

A. Positive Local Impacts

Because this article focuses on what local governments can do to respond to the impacts of hydrofracking, it necessarily highlights the adverse impacts that should concern local residents and their elected officials. One of the article's purposes is to identify, describe, and analyze the kinds of actions that localities can take, hence the emphasis on adverse impacts that need to be mitigated to protect local health, safety, and welfare interests. That said, the positive impacts of hydrofracking are persuasive to some localities and must be recognized, so that regulations respect and maximize these impacts.³

Advocates for the natural gas industry argue that hydrofracking will bring significant economic benefits to the private and public sector.⁴ Local-scale impacts relate primarily to

³ The authors recognize that opponents of hydrofracking offer rebuttals to each of these purported advantages and that the debate over positive and negative benefits of hydrofracking is anything but settled.

⁴ See Jared B. Fish, *The Rise of Hydraulic Fracturing: A Behavioral Analysis of Landowner Decision-Making*, 19 BUFF. ENVTL. L. J. 219, 265 (2012).

increased economic opportunity.⁵ Payments for drilling rights, leases, and royalties may inject significant new revenue into a community. Gas development typically increases local employment,⁶ particularly in retail, services, trucking, and heavy equipment operation. Property values may rise, on average, both because of new resource value and increasing population and economic activity. This economic boom may be accompanied by increases in property tax revenue and intergovernmental transfers. In some cases, communities may also experience such benefits from oil and gas operators as improved road maintenance and increased local charitable donations.⁷ Communities may also receive a variety of financial contributions to mitigate adverse impacts and better prepare them for hydrofracking operations. For example, the natural gas industry has directed new money into the Marcellus region; the short-term economic gain and opportunities for local businesses and property owners are a considerable aspect for the operation.⁸

The natural gas industry has ignited a serious change in domestic energy for the United States.⁹ Although estimates of gas reserves have been questioned,¹⁰ the United States is projected to be one of the largest net exporters of natural gas and nearly energy independent by 2035.¹¹ The number of natural gas wells throughout the country has increased from 300,000 to over

⁵ For further examples of the economic impacts of fracking, both positive and negative, see Susan Christopherson, *The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues*, CaRDI Reports, September 2011, at 1, 4, available at http://www.greenchoices.cornell.edu/downloads/development/shale/Economic_Consequences.pdf.

⁶ See *Red Oak Water Transfer NE, LLC v. Countrywide Energy Servs., LLC*, No. GD 11-17598, 2012 Pa. Dist. & Cnty. Dec. LEXIS 236, at *4-5 (Pa. D. & C. 2012) (explaining the positive economic impact on one of the defendants).

⁷ See Laura Legere, *Shale Gas Drillers To Pay Higher Permit Fees*, PITTSBURGH POST-GAZETTE (JUN. 13, 2014), <http://powersource.post-gazette.com/powersource/policy-powersource/2014/06/13/Shale-gas-drillers-to-pay-higher-permit-fees/stories/201406130175>.

⁸ See David Kay, *The Economic Impacts of Marcellus Shale Gas Drilling: What Have We Learned? What are the Limitations?*, CaRDI Reports, September 2011, at 5-6.

⁹ Hannah J. Wiseman, *Risk and Response in Fracturing Policy*, 84 U. COLO. L. REV. 729, 756 (2013).

¹⁰ *Id.*

¹¹ See Intl. Energy Agency World Outlook at 74 (2012).

500,000 in the past decade.¹² The shale gas boom was credited with creating 500,000 jobs in the United States and helping the country out of its recent recession.¹³ It was reported that another 870,000 jobs might be created by 2015.¹⁴ If natural gas drilling and production lasts over the next twenty to thirty years, those jobs will continue to grow.¹⁵

B. Adverse Impacts of Hydrofracking at the Local Level

Hydrofracking development also negatively impacts the local environment, the social and economic characteristics of a community, and local health and safety. Potential environmental impacts range from water pollution to water depletion; from air pollution and dust to visual blight and noise; and from habitat fragmentation to increased soil erosion. Gas development brings a surge in truck traffic that may deteriorate local roads. Spills and other accidents at well sites may threaten local health, while emergency services required to respond to such accidents may be stretched beyond capacity because of a gas development boom. The economic boom and population influx accompanying development may overwhelm local services and infrastructure, such as waste disposal, water treatment, schools, courts, housing, and jails. Environmental damage may adversely affect property values and threaten valuable agricultural resources. Impacts on local highways and bridges, municipal water and sewer systems, and other municipal infrastructure may also arise from natural gas and oil activities.

