

REGULATION OF HYDRAULIC FRACTURING

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Abstract: Recent technological advancements in hydraulic fracturing have enabled the oil and gas industry to access shale gas. While it is estimated that shale gas, a clean source of energy, will account for 20% of the total U.S. gas supply by 2020, there have been serious concerns about potential adverse impacts of fracking on the environment and public health. Consequently, a patchwork of regulations has evolved in the United States to cope with the competing concerns of environmentalists and the oil and gas industry. After an overview of the technical aspects of the fracking process and environmental concerns, this article examines the successes and shortcomings of the state-centric regulatory system and the potential application of America's regulatory scheme as a model for entrants into fracking. It reviews federal regulation of fracking and the comprehensive regulatory systems that vary from state-to-state.

Keywords: *Constitutional demarcation of state and municipal competence; environmental protection; federal legislation; fracking; hydraulic fracturing; land use regulation; natural gas; preemption of municipal legislation; regulation*

Hydraulic fracturing has transformed the United States' energy outlook in recent years. President Obama dubbed the United States the "Saudi Arabia of natural gas" because "[w]e've got a lot of it".¹ In fact, the US Department of Energy's (DOE) Energy Information Administration (EIA) estimated that the US has over 2,214 trillion cubic feet (tcf) of recoverable shale gas reserves.² By 2020, the EIA projects that shale gas will comprise over 20 per cent of the total US gas supply.³ Thus, the "fracking" process has been touted in the US as the key to a clean energy

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1 Barack Obama, President of the United States, *President Obama Discusses the Blueprint for American-Made Energy* (White House Press), available at <<http://www.whitehouse.gov/photos-and-video/video/2012/01/26/president-obama-discusses-blueprint-american-made-energy#transcript>> (accessed 18 Jan 2014).

2 Mason Inman, "Estimates Clash for How Much Natural Gas in the United States" (29 Feb 2012) *National Geographic News*, available at <<http://news.nationalgeographic.com/news/energy/2012/03/120301-natural-gas-reserves-united-states/>> (accessed 18 Jan 2014).

3 United States Energy Information Administration, "Annual Energy Outlook 2009 With Projections to 2030" [2009], available at <<http://www.eia.doe.gov/oiaf/archive/aeo09/pdf/0383%282009%29.pdf>> (accessed 18 Jan 2014).

future and to end dependence on foreign oil.⁴ Hydraulic fracturing is a process where fracturing fluids — a combination of sand, water and chemical additives — are pumped into wells under high pressure to generate fractures in underground formations.⁵ Recent technological advancements in hydraulic fracturing have enabled the oil and gas industry to access “shale gas” — natural gas produced from hydrocarbon-rich shale formations.⁶

Despite the many potential benefits of fracking, many have raised concerns about the impact of fracking on underground water resources, public health and other environmental effects in the locale of these shale gas extraction facilities.⁷ The sudden pervasiveness of fracking, in conjunction with communities and environmentalists’ concerns, has raised the issue of who regulates fracking. Because fracking is not regulated under federal law, legal battles ensued between state and local governments over who has the power to regulate fracking. A patchwork of regulations evolved in various states across the nation as legislators and municipalities struggled to cope with the competing concerns of environmentalists and the oil and gas industry.⁸

A cursory investigation into hydraulic fracturing outside the US leads to two conclusions: (1) There is more fracking in the US than in most other countries combined, some of which categorically prohibit it altogether, and

4 US EIA, “Annual Energy Outlook” (n.4), pp.2–3.

5 United States Environmental Protection Agency, “Potential Relationships Between Hydraulic Fracturing and Drinking Water Resources” [2010] 1, available at <[http://yosemite.epa.gov/sab/sabproduct.nsf/02ad90b136fc21ef85256eba00436459/3B745430D624ED3B852576D400514B76/\\$File/Hydraulic+Fract+Scoping+Doc+for+SAB-3-22-10+Final.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/02ad90b136fc21ef85256eba00436459/3B745430D624ED3B852576D400514B76/$File/Hydraulic+Fract+Scoping+Doc+for+SAB-3-22-10+Final.pdf)> (accessed 18 Jan 2014). See also Beth E Kinne, “The Technology of Oil and Gas Shale Development” in Erica L Powers and Beth E Kinne (eds), *Beyond the Fracking Wars: A Guide for Lawyers, Public Officials, Planners, and Citizens* (American Bar Association, 2013) 3.

6 Jason B Hutt and Salo L Zelemeyer, “The Shale Gale: Storming Towards Energy Independence” in ALL-ABA, *Shale Drilling and Hydraulic Fracturing: A Primer for Non-Specialists* (American Bar Association, 2012) 17.

7 US EPA, “Hydraulic Fracturing and Drinking Water Resources” (n.1), p.1.

8 Rachel Degenhardt, “Hydraulic Fracturing and Groundwater Contamination: Can Disclosure Rules Clarify What’s In Our Groundwater?” (2012) 39 *Ecology Law Currents* 39. See also United States Department of Energy, “Modern Shale Gas Development in the United States: A Primer” [2009] 25–27, available at <http://www.netl.doe.gov/technologies/oil-gas/publications/epereports/shale_gas_primer_2009.pdf> (accessed 18 Jan 2014). See also Daniel Gilbert and Alison Sider, “Ohio Limits Fracking After Series of Quakes” (12 Apr 2014) *The Wall Street Journal* (“The Ohio Department of Natural Resources said Friday it was halting fracking within a 3-mile radius of the epicenter of the quakes in northeastern Ohio, and said firms operating in the Utica Shale — a rock formation holding vast quantities of natural gas — must install seismic monitors if they drill within 3 mile of a known fault.”); Michael K Murphy and Claudia M Barrett, “Pressure Mounts to Disclose Fracking Chemicals” (7 Apr 2014) *The National Law Journal* (discussing the debate over the disclosure of fracking chemical ingredients); Emily Schmall, “Denton Fracking Ban Would Be First in Texas” (8 May 2014) *Huffington Post* (discussing the ban on fracking in Denton, Texas); Dana Feldman, “Beverly Hills Bans Fracking; First City in California To Do So” (7 May 2014) *Reuters* (City leaders in celebrity-filled Beverly Hills voted on Tuesday to ban fracking, becoming the first municipality in California to prohibit the controversial technique for extracting natural gas and oil from underground rock deposits. Environmentalists say chemicals used in the process pollute underground water supplies and cause other damage.).

(2) United States' regulation of fracking is more varied (by state) and generally more comprehensive. What follows is a random sampling of fracking practice and regulation in other, primarily European, countries and China.⁹

That there are considerable shale natural gas reserves in Europe appears to be a given. The International Energy Agency estimates that there is sufficient natural gas locked in shale formations to meet Europe's needs for at least half a century.¹⁰ Given that the European Union (EU) is collectively one of the world's largest importers of natural gas, it would appear logical to assume that Europe as a whole would welcome hydraulic fracturing to capture such a large reserve of natural gas. Not necessarily so. The region's shale gas reserve is largely untapped. The EU is expected to release a unified policy on fracking to manage a multiplicity of sometimes conflicting laws and permitting requirements throughout EU countries.¹¹ Although the EU refused to enact a complete moratorium on fracking, in October 2013, it voted to require energy companies to conduct environmental audits before fracking.¹² With the unified EU policy still in the early stages of development, several EU countries are adopting their own approaches in the interim.¹³

Poland appears to have the largest of such shale gas reserves in western Europe.¹⁴ While there are indications that the Polish government would like to develop its own gas supplies both to decrease use of fossil fuels¹⁵ and to decrease its reliance on natural gas from Russia,¹⁶ exploitation is hampered by legal obstacles such as the generic need for environmental impact assessment together with amendments to current laws directed specifically at hydraulic fracturing.¹⁷ Nevertheless, the trend appears to be toward the regulation of hydraulic fracturing rather than its outright prohibition.¹⁸

9 See for further analysis Benjamin E Griffith, "The International Community's Response to Hydraulic Fracturing and a Case for International Oversight" in Erica L Powers and Beth E Kinne (eds), *Beyond the Fracking Wars: A Guide for Lawyers, Public Officials, Planners, and Citizens* (American Bar Association, 2013) 287–313.

10 *Ibid.*, p.294.

11 Stephen L Kass, "Worldwide: Countries Approach Fracking With Interest and Caution" (6 January 2014) *Mondaq*, available at <<http://www.mondaq.com/unitedstates/x/284506/Climate+Change/Countries+Approach+Fracking+With+Interest+and+Caution>> (accessed 10 Jan 2014).

12 James Kanter, "Europe Votes to Tighten Rules on Drilling Method" (9 October 2013) *The New York Times*, available at <http://www.nytimes.com/2013/10/10/business/energy-environment/european-lawmakers-tighten-rules-on-fracking.html?_r=0> (accessed 10 Jan 2014).

13 Kass (n.11).

14 "Energy in Poland: Fracking Heaven" (23 June 2011) *The Economist*, available at <<http://www.economist.com/node/18867861>> (accessed 10 Jan 2014).

15 *Ibid.*

16 "Poland to Get Gas from 'Fracking' in Europe" *RT* (29 August 2013), available at <<http://rt.com/business/poland-shale-gas-fracking-europe-154/>> (accessed 10 Jan 2014).

17 Poland's eagerness to frack triggered opposition at the recent Warsaw conference on climate change where opponents argued that fracking actually increases GHG emissions. Kass (n.11) (citation omitted).

18 Griffith (n.9), p.296.

France appears to be at the other extreme. Although private industry secured some fracking permits, in 2011, the French Parliament issued a complete moratorium on both explorations for shale gas and hydraulic fracturing.¹⁹ Both appear to be the result of public concerns over environmental effects of fracking, including water pollution from toxic chemicals allegedly used in the injection part of the fracking process, contamination from waste byproduct from fracking, and induced seismic activity (earthquakes).²⁰ In October 2013, the French Constitutional Court upheld the ban as constitutional.²¹

In England, by contrast, the relevant governmental agencies initially gave hydraulic fracturing “a clean bill of health”, noting that the process was subject to “robust controls”.²² However, in 2011, two earthquakes in hydraulic fracturing extraction areas resulted in a Parliamentary call for an investigation into “the safety and environmental impacts of drilling for shale gas”.²³ A kneejerk reaction initially hindered the United Kingdom’s exploitation of natural gas resources in 2011, when a temporary moratorium was issued after unusual seismic activity was recorded in an area containing the only well-utilizing fracking.²⁴ In 2012, the moratorium was lifted and regulations currently require a review of seismic activity and faults in the area before the U.K. will issue a license for a fracking operation.²⁵ Now the U.K. seems eager to exploit its natural gas reserves, estimated to contain 1,300 tcf of gas — enough to provide energy to the U.K. for the next 50 years.²⁶ After a 2013 British Geological Survey revealed that there was twice as much shale gas in the north of England than previously thought, a new shale gas allowance was released halving the tax due on income from production in order to encourage exploration.²⁷

Hydraulic fracturing has become controversial in Germany as well. Germany is estimated to contain 1.3 trillion cubic meters of recoverable shale gas.²⁸ Popular opposition in German cities where fracking was planned has resulted in plans for popular referenda on moratoria for both test drilling and shale extraction.²⁹

19 Kass (n.11).

20 Griffith (n.9), pp.297–298.

21 Kass (n.11).

22 Griffith (n.9), p.299.

23 *Ibid.*

24 Nick Jardine, “UK Fracking Firm Admits They Are Causing Earthquakes” *Business Insider* (7 November 2011), available at <<http://www.businessinsider.com/fracking-earthquakes-uk-2011-11>> (accessed 10 Jan 2014).

25 “Regulatory Provisions Governing Key Aspects of Unconventional Gas Extraction in Selected Member States: Final Report” 10 *Milieu, Ltd*, submitted to the Commission Directorate General Environment (1 July 2013) (EC Report).

26 Nidaa Bakhsh, “Fracking Opponents Find Lawyers Beat Superglue in Slowing Shale” *Bloomberg News* (17 October 2013), available at <<http://www.bloomberg.com/news/2013-10-16/fracking-opponents-find-lawyers-beat-superglue-in-slowing-shale.html>> (accessed 10 Jan 2014).

27 See “George Osborne Unveils Tax Breaks For Shale Gas ‘Fracking’” (19 July 2013) *Huffington Post News*, available at <http://www.huffingtonpost.co.uk/2013/07/18/fracking-tax-breaks_n_3618084.html> (accessed 10 Jan 2014).

28 EC Report (n.25), p.10.

29 Griffith (n.9), p.297.

Finally, several Baltic countries have responded to the anticipated commencement of hydraulic fracturing by banning or placing moratoria on the process. Thus, for example, responding to public protest, Bulgaria has reportedly banned fracking altogether. Romania has reportedly imposed a moratorium on both shale exploration and extraction.³⁰

China is estimated to have the largest reserve of technically recoverable shale gas in the world (1,115 tcf) — more than the US and Canada combined.³¹ With stifling levels of pollution and being the largest importer of energy worldwide, there is little doubt that China would benefit from a shale revolution.³² To further this agenda, China's National Energy Administration released ambitious targets for shale gas development by 2020 (60–100 billion cubic meters).³³ Although China has set vigorous natural gas collection goals, it faces obstacles to fostering a successful natural gas industry. First, China's shale formations, in comparison to US shale formations, are older, deeper (sometimes 4,000 meters deep) and composed of more compact clay, posing barriers to economic retrieval.³⁴ Second, most of China's shale is on rough or inaccessible terrain and also happen to be located in China's most arid regions that often struggle with water shortages.³⁵ Third, China has little experience with domestic drilling and does not have the infrastructure necessary to transport natural gas, such as natural gas pipelines.³⁶ Finally, one of the largest shale formations, the Sichuan basin, also happens to be highly vulnerable to seismic activity.³⁷

Under-regulation of fracking by China also raises concern.³⁸ Six different government bodies in China regulate oil and gas, yet there are only 2–3 rules pertaining to fracking.³⁹ In addition, China currently has no rules on groundwater protection.⁴⁰ Also, because China's air pollution standards do not regulate methane, there is no legal limit on methane emissions or mechanism to regulate methane emissions at fracking wells.⁴¹

30 *Ibid.*, pp.300–301.

31 US EIA, “Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States” (13 June 2013) Table 6, available at <<http://www.eia.gov/analysis/studies/worldshalegas/>> (accessed 10 Jan 2014).

32 Kass (n.11).

33 Hamid Poorsafar, “China's Energy Rebalancing: A New Gazpolitik?” (18 November 2013) *The Diplomat* (18 November 2013), available at <<http://thediplomat.com/2013/11/chinas-energy-rebalancing-a-new-gazpolitik/?allpages=yes>> (accessed 10 Jan 2014).

34 David Biello, “Can Fracking Clean China's Air and Slow Climate Change?” (27 January 2014) *Scientific American*, available at <<http://www.scientificamerican.com/article/can-fracking-clean-chinas-air-and-slow-climate-change/>> (accessed 10 Jan 2014).

35 Hannah Wittmeyer, “China, Fracking, and Environmental Leadership?” (13 September 2013) *Frackwire*, available at <<http://frackwire.com/why-isnt-china-fracking/>> (accessed 10 Jan 2014).

36 *Ibid.*

37 *Ibid.*

38 *Ibid.*

39 *Ibid.*

40 *Ibid.*

41 *Ibid.*

This article briefly reviews the hydraulic fracturing process and summarizes the regulatory regimes applicable or potentially applicable to hydraulic fracturing in the US and analyzes relevant case law. Section I of this article gives an overview of shale gas, the technical process of shale gas extraction and the environmental concerns surrounding fracking operations. Section II summarizes the various laws that comprise the Federal fracking regulatory framework. Finally, Section III examines the regulation of fracking by the states and examines how courts across the US treat fracking regulations at the state and local level.

I. Overview of Shale Gas and Hydraulic Fracturing

Natural gas⁴² is an attractive asset that plays an important role in the clean energy future of the United States.⁴³ Natural gas burns cleanly and emits less potentially harmful emissions than coal and oil.⁴⁴ Eighty-four per cent of natural gas consumed in the US is produced in the US, and nearly all (97 per cent) of the natural gas consumed in the US is produced in North America.⁴⁵ Therefore, shale gas has the ability to reduce greenhouse gas emissions and simultaneously curtail the nation's dependence on foreign sources of oil.⁴⁶ As rosy as the nation's energy future may appear, fracking has been challenged on many levels, bringing the regulation of shale gas extraction to the forefront. To understand the complex interplay of regulations currently in place, it is first important to understand two bases for regulations: the natural (and unnatural) resources used in fracking and the potential environmental effects of fracking.

A. Technical Process of Hydraulic Fracturing

Fracking is not a new process. Fracking was initially developed in the 1940s to increase the production of oil reserves.⁴⁷ The rate of fracking operations expanded significantly in the 1980s and through the 1990s to reach coalbed methane (CBM)

42 "Natural gas is a mixture of light-end, flammable hydrocarbons primarily composed of methane (CH₄), but also containing lesser percentages of butane, ethane, propane, and other gases. It is odorless, colorless, and, when ignited, releases a significant amount of energy." J Daniel Arthur, Bruce Langhus, and David Alleman, "An Overview of Modern Shale Gas Development in the United States" (ALL Consulting 2008) 1 <www.all-llc.com/publicdownloads/ALLShaleOverviewFINAL.pdf> (accessed 18 Jan 2014) (citations omitted).

43 US EPA, "Natural Gas Extraction-Hydraulic Fracturing" (November 2013), available at <<http://www2.epa.gov/hydraulicfracturing>> (accessed 18 Nov 2013).