The environmental impacts of hydrofracking are of particular concern. Horizontal hydrofracking operations emit volatile organic compounds and methane raising both public

¹² Wiseman, *supra* note 9 at 735.

¹³ Jason Schumacher, *The Legal Landscape of Hydrofracking: The Oil and Gas Industry's Game-Changing Technique is its Biggest Hurdle*, 17 TEX. REV. L. & POL. 240, 256 (2013).

¹⁴ See Lisa Burleson & Sean Cooke, *Marcellus and Utica Shales and Ohio Schools: A Possible Model for Economic Growth and Opportunity*, THE HEARTLAND INSTITUTE (Jan. 16, 2013) <http://heartland.org/policy-documents/marcellus-and-utica-shales-and-ohio-schools-possible-model-economic-growth-and-oppo>

¹⁵ Jeffrey Jacquet, *Workforce Development Challenges in the Natural Gas Industry*, CaRDI Reports, September 2011, at 10.

health and climate change concerns.¹⁶ Additional air pollution, such as dust and exhaust, is caused by the thousands of truck trips that each well generates, trips that require improved or new roads, which in turn cause landscape fragmentation, impairing habitat value and removing natural vegetative cover allowing invasive species to become established.¹⁷ Vehicular activity associated with hydrofracking can cause congestion, noise, and the need for expensive road repairs.¹⁸ Potential contamination of aquifers and fresh water supply, the use of massive quantities of water, the disposal of hydrofracking fluids, the release of chemicals used in the processes, and the impact upon local landscapes can result in the degradation of a community's infrastructure.¹⁹

The disposal of flow-back or wastewater generated by hydrofracking can lead to the use of deep injection: the deposit of toxic brine waste under extreme pressure in wells several thousands of feet in the earth.²⁰ Research indicates that this process may pollute groundwater aquifers and possibly trigger earthquake activity.²¹ In some states, wastewater disposal raises complications where the geology is not favorable to injection wells.²² This, in turn, leads to a search for

¹⁶ Press Release, U. S. Environmental Protection Agency, EPA Proposes Air Pollution Standards for Oil and Gas Production/Cost-effective, flexible standards rely on operators' ability to capture and sell natural gas that currently escapes, threatens air quality (Jul. 28, 2011), *available at* <http://yosemite.epa.gov/>.

¹⁷ City of Ithaca, N.Y., Section 9.1, Prohibiting the Leasing of City of Ithaca-Owned Land for Hydraulic-fracturing Natural Gas Drilling and Extraction – Resolution.

¹⁸ See NY DEC estimate of 6,800 truck trips per well permitted. REVISED dSGEIS, *supra* note 3, at 6.

¹⁹ Town of Benton, N.Y., Local Law No. 2 (2012), “Establishing a Second Moratorium on Horizontal and Directional Gas Drilling and Hydraulic Fracturing.”

²⁰ See Stephen Hume, *Hydrofracking Waste Water Being Injected Into Old Wells In Northeastern B.C.*, VANCOUVER SUN (Jun. 16, 2014),

http://www.vancouversun.com/health/Hydrofracking+waste+water+being+injected+into+wells+northeastern/9942146/story.html?__federated=1 for impacts resulting from deep injection of hydrofracking wastewater.

²¹ See Hailey Branson-Potts, *Oklahoma Coming To Terms With Unprecedented Surge In Earthquakes*, L.A. TIMES (Jun. 17, 2014), <http://www.latimes.com/nation/la-na-oklahoma-earthquakes-20140618-story.html#page=1>, reports of earthquakes following the deep injection of hydrofracking fluids into the ground.

²² *New York Hydrofracking Debate Focuses on Wastewater*, HUFFINGTON POST (Feb. 21, 2012)

http://www.huffingtonpost.com/2012/02/20/new-york-hydrofracking_n_1288696.html (“Other geologists have said New York doesn't have the right geology for such wells.”).

appropriate injection wells in other states and for treatment plants that can handle the wastewater from water-intensive hydrofracking operations, which are often in short supply.²³

Additional environmental concerns include surface water pollution, soil erosion and sedimentation, and visual blight. There are a large number of public health concerns, as well.²⁴ These include exposure to escaped methane, volatile organic compounds, ground-level ozone, chemical fires, lung disease in workers caused by the inhalation of silica dust, benzene pollution of the air near drilling sites, particulate matter from heavy trucks travelling on dirt roads, personal injury from seeping hydrochloric acid and solvents, and diesel fuel and toxic chemicals in ground water.