44 Arthur (n.42), p.1.

45 US DOE, "Modern Shale Gas Development in the United States: A Primer" (n.8), p.5.

46 US EIA, "Natural Gas Year-in-Review 2008" (April 2009), available at <<http://www.eia.doe.gov/naturalgas/review/archive/ngyir2008/ngyir2008.html>> (accessed 18 Jan 2014).

47 Leonard Dougal and Jacob Arechiga, "Shale Play Hydraulic Fracturing: Emerging Water Resource and Regulatory Issues" (2012) 10(1) *ABA Water Quality and Wetlands Committee Newsletter* 3.

deposits.⁴⁸ The demand for natural gas, advancing fracturing technologies and federal tax credits for nonconventional energy production in the 1980s led to a prominent growth in CBM — from fewer than 100 coalbed wells in 1984 to nearly 8,000 coalbed wells in 1990.⁴⁹ The boom in CBM led to the use of hydraulic fracturing on other sources of fuel, such as shale gas.⁵⁰ The EIA, part of the US DOE, reports that production from shale formations is the fastest growing source of natural gas.⁵¹

Since the extraction technique was introduced in 1949, nearly 2.5 million fracturing treatments have been executed worldwide.⁵² Fracking is employed as “formation stimulation practice”, which increases permeability by allowing more gas to flow to the wellbore.⁵³ Horizontal wells — drilled down vertically over 5,000 feet beneath the earth’s surface, then extending horizontally — act as the means for reaching the shale formations.⁵⁴ The increased use of fracking is due to certain technological advancements in horizontal drilling which allow fracking to be applied to extract natural gas from coal beds, tight gas sands and, most importantly here, shale formations.⁵⁵ Modern fracking has greatly increased recoverable reserves of oil and gas, by 30 and 90 per cent, respectively.⁵⁶ The Independent Petroleum Association of America estimates that more than 90 per cent of new natural gas wells in the US rely on hydraulic fracturing.⁵⁷

According to EIA studies, the US contains over 827 tcf of *recoverable* shale gas reserves.⁵⁸ Due to the abundance of shale gas, the EIA projects that shale gas production will triple of the next 25 years, from 5 tcf in 2010 to 13.6 tcf in 2035.⁵⁹ To provide some context, 1 tcf of natural gas is sufficient to heat 15 million homes for one year, to generate 100 billion kilowatt-hours of electricity or to fuel

48 Mary Tiemann and Adam Vann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (2013) *Congressional Research Service* 2 <www.fas.org/sgp/crs/misc/R41760.pdf> (accessed 18 Jan 2014). “CBM production through wells began in the 1970s as a safety measure in coal mines to reduce the explosion hazard posed by methane.” *Ibid.* Coalbed methane refers to methane that is found in coal seams and is another source of unconventional gas. US EPA, “Unconventional Extraction in the Oil and Gas Industry” (August 2013), available at <<http://water.epa.gov/scitech/wastetech/guide/oilandgas/unconv.cfm>> (accessed 18 Nov 2013). CBM “is naturally created during the geologic process of converting plant material to coal (coalification). To extract the methane, CBM operators drill wells into coal seams and pump out ground water ... [and] the water removal reduces the pressure and allows the methane to release from the coal[.]” *Ibid.*

49 *Ibid.*, p.2 (citations omitted).

50 *Ibid.*

51 *Ibid.* (citation omitted).

52 Carl T Montgomery and Michael B Smith, “Hydraulic Fracturing: History of an Enduring Technology” (2010) *Journal of Petroleum Technology* 27.

53 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.56.

54 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” [2011] 5, available at <http://groundwork.iogcc.org/sites/default/files/Shale_Gas_March_2011.pdf> (accessed 18 Jan 2014).

55 Dougal (n.47), p.3.

56 Montgomery (n.52), pp.27–28.

57 *Ibid.*

58 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54), p.4.

59 Hutt (n.6).

12 million natural-gas-fired vehicles for one year.⁶⁰ Six shale regions in the US have been targeted as the most prolific for shale gas production: Bakken, Eagle Ford, Haynesville, Marcellus, Niobrara and Permian.⁶¹ Although shale resources are found in many states, the aforementioned six regions accounted for 90 per cent of domestic oil production — and nearly all natural gas production — from 2011 to 2012.⁶² The abundance of natural gas reserves, however, is without value if it cannot be safely and economically extracted. Hydraulic fracturing, enhanced by technological advancements, is purportedly the long sought-after tool for accessing shale gas.⁶³

Hydraulic fracturing is the only economically viable means of extracting shale gas. Shale gas is found within shale formations, which act as the reservoir for the gas.⁶⁴ Shale gas is created when organic matter deposited within the rock generates natural (methane) gas, and the gas itself is located in the fine pores of the shale rock throughout the shale formation.⁶⁵ The fine pores of the shale rock are not naturally permeable.⁶⁶ Hydraulic fracturing seeks to extract the natural gas by injecting, through the wells, large volumes of a fracturing fluid under high pressure to permeate microscopic perforations in shale formations.⁶⁷ Fracturing fluid is a water-based liquid containing a proprietary blend of chemical additives that help to carry a propping agent, such as sand, through the fractures in the shale.⁶⁸ Upon stopping the forceful pumping of fluids, the sand (or other proppant) remains within the fractures in the shale and “props” open the fracture to allow gas to escape the dense rock formation.⁶⁹ More than 10 million gallons of water may be used in shale wells during the fracking process.⁷⁰ Fluid in the well must be pumped out of the well before extraction of gas can take place.⁷¹ This process is called “flowback”, which refers to “the process of allowing fluids to flow from the well following a treatment, either in preparation for a subsequent treatment or in preparation of cleanup and returning the well to production”.⁷²

The extraction of natural gas from shale formations has transformed the natural gas industry by exponentially increasing natural gas production and

60 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54), p.4.

61 US EIA, “Petroleum & Other Liquids: Drilling Productivity Report” [2013], available at <<http://www.eia.doe.gov/petroleum/drilling/#tabs-summary-1>> (accessed 18 Jan 2014).

62 *Ibid.*

63 US EPA, “Natural Gas Extraction-Hydraulic Fracturing” (n.43).

64 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.14.

65 *Ibid.*, p.15.

66 *Ibid.*, p.56.

67 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54), p.5. See also Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.1.

68 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.56.

69 *Ibid.*

70 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54), p.5.

71 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.1.

72 *Ibid.*, fn.5.

energy reserve levels to unprecedented levels.⁷³ Although the brisk growth of the use of hydraulic fracturing and horizontal drilling for shale gas has enabled the industry to expand markedly, a host of concerns have arisen regarding the potential environmental impacts of fracking on natural resources such as groundwater.⁷⁴ Modern fracking operations have come under scrutiny for these potential adverse impacts, and the public is demanding regulation — on a state level, federal level, or both — of fracking operations and their potential effects.

B. Potential Environmental Concerns Attributed to Hydraulic Fracturing

Although the focus of this article is not on the potential environmental impacts of fracking, much of the existing federal regulatory scheme originates from the environmental law arena. According to the Environmental Protection Agency (EPA), fracking operations can conceivably cause the following environmental impacts: (1) stress on surface and ground water supplies from the withdrawal of large volumes of water used in drilling and hydraulic fracturing; (2) contamination of underground sources of drinking water (USDW) and surface water resulting from spills; (3) adverse impacts from discharges into surface waters or from disposal to underground injection wells; and (4) air pollution resulting from the release of volatile organic compounds, hazardous air pollutants, and greenhouse gasses.⁷⁵

The possibility that fracking fluid may contaminate underground drinking water sources is of greatest concern to residents and municipalities surrounding fracking operations.⁷⁶ As stated earlier, in any given fracking operation, millions of gallons of fracking fluids — containing chemicals, water and proppant materials — are pumped into shale formations with just one fracking treatment.⁷⁷ The greatest cause for contamination concerns is the unknown concoction of chemicals and additives that compose fracturing fluids.⁷⁸ The overall concentration of additives is small, relative to the amount of water used, in a typical fracking procedure — between 0.5 and 2 per cent additives and 98 and 99.5 per cent water.⁷⁹ However, given the vast amounts of fracking fluids that are utilized in each fracking well operation,⁸⁰ the small percentage of additives can be extrapolated to over 500,000 gallons of additives. Not surprisingly, much of the existing regulatory scheme has been driven by the fear that fracking operations will lead to a contaminated ground

73 Hutt (n.6).

74 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.4.

75 US EPA, “Natural Gas Extraction-Hydraulic Fracturing” (n.43).

76 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.61.