III. State and Federal Regulation and Resultant Gaps

A. Hydrofracking Raises Jurisdictional Issues

One of the many issues raised by hydrofracking is which level of government should regulate which aspects of the practice. This debate is complicated by the fact that the benefits associated with hydrofracking are national, regional, state-wide, and local in nature and that the risks associated with hydrofracking raise concerns that are within the existing legal jurisdiction of federal, state, and local governments. These realities lead, in turn, to further debates about which level of government should have the primary role in regulating hydrofracking; indeed, some argue that the federal government should fully preempt the field of hydrofracking regulation, others argue that states should preempt local regulation, and some see benefits in the

²³ 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, 120-21 (2009)[hereinafter *Untested Waters*].

²⁴ See Physicians Scientists & Engineers for Healthy Energy, PSE Study Citation Database on Shale Gas and Tight Oil Development, available at <http://www.psehealthyenergy.org/site/view/1180>.

involvement of all three levels of government in regulating the technology.²⁵ As this section demonstrates, none of these levels of government is fully regulating the adverse impacts of hydrofracking, leaving local communities and their residents exposed to the dangers of its many adverse impacts.

B. Federal Jurisdiction

The current federal regulatory system is both fragmented and incomplete. The Safe Drinking Water Act (“SDWA”),²⁶ Clean Water Act (“CWA”),²⁷ Clean Air Act (“CAA”),²⁸ Comprehensive Environmental Response Compensation Act (“CERCLA”),²⁹ Resource Conservation and Recovery Act (“RCRA”),³⁰ Endangered Species Act (“ESA”),³¹ and Toxic Substance Control Act (“TSCA”)³² all nominally may cover aspects of the hydrofracking lifecycle, but all contain exemptions or nuances that make them largely ineffectual under the unique circumstances of hydrofracking.

The SDWA, for example, applies to the injection or reinjection of hydrofracking fluid into groundwater aquifers that provide drinking water. However, the SDWA only imposes standards upon drilling operations injecting diesel fuel into aquifers.³³ The CWA, which applies to surface water contamination, is powerless to address potential contamination resulting from water

²⁵ See Christopher S. Kulander, *State Regulatory Issues Related to Drilling for Shale Gas and Hydraulicfracturing*, ROCKY MOUNTAIN MINERAL LAW FOUNDATION, 5-1, 5-31 (2012). “What is being derided as a weakness is actually a strength: each state can quickly respond to its distinctive blend of economic, political, hydrological and geological realities to achieve optimal regulatory oversight. Another weakness alleged by those favoring federal oversight, that states are “rushing” to create law regulating hydrofracking, is also actually a strength—necessary regulations are made in a timely manner, in response to industry activity, by those more familiar with the challenges faced by an individual state.”

²⁶ Safe Drinking Water Act, 42 U.S.C. (2010).

²⁷ 33 U.S.C. § 1313.

²⁸ Clean Air Act, 42 U.S.C. §7411.

²⁹ Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 (2005).

³⁰ Resource Conservation and Recovery Act, 42 U.S.C. §6901 (1976).

³¹ Endangered Species Act, 16 U.S.C. §§ 1531-1544 (1988).

³² Toxic Substances Control Act, U.S. Cong. 107th Cong. Public Law 107-377 (2002).

³³ See Energy Policy Act of 2005, Pub. L. No. 109-58, § 322, 119 Stat. 594, 694 (2005).

migrating to surface waters after being injected into the ground.³⁴ The Environmental Protection Agency is currently using CAA authority to institute new rules regulating the release of methane and hazardous air pollutants,³⁵ but the scope of this regulatory scheme is confined to the well pad point source.³⁶ Likewise, oil and gas waste is exempt from the “cradle-to-grave” waste management scheme of RCRA. Under this exemption, most oil and gas exploration and production wastes are not subject to the federal hazardous waste portions of RCRA.³⁷

C. State Regulation³⁸

State governments have traditionally played the primary role in regulating the oil and gas industry. Because of this and because of the various exemptions of most hydrofracking operations from federal regulations, the states have the bulk of the responsibility for regulating the impacts of gas well site development, drilling, hydrofracking, and ongoing production from gas wells. With few exceptions, the regulatory regimes in most states are anything but comprehensive, particularly with respect to regulating adverse impacts on local communities. In this section we provide a general overview of the approach taken by state governments.³⁹

With respect to geophysical testing regarding the proper location of oil or gas wells using horizontal drilling technology, only a few states require careful environmental review. For

³⁴ Jason Obold, *Leading by Example, The Fracturing Responsibility and Awareness of Chemicals Act of 2011 as a Catalyst for International Drilling Reform*, 23 COLO. J. INT’L ENVTL. L. & POL’Y 473 (citing Office of Pub. Affairs, Dep’t of Justice, Texas Natural Gas and Oil Drilling Contractor Pleads Guilty to Negligent Violation of Clean Water Act in Oklahoma (2011), http://www.justice.gov/opa/pr/2011/October/11_enrd_1342.html).