77 *Ibid.*

78 *Ibid.*

79 *Ibid.*

80 US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54).

water supply. To calm public hysteria,⁸¹ the Federal government commissioned a report on the chemical additives used in fracking fluids.⁸²

In early 2010, the Committee on Energy and Commerce launched an in-depth investigation into the practice of hydraulic fracturing and the chemical makeup of fracturing fluids.⁸³ Fourteen industry leaders engaged in fracking were invited to disclose the types, volumes and chemical compositions of the fracking fluid they used in their respective operations.⁸⁴ The Committee found that between 2005 and 2009, “the 14 oil and gas service companies used more than 2,500 hydraulic fracturing products containing 750 chemicals and other components. Overall, these companies used 780 million gallons of hydraulic fracturing products — not including water added at the well site[.]”⁸⁵ Even more problematic for regulation, a majority of the companies refused to disclose selected chemicals and additives used in the fracking fluids because it was deemed proprietary or a trade secret.⁸⁶

Fracking operations — including everything from well site construction to processing facilities, pipeline right of ways and access roads — have also been targeted as causing various “surface-level” effects. Another related surface-level concern is that fracking exacerbates natural fissures in the earth’s crust that can lead to the migration of gasses into subsurface potable water aquifers and eventually surface water.⁸⁷ The fracking operation, in itself, has impacts such as fragmentation of forest ecosystems through the creation of open spaces where there were once trees, increased potential for sediment runoff from cleared sites to streams, creation of corridors for invasive species and alteration of the viewscape.⁸⁸

The abundance of shale gas in the US is leading to an influx of drilling and production operations to take root in areas that have not previously seen gas development.⁸⁹ Hydraulic fracturing operations’ ability to affect masses of people (not previously exposed to oil and gas production practices) means the process and its providers are exposed to public criticism. Concerns regarding fracking are flooding legislatures, town halls and municipalities alike, the spotlight is on the suitability of the current regulatory scheme to effectively manage shale gas development.

81 Ian Urbina, “Regulation Lax as Gas Wells’ Tainted Water Hits Rivers” (26 February 2011) *New York Times*, available at <http://www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=all&_r=0> (accessed 18 Jan 2014).

82 US HR Comm. On Energy and Commerce Minority Staff, “Chemicals Used in Hydraulic Fracturing” [2011] 1.

83 *Ibid.*, p.3.

84 *Ibid.*

85 *Ibid.* (Emphasis added.)

86 *Ibid.*, p.4.

87 US DOE, “Modern Shale Gas Development in the United States: An Update” [2009] 60–61, available at <<http://www.netl.doe.gov/technologies/oil-gas/publications/epereports/shale-gas-primer-update-2013.pdf>> (accessed 18 Jan 2014).

88 *Ibid.*, p.58.

89 Arthur (n.42), p.1.

II. The Federal Regulatory Framework

There is a considerable amount of substantive activity over the regulation of fracking at the federal level, even though most such *actual* regulation is at the state and local government levels.⁹⁰ As of 2012, the hydraulic fracturing process itself is exempt from federal regulation under seven different statutes.⁹¹ Nevertheless, there is indirect federal regulation affecting local land use regulation, and if commentators and the environmental community win the next round in Congress, fracking will be heavily regulated by the federal government primarily through two major pieces of legislation including the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA).⁹² Following is a summary of the major federal legal regimes and recent cases dealing with the regulation of fracking.

A. Safe Drinking Water Act

The SDWA was originally enacted in 1974 to ensure the safety of public drinking water, in part, through the establishment of regulations monitoring and controlling the underground injection of fluids.⁹³ The complex series of programs and regulatory schemes comprising the SDWA are astonishingly comprehensive, but initially failed to play a role in the regulation of fracking. However, a Federal Court decision in 1997 determined that fracking was within the purview of the statute and prompted investigations into its effects and the amendment of the SDWA.⁹⁴ A brief overview of the SDWA provides a foundation for the subsequent discussion of the SDWA's regulation of hydraulic fracturing.

Relevant to hydraulic fracturing, the SDWA provides a regulatory scheme for safeguarding "USDW" by prohibiting underground injection of fluids without a permit.⁹⁵ Pursuant to the SDWA, the EPA implemented minimum inspection, monitoring, record keeping and reporting requirements for state Underground Injection Control (UIC) programs, including the following: the program must prohibit all underground injections, except those specifically exempted, unless such injections are authorized; the program must ensure that permitted injections

90 See Rebecca Jo Reser and David T Ritter, "State and Federal Legislation and Regulation of Hydraulic Fracturing" (2011) 57 *The Advocate (Texas)* 31.

91 Text to s.II.

92 *Ibid.*

93 Safe Drinking Water Act, Pub L No 95-523 s.2(a), 88 Stat 1660 (1974) (codified as 42 USC s.300ff) (SDWA).

94 *Legal Environmental Assistance Foundation v Environmental Protection Agency* (11th Circuit 1997) 118 F 3d 1467, 1471 (*LEAF I*).

95 SDWA s.300h(b)(1)(a). The SDWA directs EPA to protect against endangerment of an "underground source of drinking water", defined as "an aquifer or its portion: (a)(1) which supplies any public water system; or (2) which contains a sufficient quantity of ground water to supply a public water system; and (i) currently supplies drinking water for human consumption; or (ii) contains fewer than 10,000 mg/l total dissolved solids; and (b) which is not an exempted aquifer". 40 CFR s.144.3.

do not endanger drinking water resources; and the program must ensure that the state has adequate inspection, monitoring, record keeping and reporting administrative program.⁹⁶

Under the ordinary and plain meaning of the activities regulated under the SDWA, fracking is and would seemingly be regulated by the Federal government. After all, the majority of public water systems and nearly all rural residents rely on USDW.⁹⁷ Given that the SDWA directs and requires the EPA to regulate the underground injection of fluids to protect USDW, it should follow naturally that the SDWA would regulate hydraulic fracturing.⁹⁸ In other words, there is a strong argument that the national regulatory program for USDW necessarily includes the oversight and limitation of any “underground injections” that could affect aquifers or other USDW.⁹⁹

SDWA section 1421(b)(2) states that the EPA “may not prescribe requirements for state UIC programs which interfere with or impede [any underground injection for the recovery of oil or natural gas] . . . , *unless such requirements are essential to assure that underground sources of drinking water will not be endangered by such injection*”.¹⁰⁰ In addition, the SDWA contains an “endangerment standard”.¹⁰¹ The SDWA states that UIC regulations must “contain the minimum requirements for effective programs to prevent underground injection which endangers drinking water sources”.¹⁰² This “endangerment standard” focuses on the protection of groundwater that is or will be used for the public water supply, and thus, plays a key role in the regulation of underground injections.¹⁰³ However, this language raises the issue of whether EPA regulations extend only to water used in public systems, excluding private, residential wells.¹⁰⁴

States can submit an application to the EPA to obtain primary enforcement responsibility of their UIC programs or “primacy”.¹⁰⁵ Once approved, states are primarily responsible for issuing injection permits and monitoring the effect of injections on the quality of USDW.¹⁰⁶ However, in the absence of an approved

96 SDWA s.300h(b)(1)(c). See also Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.7.

97 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48).

98 The Safe Drinking Water Act of 1974 (PL 93-523) authorized the UIC program at EPA (SDWA). UIC provisions are contained in SDWA, Part C, ss.1421–1426; 42 USC ss.300h–300h-5.

99 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.18. Part C of the SDWA contains the UIC provisions, ss.1421–1426, 42 USC ss.300h–300h-5. The SDWA directs the EPA to protect against endangerment of an “underground source of drinking water”.

100 42 USC s.300h(b)(2). (Emphasis added.)

101 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.9.

102 42 USC s.300h(b)(1); SDWA s.1421.

103 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.9.

104 *Ibid.*

105 US EPA, “UIC Program Primacy” (August 2012), available at <<http://water.epa.gov/type/groundwater/uic/Primacy.cfm>> (accessed 1 Nov 2013).

106 SDWA s.300h(b)(1)(b).

state UIC program or in the absence of competent management, federal control and management is permissible.¹⁰⁷

Each state UIC program must also ensure that underground injection wells meet certain performance criteria, depending on the type of well.¹⁰⁸ The EPA delineated six classifications for underground injection wells, distinguished by the nature of material injected into the ground.¹⁰⁹ Class I wells allow for deep-water injection of industrial hazardous or non-hazardous waste materials, or municipal wastewater beneath the lowermost underground source of drinking water.¹¹⁰ These wells, which include over 650 wells in the US, are subject to the most stringent regulations.¹¹¹ Class II wells permit the injection of certain fluids associated with oil and natural gas production beneath the lowermost source of drinking water.¹¹² Over 21,400 Class III wells permit the injection of fluids used in the mining of minerals, such as salt and uranium, beneath the lowermost underground source of drinking water.¹¹³ In contrast, only 24 Class IV wells permit the injection of hazardous or radioactive wastes.¹¹⁴ Class V is the catchall category and includes all other injection wells and any experimental wells.¹¹⁵ Between 500,000 and 650,000 Class V wells exist and regularly inject non-hazardous fluids.¹¹⁶ In addition, in 2010, the EPA issued a rule for Class VI wells to be used for the geologic sequestration of carbon dioxide.¹¹⁷

Before granting primacy, the EPA requires that states' UIC programs require Class II wells to be effective in preventing endangerment of USDW.¹¹⁸ So far, thirty-three states have assumed primacy for the UIC program.¹¹⁹ In ten states, the EPA has implemented its control, and in the remainder of the states, the authority is

107 Tiemann, "Hydraulic Fracturing and Safe Drinking Water Act Issues" (n.48), p.7. In order to ensure compliance with the Act, certain provisions of the SDWA grant broad powers to the EPA Administrator. *Ibid.*, p.8. For example, SDWA s.1431 gives the EPA Administrator the power to issue emergency orders and commence civil actions to protect USDWs and public water systems. *Ibid.* Section 1449, authorizes citizens' civil actions against anyone whom allegedly violates the SDWA, or even against the EPA if they fail to perform their duties. *Ibid.*

108 US EPA, "Underground Injection Control Program" (November 2013), available at <<http://water.epa.gov/type/groundwater/uic/>> (accessed 1 Nov 2013).