³⁵ <http://water.epa.gov/scitech/wastetech/guide/upload/shalereporterfactsheet.pdf>.

³⁶ Note the EPA is expanding regulations to address impacts of hydrofracking. Effective January 1, 2015, extraction companies must be in compliance with “green completion,” which utilizes specialized machinery to separate gas and liquid hydrocarbons from flowback fluid. See Summary of Key Changes to the New Source Performance Standards, at 1, <http://www.epa.gov/airquality/oilandgas/pdfs/20120417changes.pdf>. The EPA also recently announced proposed rulemaking for obtaining information for chemical substances and mixtures used in hydroracking. See <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPPT-2011-1019-0001>.

³⁷ 42 U.S.C. 6921(b)(2)-(3).

³⁸ See Nathan Richardson, Medeline Gottlieb, Alan Krupnick, & Hannah Wiseman, *The State of Shale Gas Regulation*, Resources for the Future (2013), available at <http://www.rff.org/shalemaps>.

³⁹ See generally Hannah J. Wiseman, *Risk and Response in Fracturing Policy*, 84 U. COLO. L. REV. 729 (2013).

testing that involves the use of explosives in “shot holes,” most states require that anyone blasting shot holes must have a blaster’s license. Some states mandate minimum distances between blasting and buildings and other structures, and some require the filling in of shot holes and minimal restoration of sites.

For well site development once geophysical testing is complete, states with delegated Clean Water Act authority typically issue a general stormwater permit subject to specified best management practices to prevent and mitigate soil erosion; EPA issues this permit in states without delegated authority. Some states also require that operators test existing water quality prior to well site development, or incentivize this testing by adopting a rebuttable presumption that contamination within a certain distance and time of drilling was caused by the oil and gas operator. Most states do not address habitat fragmentation or other impacts of well site development.

The bulk of state regulations apply after site development, when drilling begins. All states require that the well be “cased” in a particular way—that it be lined with steel cemented into the ground. Casing regulations vary substantially. Some are narrative, requiring “adequate” casing, whereas others specify the type of steel and cement that must be used, the time for which the cement must set around the casing before being disturbed, the type of cementing method required, and how deep the casing must run. During drilling, states typically require the use of blowout prevention equipment to prevent the well from exploding when an operator encounters unexpected pressures while drilling. All states also regulate, to some extent, the surface pits or tanks that are used to store drilling, and later fracturing, wastes. Most require that the pits be lined and emptied and dried out within a certain period of time after drilling and fracturing ends. Solids from dewatered pits and the drill cuttings such as rock and soil that come out of the

well must either be buried on site or sent to a state-regulated exploration and production waste landfill.

With respect to the management of surface pits at well sites, most states also require that a certain amount of excess capacity be maintained in pits so that they do not overflow, and some require secondary containment beneath storage tanks or pits—additional liners or other materials that will catch spills if they occur. Finally, with respect to site development, most states require operators to have a spill prevention and response plan, under which certain practices are to be followed to avoid or catch spills and quickly recover spills if they occur.

For the actual operation of gas wells, state regulations are somewhat limited. States typically do not regulate the type of chemicals that may be used, for example, although most require disclosure of the chemicals while allowing for trade secret protection. Several states do, however, require that the well be pressure tested before fracturing begins to ensure that the casing can withstand the pressure, and that operators notify the state oil and gas agency before beginning drilling operations. Some states require permits for groundwater withdrawal of the immense amounts of water needed for fracturing; others do not. Regarding surface water withdrawals, states like West Virginia and Pennsylvania ask the operator to demonstrate that the withdrawals will not adversely affect aquatic life. Specific state regulations also apply to the disposal of waste or flowback water,⁴⁰ with many states allowing disposal only in underground injection control wells (regulated by states if they have delegated authority under the Safe Drinking Water Act) or, in limited circumstances, through wastewater treatment plants. States typically require that the gas emitted by wells be vented, burned off, or captured and sent through