109 *Ibid.*

110 US EPA, "Industrial & Municipal Waste Disposal Wells (Class I)" (March 2012), available at <http://water.epa.gov/type/groundwater/uic/wells_class1.cfm> (accessed 1 Nov 2013).

111 *Ibid.*

112 US EPA, "Class II Wells — Oil and Gas Related Injection Wells (Class II)" (May 2013), available at <<http://water.epa.gov/type/groundwater/uic/class2/index.cfm>> (accessed 1 Nov 2013).

113 US EPA, "Mining Wells (Class III)" (March 2012), available at <http://water.epa.gov/type/groundwater/uic/wells_class3.cfm> (accessed 1 Nov 2013).

114 US EPA, "Shallow Hazardous and Radioactive Injection Wells (Class IV)" (March 2012), available at <http://water.epa.gov/type/groundwater/uic/wells_class4.cfm> (accessed 1 Nov 2013).

115 US EPA, "Class V Wells" (May 2012), available at <http://water.epa.gov/type/groundwater/uic/wells_class5.cfm> (accessed 1 Nov 2013).

116 *Ibid.*

117 US EPA, "Geologic Sequestration Class VI Wells" (July 2012), available at <<http://water.epa.gov/type/groundwater/uic/class6/gclass6wells.cfm>> (accessed 1 Nov 2013).

118 Other requirements for state UIC programs are contained in 40 CFR ss.144–147.

119 US EPA (n.105). Information on each state may be found at 40 CFR s.147.

shared.¹²⁰ With primacy granted under section 1425, states regulate Class II wells using their own program requirements rather than following the EPA regulations, providing significant regulatory flexibility to the states.¹²¹

Fracking became increasingly controversial as the EPA insisted it had no role in its regulation because oil and gas production processes (including fracking) were exempt from the SDWA and other federal statutes, including the CWA, the Resource Conservation and Recovery Act (RCRA), the Clean Air Act (CAA), the National Environmental Policy Act (NEPA), and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).¹²² As fracking became more prevalent, litigation over regulation and enforcement flooded the judicial system, initially leaving courts to determine the extent of federal regulation. Although the SDWA exempted the regulation of oil and gas activities, two related cases make it clear that the federal government still has the power to regulate hydraulic fracturing.

1. Federal Government could Regulate Fracking directly: The *LEAF* Decisions

When the SDWA was enacted in 1974, federal and state governments and regulatory agencies such as the EPA had a mutual understanding that fracking was exempt from regulation under the SDWA.¹²³ The presumption that fracking was exempt from federal regulation under the SDWA left fracking unregulated for decades. This presumption was challenged in 1994.

In 1982, the EPA approved Alabama's UIC program for Class II wells, and the State Oil and Gas Board of Alabama then had responsibility for administering the program.¹²⁴ In 1983, the EPA approved Alabama's UIC program for the remainder of well classes to be administered by the Alabama Department of Environmental Management.¹²⁵ State agencies administering these programs did not consider that wells used for hydraulic fracturing in Alabama coalbeds fell within the definition of any wells regulated by the SDWA.¹²⁶ At the time *Legal Environmental Assistance Foundation, Inc v US EPA (LEAF I)* was heard, state UIC programs were to prohibit unauthorized "underground injection", defined as "the subsurface emplacement of fluids by well injection".¹²⁷

120 Tiemann, "Hydraulic Fracturing and Safe Drinking Water Act Issues" (n.48).

121 Courts are in Accord: *LEAF I* (n.94); *LEAF II* (n.138).

122 Shawna Bligh and Chris Wendelbo, "Hydraulic Fracturing: Drilling into the Issue" [2013] 30 no. 5 GPSolo 72.

123 151 Cong Rec S7267-01 at S7278 to S7279 (2005); *LEAF I* (n.94) (Alabama argued that the SDWA did not apply to hydraulic fracturing operations because, among other reasons, the purpose of fracking is not disposal, most of the fracking fluids are recovered from the well, and the SDWA's language suggests that it was not meant to regulate drilling for oil or gas).

124 *LEAF I* (n.94), p.1470.

125 *Ibid.*

126 *Ibid.*, pp.1470-1471.

127 *Ibid.*

In 1994, LEAF petitioned EPA to initiate proceedings to have the agency withdraw its approval of the Alabama UIC program because the program did not regulate hydraulic fracturing operations in the state associated with production of methane gas from coalbed formations.¹²⁸ The state of Alabama had previously been authorized by EPA to administer a UIC program pursuant to the terms of the SDWA.¹²⁹ The EPA denied the LEAF petition in 1995 based on a finding that hydraulic fracturing did not fall within the definition of “underground injection” as the term was used in the SDWA and the EPA regulations promulgated under that act.¹³⁰ According to EPA, that term applied only to wells whose “principal function” was the placement of fluids underground.¹³¹ LEAF challenged EPA’s denial of its petition in the US Court of Appeals for the Eleventh Circuit, arguing that EPA’s interpretation of the terms in question was inconsistent with the language of the SDWA.¹³²

The court rejected EPA’s claim that the language of the SDWA allowed it to regulate only those wells whose “principal function” was the injection of fluids into the ground.¹³³ EPA based this claim on what it perceived as “ambiguity” in the SDWA regarding the definition of “underground injection” as well as a perceived congressional intent to exclude wells with primarily non-injection functions.¹³⁴ The court held that there was no ambiguity in the SDWA’s definition of “underground injection” as “the subsurface emplacement of fluids by well injection”, noting that the words have a clear meaning and that:

The process of hydraulic fracturing obviously falls within this definition, as it involves the subsurface emplacement of fluids by forcing them into cracks in the ground through a well. Nothing in the statutory definition suggests that EPA has the authority to exclude from the reach of the regulations an activity (i.e. hydraulic fracturing) which unquestionably falls within the plain meaning of the definition, on the basis that the well that is used to achieve that activity is also used — even primarily used — for another activity (i.e. methane gas production) that does not constitute underground injection.¹³⁵

The language of the SWDA requiring the state UIC programs approved by the EPA “shall prohibit ... any underground injection in such State which is not authorized by permit issued by the state” gave a “straightforward statutory command” and

¹²⁸ *Ibid.*, p.1471.

¹²⁹ *Ibid.*, p.1470.

¹³⁰ *Ibid.*, p.1471.

¹³¹ *Ibid.*

¹³² *Ibid.*, p.1472.

¹³³ *Ibid.*, pp.1473–1474.

¹³⁴ *Ibid.*

¹³⁵ *Ibid.*, pp.1474–1475.

“dictated that all underground injection be regulated under the UIC programs”.¹³⁶ Accordingly, the court remanded the case to the EPA for reconsideration of LEAF’s petition for withdrawal of Alabama’s UIC program approval.¹³⁷ Alabama eventually incorporated fracking into its UIC regulations under a portion of the SDWA that applied to secondary recovery of resources, which the EPA and the court accepted.

Following *LEAF I*, however, the EPA failed to amend its UIC regulations to expressly require states’ regulation of fracking as an underground injection. Thereafter, LEAF sought a writ of mandamus to enforce the Court’s mandate in *LEAF I*.¹³⁸ The EPA subsequently commenced processes to withdraw approval of Alabama’s Class II UIC program.¹³⁹ Meanwhile, Alabama submitted its revised UIC program for the EPA’s approval under the alternative demonstration provision in section 1425 of the SDWA.¹⁴⁰ LEAF objected to approval, arguing that fracking was not one of the types of activities listed in section 1425, thus, Alabama must demonstrate that its revised program could satisfy the showing required by SDWA section 1422(b).¹⁴¹

In early 2000, the EPA approved Alabama’s revised UIC program under section 1425, prompting LEAF to file a petition for review challenging the EPA’s approval of Alabama’s revised UIC program, making the following three arguments.¹⁴² First, the Plaintiff argued that the EPA should not have approved state regulation of fracking under SDWA section 1425, because it does not “relate[] to . . . underground injection for the secondary or tertiary recovery of oil or natural gas” (a requirement for approval under section 1425).¹⁴³ The Court rejected this argument, finding that the phrase “relates to” was broad and ambiguous enough to include regulation of hydraulic fracturing as being related to tertiary recovery of gas.¹⁴⁴

Second, LEAF challenged the Alabama program’s regulation of hydraulic fracturing as “Class II-like” wells not subject to the same regulatory requirements as Class II wells.¹⁴⁵ The Court agreed with LEAF, noting that in *LEAF I*, it had held that methane gas production wells used for hydraulic fracturing are “wells” within the meaning of the statute.¹⁴⁶ Hydraulic fracturing must fall within one of the five classes set forth in EPA regulations.¹⁴⁷ The Court remanded the matter to the EPA for a determination of whether Alabama’s updated UIC program complied with the requirements for Class II wells.¹⁴⁸

136 *Ibid.*, p.1475.

137 *Ibid.*, pp.1477–1478.

138 (11th Circuit 2001) 276 F 3d 1253, 1256 (citation omitted) (*LEAF II*).

139 *Ibid.*

140 *Ibid.*

141 *Ibid.*, pp.1256–1257.

142 *Ibid.*

143 *Ibid.*, p.1257.

144 *Ibid.*, p.1258.

145 *Ibid.*, pp.1261–1262.

146 *Ibid.*

147 40 CFR s.144.6.

148 *LEAF II* (n.138), pp.1264–1265.

Finally, LEAF argued that even if Alabama’s revised UIC program was eligible for approval under section 1425, EPA’s decision to approve it was “arbitrary and capricious” and therefore a violation of the Administrative Procedure Act.¹⁴⁹ The Court rejected this argument, observing that “the practical difference between the two statutory methods for approval is that the requirements for those programs covered under § 1425 are more flexible than the requirements for those programs covered under § 1442(b).”¹⁵⁰ The Court, rejecting LEAF’s interpretation of the SDWA, found that LEAF’s argument undervalued the term “relates to” under the alternate path.¹⁵¹ The Court ultimately upheld the EPA’s approval of Alabama’s revised UIC program.¹⁵²

With fracking now subject to regulation under the SDWA, the EPA launched a study to examine the potential effects of fracking on USDW and to formulate regulations that adequately addressed public concerns.¹⁵³ In 2004, the EPA concluded that the injection of fracking fluids into CBM wells posed little or no threat to USDW.¹⁵⁴ This study was widely criticized by the public, environmental groups and EPA employees.¹⁵⁵

2. Federal Exemption for Fracking: Energy Policy Act 2005

In 2005, only one year after the EPA study, Congress passed the Energy Policy Act of 2005, which addressed an array of energy-related issues.¹⁵⁶ Section 332 of the EPAct amended the SDWA to specifically exempt hydraulic fracturing from regulation.¹⁵⁷

The EPAct was likely a response to the EPA study and the *LEAF* decisions. The Court’s holding in *LEAF I* — that hydraulic fracturing “unquestionably falls within the plain meaning of the definition [of underground injection]”¹⁵⁸ — raised the possibility that the EPA could be *required* to regulate fracking under the SDWA.¹⁵⁹ In order to clarify its intent for non-regulation, Congress passed an Amendment to

149 *Ibid.*, p.1265.

150 *Ibid.*, p.1257.

151 *Ibid.*, p.1259 (“By focusing only on whether hydraulic fracturing is the same as ‘secondary or tertiary recovery of oil or natural gas,’ LEAF’s construction of § 1425 fails to give full weight to the phrase ‘relates to.’ Since ‘relates to’ injects ambiguity and interpretive breadth into this statutory provision, we cannot accept LEAF’s construction.”).

152 *Ibid.*, p.1265.

153 US EPA, “Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs” [2004] ES-7.

154 *Ibid.*, ES-16.

155 See for example, Weston Wilson, “EPA Allows Hazardous Fluids to be Injected into Ground Water: A report on EPA’s failure to protect America’s ground water from the impacts of oil and gas production” [2004], available at <<http://www.earthworksaction.org/files/publications/Weston.pdf?pubs/Weston.pdf>> (accessed 18 Jan 2014).

156 Energy Policy Act 2005, Pub L No 109–58, 119 Stat 694 (2005) (EPAct).

157 EPAct s.322.

158 *LEAF I* (n.94), p.1475.

159 Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.18.

the SDWA as part of the EPA Act¹⁶⁰ stating that the UIC requirements do not apply to fracking, and amended the definition of “underground injection”:

The term “underground injection”

- (1) means the subsurface emplacement of fluids by well injection; and
- (2) *excludes* (i) the underground injection of natural gas for purposes of storage and (ii) the underground injection of fluids or propping agents (other than diesel fuels) *pursuant to hydraulic fracturing operations* related to oil, gas or geothermal production activities.¹⁶¹

In other words, “underground injection” only includes the subsurface emplacement of fluids by well injection, which specifically excludes the underground injections of fluids or chemicals associated with hydraulic fracturing operations.¹⁶² Under this newly tailored definition, as long as diesel is not used,¹⁶³ oil and gas extraction companies can now inject anything in association with fracking operations without having to comply with the SDWA. Congress’ deliberate elimination of fracking from the purview of the SDWA left fracking unregulated by the federal government.¹⁶⁴

3. Proposed Legislation in the 112th Congress: The FRAC Act

Fracking is currently exempt from regulation under the principal federal environmental laws,¹⁶⁵ including the SDWA unless diesel fuel is used in the process.¹⁶⁶ However, since granting the exemption for fracking from federal regulation, Congress has sought to undo its regulatory blunder. In 2009, Congress introduced “twin bills” to amend the SDWA which would give the EPA the authority to regulate fracking.¹⁶⁷ The Fracturing Responsibility and Awareness of Chemicals (FRAC) Act, H.R. 1084 and s587, would require producers in the energy industry

160 EPA Act, s.1(a), 119 Stat 594 (2005) (amended [1] of s.1421(d) of the SDWA (42 USC s.300h(d)).

161 EPA Act, s.322 (amending 42 USC s.300h(d)). (Emphasis added.)

162 42 USC s.300h(d).

163 While the fracking process is not generally regulated under the SDWA, fracking operations that use diesel fuel *do* fall within the definition of “underground injection”. Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), pp.7–8. Recently, the EPA has issued new guidance on fracking with diesel, but most oil and gas companies have already phased diesel fuel out of their fracking operations. Michael Bastasch, “EPA Looks to Regulate ‘Potential’ Water Threats From Fracking” *The Daily Caller* (12 February 2014), available at <<http://dailycaller.com/2014/02/12/epa-looks-to-regulate-potential-water-threats-from-fracking/>> (accessed 12 Feb 2014).

164 US DOE (n.87), p.57.

165 Erica L Powers and Beth E Kinne (eds), *Beyond the Fracking Wars: A Guide for Lawyers, Public Officials, Planners, and Citizens* (American Bar Association, 2013) 913–914, fn 4 (listing fracking exemptions from federal laws).

166 42 USC s.300h(d)(1)(B) (exempting from regulation “the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations”).

167 Abrahm Lustgarten, “FRAC Act—Congress Introduces Twin Bills to Control Drilling and Protect Drinking Water” (9 June 2009) *ProPublica*, available at <<http://www.propublica.org/article/frac-act-congress-introduces-bills-to-control-drilling-609>> (accessed 18 Jan 2014).

to fully disclose the chemicals used in fracking fluids, information which has been protected due to the energy industry's assertion that the chemicals are protected as a trade secret.¹⁶⁸ The two bills have some minor language differences, but are substantially similar — each contains two amendments to the SDWA: (1) amend the definition of underground injection to include hydraulic fracturing and (2) create a new disclosure requirement for the chemicals used in hydraulic fracturing.¹⁶⁹

The FRAC Act failed due to opposition from industry, members of Congress and even some environmentalists who believe that the regulation of fracking should continue to rest with the states.¹⁷⁰ Many environmental groups are advocating for the uniform regulation of gas drilling and more stringent environmental protections for water resources. While these groups support eliminating the SDWA exemption for gas drilling, some states are formally requesting that the EPA leave regulation of fracking to them.¹⁷¹

In March 2012, the Fracturing Regulations are Effective in State Hands Act was introduced. Also known as the “FRESH Act”, section 2248 and H.R. 4322 would require that states have the *sole authority* to regulate hydraulic fracturing on federal lands within the state's borders. A draft of the Bureau of Land Management (BLM) proposed rule would require public disclosure of chemicals used in hydraulic fracturing on BLM-managed lands.