⁴⁰ For discussion of controversy over hydrofracking wastewater disposal regulations, see Mark Hume, *Where Does All The Wastewater From This B.C. Disposal Well Go?*, THE GLOBE AND MAIL (Jun. 15, 2014), <http://www.theglobeandmail.com/news/british-columbia/the-mystery-of-northeast-bcs-well-2240-where-does-dirty-wastewater-go/article19176208/>.

a gathering line to a pipeline. This cleans out the well and then allows for ongoing production. Some states limit the amount of venting or flaring that may occur, and several also require leak and valve controls on various wellhead equipment and storage tanks to limit volatile organic compound emissions, including methane.

During the ongoing production of gas, states regulate how wastewater may be stored and disposed of. Many allow the brine to be spread on dirt roads, and other disposal typically occurs through underground injection control wells, or, more rarely, wastewater treatment plants. In some areas, operators are reusing much of the flowback water for fracturing at other well sites. Following drilling and fracturing, states typically require minimal site restoration.

IV. Local Regulation

A. Bans and Moratoria

A careful comparison of the adverse impacts of hydrofracking with the impacts regulated in most states makes it clear to localities that they remain exposed to some of the risks of gas exploration. There is much evidence that concern over these unregulated adverse impacts of hydrofracking has motivated local legislatures to ban the practice completely or impose moratoria preventing all operations until more studies have been completed. Currently, there are hundreds of bans and/or moratoria adopted nationally.⁴¹ For example, the City of Terre Haute, Indiana has placed a perpetual moratorium on hydrofracking within the corporate limits of Terre Haute, until the City Council understands the risks of hydrofracking.⁴² Similarly, the City of Las

⁴¹ *Local Actions Against Fracking*, foodandwaterwatch.org, <http://www.foodandwaterwatch.org/water/fracking/fracking-action-center/local-action-documents/>.

⁴² Common Council of City of Terre Haute, Ind., Res. No. 12 (June 8, 2013), *available at* http://documents.foodandwaterwatch.org/doc/Frack_Actions_TerreHauteIN.pdf.

Vegas, New Mexico has placed a moratorium to remain in effect until the City's Governing Body reaches a conclusion on how to best address the issues raised by hydrofracking.⁴³ In Boulder, Colorado an 18-month extension was placed on Boulder's previous temporary moratoriums imposed on hydrofracking.⁴⁴ The moratorium applies to "any application for oil or gas exploration, development, or production currently being processed by the Land Use Department, which may continue to be processed and reviewed as provided in the Land Use Code."⁴⁵

Other municipalities have placed outright bans on hydrofracking. The Town of Lumberland, New York has explicitly prohibited any building or structure to be created or altered for hydrofracking in every zoning district.⁴⁶ It is unlawful for anyone to conduct "heavy industry" within the Town of New Lisbon, New York.⁴⁷ Included in New Lisbon's definition for heavy industry is the "exploration for natural gas; extraction of natural gas; natural gas processing facilities and/or compressor stations."⁴⁸ Pittsburgh, Pennsylvania has banned the commercial extraction of natural gas, stating the operation "poses a significant threat to the health, safety, and welfare of residents and neighborhoods within the City."⁴⁹ In Lewisburg, West Virginia, "locating, drilling, equipping, or producing of any oil and gas" is listed as a prohibited use within the City.⁵⁰

⁴³ City of Las Vegas, N.M., Office of the Mayor, Exec. Order 2012-14 (July 23, 2012), *available at* http://documents.foodandwaterwatch.org/doc/Frack_Actions_LasVegasNM.pdf

⁴⁴ BOULDER, COLO., LAND USE CODE art. 12 § 12-300 (2013). *available at* <https://www.bouldercounty.org/doc/landuse/lucodearticle12.pdf>.

⁴⁵ *Id.*

⁴⁶ Town of Lumberland, N.Y., Res. No. 150 (Apr. 18, 2012), *available at* <http://www.ecode360.com/26935197>.

⁴⁷ Town of New Lisbon, N.Y., Local Law No. 2 (2011), *available at* <http://www.citizenscampaign.org/PDFs/hydrofracking-resolutions/HF%20local%20laws%20New%20Lisbon.pdf>.

⁴⁸ *Id.*

⁴⁹ PITTSBURGH, PA., tit. 6, Pa. CODE ch. 618, art. 1 (2010).

⁵⁰ LEWISBURG, W. VA., CODE art. 5, § 35 (2011).

B. Traditional Regulatory Responses

There is a perceptible, but largely unnoticed, trend toward the use of local zoning and land use regulation of hydrofracking, treating gas drilling operations as if they were any other heavy industrial land use. Some of these municipal initiatives are surprisingly comprehensive and, in the aggregate, they provide a significant, if embryonic, menu of options for other localities to consider. Flower Mound, Texas, for example, requires a setback distance of 1,500 ft. from any residence, public park, public building, school, or hospital, and of 750 ft. from any floodplain, environmentally sensitive area, or public road or highway.⁵¹ An oil or gas well permit will not be issued in Flower Mound unless the applicant presents written approval from the United States Army Corps of Engineers, ensuring that a drilling or pad site will not be located within 3,000 ft. of a federal public work.

Oklahoma City, Oklahoma created an oil and gas zone that defines permitted uses, requires permits for drilling, requires the drillers be insured, regulates the location of wells, has enforcement provisions, and regulates fencing/screening/landscaping, equipment, storage tanks, noise/nuisance, and impoundments.⁵² Oklahoma City also regulates blowout prevention equipment, requiring at least three blowout preventers to be installed at the well site and to be used on all operating wells. Santa Fe County, New Mexico established an oil and gas overlay district governing oil and gas exploration, drilling, production, transportation, abandonment, and remediation.⁵³ The County prohibits any oil or gas facility as of right and requires the owner to apply for and obtain an Oil and Gas Overlay Zoning District Classification, a Special Use and

⁵¹ TOWN OF FLOWER MOUND, TEX., LOC. GOV'T CODE ANN. § 34-421 (West 2011).

⁵² OKLAHOMA CITY, OKLA., ADMIN. CODE § 37-81 (1999), *available at* <http://www.okc.gov/pw/pdf/c37.pdf>.

⁵³ SANTA FE, N.M., CODE R. § 2008-19 (LexisNexis 2008), *available at* http://www.santafecountynm.gov/userfiles/SFCOrdinance2008_19.pdf.

Development Permit, Grading and Building Permits, and a Certificate of Completion, which may require other local, state, and federal development approvals.

Cecil Township, Pennsylvania adopted an oil and gas overlay district as well, making oil and gas development a use subject to conditions: reasonable safeguards established by the Township.⁵⁴ Operators in Peters Township, Pennsylvania are required to provide, at their own expense, an annual group-training program for emergency responders regarding emergencies at drill sites.⁵⁵ In Southlake, Texas drilling and production of gas within city limits is only allowed by a special use permit, which is subject to several protective standards. In Southlake, hydrofracking and the completion of wells is prohibited during the summer months and hydrofracking operations are only permitted to occur during daytime hours.⁵⁶ The City of Chanute, Kansas limits the operation of hydrofracking wells to between eight o'clock a.m. and four o'clock p.m. Monday through Friday to mitigate the noise impact of hydrofracking operations.⁵⁷ In Flower Mound, drilling is limited to the hours of seven o'clock a.m. to seven o'clock p.m. Monday through Friday, and from nine o'clock a.m. to five o'clock p.m. on Saturdays.

In Arlington, Texas the City Council restricts the hours of operation of vehicles associated with drilling and production if a proposed vehicle passes a designated school zone, heavily used roadway, protected uses, or travels along local residential streets. Vehicles are prohibited from accessing any private road surfaced in gravel or caliche in route to drill sites. Flower Mound also regulates vehicles over three tons in weight associated with drilling and production. Such

⁵⁴ CECIL TOWNSHIP, PA., CODE § 3-2011 (2011), *available at* <http://www.ceciltownship-pa.gov/documents/ord201103.pdf>.

⁵⁵ PETERS TOWNSHIP, PA., CODE ch. 27, § 27-713 (2013).

⁵⁶ SOUTHLAKE, TEX., LOC. GOV'T CODE ANN. ch. 9.5, art. 4, § 880-A (West 2011), *available at* <http://weblink.cityofsouthlake.com/WebLink8/DocView.aspx?id=452815&&dbid=0>.

⁵⁷ CITY OF CHANUTE, KAN., ADMIN. REGS. § 16.44.030 (2014).

vehicles are limited to use only state arterials and highways in route to the operation site, and must travel only during the regulated drilling hours specified. Peters Township requires operators to include proposed truck routes with permit applications. The Township also retains the right to designate reasonable truck routes as needed to avoid interruption with roadway jurisdiction, traffic, physical conditions, location of school bus routes, and the amount of residential housing along potential routes.