B. Federal (DOI) Proposed Fracking Regulations

In May 2013, the Obama administration issued a new set of proposed regulations for fracking on public lands.¹⁷² These new rules would apply *only to fracking on federal lands*, which contains only 13 per cent of shale production and formations.¹⁷³ The Obama administration originally intended this new set of proposed rules as a guideline for the states, but many of the states affected by hydraulic fracturing had already enacted much stricter regulations.¹⁷⁴ As one commentator put it:

According to DOI's summary, the rule “adds a provision allowing the BLM to approve a variance that would apply to all lands within the boundaries of a State, a tribe, or described as field-wide or basin-wide,

168 *Ibid.*

169 *Ibid.*

170 *Ibid.*

171 HR 6025, Regular Session (Kansas 2011) (resolution urging Congress “to preserve the primacy of the Kansas Corporation Commission to regulate hydraulic fracturing”); H Con Res 3008, 62nd Legis Assem, Reg Sess (North Dakota 2011) (urging Congress to clearly delegate responsibility for the regulation of fracking to the states).

172 “Proposed Rule: Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands” (24 May 2013) *Regulations Gov*, available at <http://www.regulations.gov/#!documentDetail;D=BLM_FRDOC_0001-0061> (accessed 22 Nov 2013).

173 *Ibid.*

174 Drew Dorner, “US DOI Proposing Regulation of Fracking on Federal Lands: Is Such Regulation Coming To A Gas Well Near You?” (*Fresh Law Blog*, 7 June 2013), available at <<http://www.freshlawblog.com/2013/06/07/doi-proposing-regulation-of-fracking-on-federal-lands-is-such-regulation-coming-to-a-gas-well-near-you/>> (accessed 18 Jan 2014).

that is commensurate with the state or tribal regulatory scheme,” if the “State or tribal law ... meets or exceeds the effectiveness of the proposed [federal] rule.” Taken together, this means that the proposed regulations should be evaluated now, as they are likely to form the basis of a future federal proposal on fracking standards.¹⁷⁵

The new rules would require that the oil companies disclose most of the drilling fluid components (but are allowed to keep certain trade components a secret) and require “integrity tests” on a well to ensure compliance.¹⁷⁶ If approved, the rules will require a company with just a single well on federal land to disclose the chemical makeup of its fracking operations at any similarly operated wells on private lands.¹⁷⁷ Additionally, the new rules would impose a laundry list of construction standards on fracking wells and add a requirement that fracking well operators put appropriate plans in place for managing flowback waters from fracturing operations.¹⁷⁸ While environmentalists were disappointed that full disclosure of the chemicals used in the drilling process was not required by the promulgated rules, this stricter regulation is considered a victory for those who are against fracking. The DOI is scheduled to release new regulations for fracking on federal lands within the next six months.¹⁷⁹

C. Other Federal Loopholes, Exemptions and Cursory Regulation

A series of federal laws also play a more attenuated role in the regulation of fracking — although none come close to attaining comprehensive regulation. As of 2012, fracking was exempt from seven different federal laws. The most prominent of these laws include the CWA and the CAA.¹⁸⁰ In short, the CWA regulates surface water discharge from fracking operations and runoff from well sites.¹⁸¹ The CAA limits air emissions from engines, natural gas processing equipment and any other potential emissions arising from natural gas extraction activities.¹⁸² Although the following federal legislation regulates certain aspects of fracking, the fracking exemption in the EPAct of 2005 renders regulation largely ineffective.

175 *Ibid.*

176 “Proposed Rule” (n.172).

177 *Ibid.*

178 *Ibid.*

179 Jeffrey Folks, “The High Cost of Fracking Regulation” (12 February 2014) *American Thinker*, available at <http://www.americanthinker.com/2014/02/the_high_cost_of_fracking_regulation.html> (accessed 12 Feb 2014); Brian Wingfield, “E-Cigarette, Fracking Rule Changes Seen in 2014 Surge” (3 December 2013) *Bloomberg Politics*, available at <<http://www.bloomberg.com/news/2013-12-04/e-cigarettes-to-fracking-rules-seen-in-2014-surge.html>> (accessed 12 Feb 2014).

180 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.25.

181 *Ibid.* See also Beth E Kinne, “Clearing the Air” in Erica L Powers and Beth E Kinne (eds), *Beyond the Fracking Wars: A Guide for Lawyers, Public Officials, Planners, and Citizens* (American Bar Association, 2013) 109 ff.

182 US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.25.

1. Clean Water Act

The CWA¹⁸³ regulates unpermitted discharges of soil, chemicals or other materials to wetlands or surface waters.¹⁸⁴ Because the CWA regulates mostly discharge at the surface level, instead of underground injections of fluids, the CWA has historically not played a large role in the regulation of oil and gas operations. Since 1987, drilling operations have been exempted from storm water runoff provisions of the CWA.¹⁸⁵ When the use of fracking increased, the CWA was amended and “pollutant” was defined to exclude hydraulic fracturing fluids: “The term ‘pollutant’ ... does not mean ... (B) water, gas, or other material which is injected into a well to facilitate production of oil or gas”.¹⁸⁶ Regulation by the CWA, if at all, will likely come into play with flowback or fracking wastewater.¹⁸⁷

2. Clean Air Act

The CAA was passed in 1970 in an effort to “protect and enhance the quality of the Nation’s air resources so as to promote the public health and welfare”.¹⁸⁸ Section 112 of the CAA addresses potentially hazardous air pollutants, including emissions from oil and gas drilling operations.¹⁸⁹ Section 112 regulates “major sources” of pollutants, defined as:

[A]ny stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit ... in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.¹⁹⁰

For these “major sources”, the EPA is required to promulgate standards for technology that will yield the “maximum degree of reduction in emissions”.¹⁹¹ Theoretically, most of the oil and gas drilling operations would be under the EPA’s direct control under this provision of the CAA. However, section 112 goes on to exempt a substantial portion of the oil and gas industry from these regulations: “in the case of any oil or gas exploration or production well (within its associated equipment), such emissions shall not be aggregated for any purpose under this section”.¹⁹²

183 33 USC ss.1251–1387.

184 *Ibid.*, s.1251(a)(1).

185 Water Quality Act 1987 s.401; 33 USC s.1342(1)(2).

186 33 USC s.1362.

187 Jason T Gerken, “What the Frack Shale We Do? A Proposed Environmental Regulatory Scheme for Hydraulic Fracturing” [2013] 41 Cap U L Rev 81, 103.

188 CAA s.101(b)(1) (codified as 42 USC s.7401 ff).

189 42 USC s.7412.

190 *Ibid.*, s.7412(a)(1).

191 *Ibid.*, s.7412(d)(2).

192 *Ibid.*, s.7412(n)(4)(A).

More recently, however, the EPA has issued rules regulating air pollution from the oil and gas industry. In April 2012, the EPA issued final rules targeting emissions from oil and gas operations, specifically including fracking wells, which require the industry to apply “green completions”.¹⁹³ Green completion would require drilling operations to utilize equipment that separates gas from the flowback fluid and stores it to prevent or reduce methane emissions.¹⁹⁴

3. Resource Conservation and Recovery Act

The 1976 RCRA¹⁹⁵ is the primary federal law governing the handling and disposal of solid and hazardous waste.¹⁹⁶ In the late 1980s, the Solid Waste Disposal Act Amendments were passed, temporarily exempting oil and gas exploration and production wastes from regulation under RCRA.¹⁹⁷ The exemption was to last at least two years while the EPA, authorized by Congress, would study whether waste from oil and gas operations needed to be regulated as hazardous waste under RCRA.¹⁹⁸ After completing the study, the EPA concluded that wastes associated with exploration and production activities did not warrant hazardous waste regulatory controls because they were high-volume wastes that were low in toxicity.¹⁹⁹ Despite acknowledging that exempted wastes (including oily sludges, workover wastes, and well completion and abandonment wastes) are known to contain toxic substances, the EPA determined regulation was unnecessary, in part, because state regulations adequately address the risk.²⁰⁰

4. Comprehensive Environmental Response, Compensation and Liability Act

Enacted by Congress in 1980, the CERCLA²⁰¹ established a framework for the cleanup of toxic materials, known as the Superfund Program.²⁰² CERCLA imposes strict liability on the responsible parties for spills of hazardous substances into

193 77 Fed Reg 49, 490 (to be codified at 40 CFR pts 60, 63); “EPA Fracking Rules On Emission To Be Finalized” *Reuters* (18 April 2012), available at <http://www.huffingtonpost.com/2012/04/18/epa-fracking-rules-emissions_n_1434526.html> (accessed 10 Jan 2014).

194 See US EPA, “Overview of Final Amendments to Air Regulations for the Oil and Natural Gas Industry” 1 (Aug 2012), available at <<http://epa.gov/airquality/oilandgas/pdfs/20120417fs.pdf>> (accessed 10 Jan 2014).

195 42 USC ss.6901–6992k.

196 *Ibid.*, ss.6921–6939e.

197 *Ibid.*, s.6921(b)(2)(A).