Gas well permits in Arlington, Texas involve a two-step process. First, operators must obtain approval for a special use permit; only then may they apply for a gas well permit. In Peters Township, gas drilling sites are evaluated as a conditional use. Pre-drilling requirements are imposed on the operator to test all existing water supplies within 1,000 ft. of the surface location of the well; the operator must submit a pre-testing and pre-drilling plan that includes soil testing and water quality testing, which must be approved by the Township.⁵⁸ The Township also requires operators to schedule seismic testing, to inform property owners in surrounding areas when testing will occur, to restore any and all property damage, and to be insured with respect to operations for no less than five million dollars. Similarly, Burleson, Texas requires that hydrofracking operations with ponds or pit storage perform baseline soil testing.⁵⁹ In Mount Carmel, Illinois operators are required to prevent the escape of gas or fumes into the atmosphere from wells, tanks, or pipelines. Operators are responsible for damages for any injury to people or property caused by allowing gas or fumes from wells to escape into the atmosphere.

Tracy, California limits hydrofracking operations to specific zoning districts and requires setbacks for wellbores. The ordinance includes erosion provisions, prohibits hydrofracking ponds and pits, and requires all flowback of hydrofracking fluid to be stored in aboveground

⁵⁸ PETERS TOWNSHIP, PA., CODE ch. 27, § 27-713 (2013).

⁵⁹ BURLESON, TEX. CODE ANN. ch. 14, art. 7, § 14-361 (West 2014).

steel tanks.⁶⁰ The City of Longmont, California adopted an ordinance that excludes oil and gas facilities in designated hazard areas and zoning districts including residential, mixed use, and planned unit development districts. This ordinance also requires the payment of impact fees for all permits issued and it imposes setbacks from water sources of various types.⁶¹

Saguache County, Colorado divides drilling operations into major and minor facilities and applies different requirements to each, paralleling the way most local governments regulate subdivisions, but both require a permit in order to operate. Wells of both types must be set back at least 1,000 ft. from the normal high water mark of any water body.⁶² In Coppell, Texas drilling is permitted only in light industrial and agricultural zones and, even in those zones, it is prohibited within 1,000 ft. of residential structures, religious institutions, public buildings, hospitals, schools, public parks, or any business.⁶³

Flower Mound requires operators to submit a detailed site plan to obtain an Oil and Gas Permit and to pay a stipulated fee. Operators are obligated to notify property owners of their pending application, and a public meeting must be held prior to permit issuance. The local law explains that the permit and procedure are designed to ensure that hydrofracking operations will not occur at the expense of environmental quality, community character, or quality of life. Texas City, Texas requires operators to acquire written permission from any property owner of a residence, building, or structure located within 600 ft. of the drilling location before a permit may be issued. Similarly, in Chanute, Kansas operators must publicize their intent to file an application for a permit to drill a gas well in the official city newspaper five days prior to

⁶⁰ TRACY, CAL., CODE REGS. tit. 10 § 10.08.49 (West 2014).

⁶¹ CITY OF LONGMONT, COLO. CODE § 2012-25 (2012), *available at* http://www.ci.longmont.co.us/city_council/agendas/2012/documents/071712_8A.pdf

⁶² SAGUACHE COUNTY, COLO., LAND DEV. CODE Art. XXI (2008), *available at* <http://www.saguachecounty.net/images/stories/docs/oilgas/O&GRegs-adopted.pdf>

⁶³ COPPELL, TEX., REV. CIV. STAT. ANN. art. 9-26, § 2009-1228 (West 2009), *available at* <http://www.nctcog.org/trans/air/Coppell.pdf>.

submitting an application. The operator must also give written notice by mail or personal delivery of their intent to file an application to the owners of properties adjacent to the proposed site.

The City of Fort Worth, Texas requires that hydrofracking operations carry and maintain insurance coverage of at least \$10 million.⁶⁴ This coverage ensures that Fort Worth can recover from operators if environmental damage occurs. The Town of Pelham, Alabama has a license fee schedule that charges oil and gas operations fees calculated as a percentage of their future gross receipts.⁶⁵ Similarly, Flower Mound requires drillers to be insured, to pay an annual inspection fee for the hydrofracking operation site, and to secure a restoration bond payable to the town in the amount of \$100,000 per acre. The purpose of the bond is to restore proper grading and vegetation to the operation site following the expiration of the oil and gas permit.

Flower Mound's regulations require clean-up operations to occur no later than twenty-four hours of spills, leaks, or malfunctions, and requires drilling equipment to be painted in unobtrusive, neutral colors. To restore operation sites after well servicing, Flower Mound requires operators to clean the drill or operation site and repair all damage to public property caused by operations within thirty days. Operators are also required to follow abandonment regulations in the event of abandonment of an operation, and are responsible for the restoration of the site to its original condition.

C. Non-Regulatory Actions⁶⁶

⁶⁴ FORT WORTH, TEX. UTIL. CODE ANN. ch. 15, art. 2, § 15-41 (West 2014), *available at* http://fortworthtexas.gov/uploadedFiles/Gas_Wells/090120_gas_drilling_final.pdf.

⁶⁵ PELHAM, ALA., CODE ch. 5, art. 1, § 5-1-211 (West 2012).

⁶⁶ For further discussion of non-regulatory strategies available to municipal governments, *see* John R. Nolon & Victoria Polidoro, *Hydrofracking – Disturbances both geological and political: Who Decides?* 44 THE URBAN LAWYER 507, 526-531 (2012).

Municipal governments have a number of non-regulatory strategies available to them to control the local impacts of hydrofracking. These include education and planning functions that convene, inform, and influence the residents and businesses in the community, preparing the way for cautious and careful progress. Such strategies can involve working with landowners to ensure that their lease agreements with drilling companies contain measures to prevent or mitigate local impacts. Also, leases could compel lessees to sign a local host community agreement that requires signatories to follow stewardship and drilling procedures in lieu of local regulations. Following proper local educational efforts, a municipality can amend its comprehensive plan (an advisory, non-regulatory document) to add an unconventional gas exploration component that articulates objectives and planning strategies for achieving those objectives. This component should list and describe possible local impacts in detail, which further educates the public about pending changes due to this industrial activity.

Implementation of these local strategies puts municipal leaders in a position to create collaborative decision-making forums and to mediate the tension that inevitably occurs when local leaders and stakeholders are excluded from decisions affecting their communities and local impacts are ignored. In addition, municipal governments that have not been preempted from regulating local land use impacts of hydrofracking can move gradually from these non-regulatory approaches to the adoption of land use and police power regulations as necessary to respond to impacts not checked by these non-regulatory initiatives.

V. A Presumption Against Preempting Local Zoning and Land Use Regulation

For some, allocating regulatory authority to hundreds, if not thousands, of local governments in gas-producing states is counterintuitive. How can an industry operate if it is subject to such a

fragmented, multi-layered regulatory environment? Shouldn't this be prevented by state legislatures by the simple act of preempting, expressly, all such regulation of critically needed energy resources? On the other hand, where the existing regulatory regime, state and federal, leaves significant adverse impacts to be reckoned with, should local zoning and other land use regulations be thwarted? Doesn't the growing evidence of local competence in this field demonstrate that localities can regulate hydrofracking as it does other high-impact land uses?

If the advocates of state preemption prevail, the historical role of local governments in controlling local land uses and their impacts will be diminished, if not extinguished. Local governments are created by and derive their powers from the state. They get the power to adopt land use plans and regulations through state planning and zoning enabling acts and home rule statutes. If the state legislature expressly and in certain terms preempts using that delegated power in order to promote a state interest such as gas exploration, the power of local government is clearly trumped. When state legislatures do not expressly preempt local zoning or where their intention to do so is ambiguous, it is the job of the courts to determine whether localities are preempted. Courts may find that, by implication, state legislatures intended to preempt local power. Implied preemption may be based on the court finding direct conflicts between general state legislation and local zoning controls or by finding that the state legislative scheme is so comprehensive that it intended to occupy the field.

In most states, zoning is one of several powers and responsibilities that local governments are delegated to serve local and state interests. Zoning determines how property is used, developed, and how valuable it will be; localities have the power to impose property taxes on the land they regulate and they are expected to use those revenues to fund municipal operations, provide municipal infrastructure, and carry on the business of local government, which benefits local

citizens and the state in multiple ways. Given the complexity, comprehensiveness, and utility of these linked powers and duties, the judiciary in most states is rightfully cautious about implying that state statutes, like regulating hydrofracking, were intended by the legislature to inhibit these critical and interrelated local prerogatives. The importance of local land use regulation leads to a presumption against preemption that must be overcome to convince most state judges that, in adopting oil and gas laws, state legislatures truly intended to preempt local zoning.