198 *Ibid.*, s.6921(b)(2)(B).

199 US EPA, “Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations” 5 (October 2002) <www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf> (accessed 10 Jan 2014).

200 *Ibid.*

201 42 USC s.1906 *et seq.* (CERCLA).

202 “CERCLA Overview” US EPA, available at <<http://www.epa.gov/superfund/policy/cercla.htm>> (accessed 10 Jan 2014).

the environment.²⁰³ The list of “hazardous substances” regulated under CERCLA is extensive and includes many chemicals found in crude oil and petroleum.²⁰⁴ However, “petroleum [and] natural gas” are exempted from the “hazardous substances” definition, thus leaving fracking activities exempt from regulation under CERCLA.²⁰⁵

5. National Environmental Policy Act

The NEPA²⁰⁶ of 1970 establishes goals for national goals for the protection, maintenance and enhancement of the environment and provides a process for implementing these goals within federal agencies.²⁰⁷ NEPA also establishes the Council on Environmental Quality (CEQ).²⁰⁸ NEPA provides three levels of environmental review, depending on the severity of the interference: (1) actions that fit within a categorical exclusion (CE) undergo a low level of review because an agency has found that these actions do not have a significant effect on the environment; (2) an environmental assessment is used when an agency wants to determine whether an environmental impact statement (EIS) is necessary and (3) an EIS is the most comprehensive level of review and provides alternative actions, unavoidable adverse effects and other stringent requirements.²⁰⁹ In 2005, the EPA effectively exempted certain oil and gas activities from stringent environmental review under NEPA.²¹⁰ The EPA specified that oil- and gas-related activities were to be evaluated under the CE standard, which is the lowest level of scrutiny required under NEPA and does not allow for public comment.²¹¹ In addition, in 2006 and 2007, the US BLM granted this exemption from EISs to oil and gas companies who lease federal lands.²¹²

203 42 USC s.1906 *et seq.*

204 42 USC s.9601(14) (a list of over 600 CERCLA hazardous substances is provided in 40 CFR 302.4).

205 “Superfund: Reportable Quantities” US EPA, available at <<http://www.epa.gov/superfund/policy/release/rq/index.htm#substance>> accessed 10 Jan 2014. See also Earthworks, “Loopholes for Polluters” 2 <www.shalegas.energy.gov/resources/060211_earthworks_fs_oilgasexemptions.pdf> (accessed 10 Jan 2014).

206 42 USC 4321 *et seq.* (NEPA).

207 “National Environmental Policy Act” US EPA, available at <<http://www.epa.gov/compliance/basics/nepa.html>> (accessed 10 Jan 2014).

208 The CEQ promulgated regulations implementing NEPA, codified at 40 CFR parts 1500–15081.

209 Brandon J Murrill, “Hydraulic Fracturing and the National Environmental Policy Act (NEPA): Selected Issues” (25 April 2012) *Congressional Research Service* 2 <www.fas.org/sgp/crs/misc/R42502.pdf> accessed 10 Jan 2014.

210 Earthworks (n.205), p.2 (citation omitted).

211 Murrill (n.209), p.2.

212 US Government Accountability Office: Report to Congress, “Energy Policy Act of 2005: Greater Clarity Needed to Address Concerns with Categorical Exclusion for Oil and Gas Development under Section 390 of the Act” 2 (September 2009), available at <<http://www.gao.gov/new.items/d09872.pdf>> (accessed 10 Jan 2014).

6. Endangered Species Act

The Endangered Species Act (ESA)²¹³ protects threatened and endangered species and their habitat.²¹⁴ The ESA requires federal agencies to report any activities that could potentially impact a listed species or habitat.²¹⁵ Not specifically related to fracking operations, several multi-million dollar settlements have occurred for failure to prevent endangered birds from landing in oil and gas production waste pits.²¹⁶ Although the ESA has not been heavily used, to date, to address environmental fracking concerns, legislation has been proposed to require the ESA to more closely regulate the interaction between listed species and oil and gas operations.²¹⁷

Clearly, federal regulation is so far virtually nonexistent. States will likely continue to play an important role in enforcing fracking locally while simultaneously addressing broadly experienced public concern.

III. State and Local Regulation

In the absence of clear and effective federal regulation, fracking continues to be primarily a matter of state and local law. While the federal government currently exempts most fracking activity from regulation, the states are free to regulate practices as they see fit.²¹⁸ There currently exists a patchwork of state regulations, with each state enacting various requirements for wastewater disposal, underground injection, storm water runoff, water supply acquisition, and the process for spacing, drilling, casing and operating wells. Many states are also reviewing, amending or drafting regulations that apply directly to fracking.²¹⁹ Given the lack of federal regulation and the likelihood that state courts (following *Coastal Oil and Gas Corp v Garza Energy Trust's*²²⁰ lead) will be hesitant to interfere with

213 16 USC Cap.35, Pub L 113-75 (ESA).

214 16 USC s.1531(a).

215 *Ibid.*

216 US Fish and Wildlife Service, "Contaminant Issues: Oil Field Waste Pits", available at <<http://www.fws.gov/mountain-prairie/contaminants/contaminants1a.html>> (accessed 10 Jan 2014). The Migratory Bird Treaty Act of 1918 (MBTA) also protects certain listed bird species from takings similarly to the ESA. 16 USC ss.703–712.

217 Suzie Gilbert, "Fracking Over Endangered Species" (16 September 2013) *Shale Reporter*, available at <http://www.shalereporter.com/blog/suzie_gilbert/article_b793e550-1f07-11e3-995b-0019bb30f31a.html> (accessed 10 Jan 2014).

218 Tiemann, "Hydraulic Fracturing and Safe Drinking Water Act Issues" (n.48), p.2.

219 Dougal (n.47), pp.3–4.

220 268 SW 3d 1 (Texas 2008). The rule of capture, which gave a mineral rights owner title to the oil and gas produced from a lawful well bottomed on the property, even if the oil and gas flowed to the well from beneath another owner's tract, prevented royalty interest owners of a natural gas lease from recovering damages against a well operator on trespass claim that alleged that the operator's subsurface hydraulic fracturing of the natural gas well caused the draining of natural gas, which was subject to the lease, to the operator's well on the adjacent property.

states' regulation of fracking, state regulation is the central mechanism controlling fracking and its effects.

A. *What Level of Government Should Regulate Fracking — Federal or State?*

The Groundwater Protection Council (GWPC)²²¹ and Interstate Oil and Gas Compact Commission (IOGCC)²²² both oppose federal regulation of fracking, noting that this process is regulated by the states, most often through general oil and gas productions regulations, policies and practices. Both report that the major oil and gas producing states now have laws and regulatory requirements in place to protect water resources during oil and natural gas exploration and production activities.

Proponents of federal regulation argue that the federal government is in a better position to provide oversight of and set requirements for the rapidly expanding industry of fracking.²²³ In July 2013, however, the 113th Congress saw the introduction of the Protecting States' Rights to Promote American Energy Security Act.²²⁴ This Act seeks to require the federal government to defer to individual states' fracking regulations with the goal of "recogniz[ing] States' authority to regulate oil and gas operations and promote American energy security, development, and job creation".²²⁵ The bill passed in the House in November 2013 and goes on to the Senate next.²²⁶ If enacted, a state's laws or regulations regarding fracking would be the rules applied in that state, not any regulations created by the federal government.

221 Available at <<http://www.gwpc.org/>> (accessed 10 Jan 2014). The GWPC is a national association representing state groundwater and UIC agencies whose mission is to promote protection and conservation of groundwater resources for beneficial uses. *Ibid.* The stated purpose of the GWPC is "to promote and ensure the use of best management practices and fair but effective laws regarding comprehensive ground water protection". "About the Groundwater Protection Council", available at <<http://www.gwpc.org/about-us>> (accessed 10 Jan 2014).

222 Available at <<http://www.iogcc.state.ok.us/about-us>> (accessed 10 Jan 2014). The IOGCC represents state oil and gas agencies. *Ibid.* The commission was established in the 1930s, initially to reduce the waste of oil during exploration and production by developing model statutes and practices to improve the conservation of oil resources. *Ibid.*

223 See Adam Garnezy, "Balancing Hydraulic Fracturing's Environmental and Economic Impacts: The Need for A Comprehensive Federal Baseline and the Provision of Local Rights" (2013) 23 *Duke Environmental Law & Policy Forum* 405, 427–428 (arguing that fracking regulation should be in the hands of the federal government, not the states).

224 "H.R. 2728: Protecting States' Rights to Promote American Energy Security Act" (21 November 2013) *Govtrack.us*, available at <<https://www.govtrack.us/congress/bills/113/hr2728>> (accessed 4 Jan 2014). Republican Representative Bill Flores of Texas, District 17, introduced H.R. 2728 on 18 Jul 2013. *Ibid.*

225 "H.R. 2728: Protecting States' Rights to Promote American Energy Security Act" (21 November 2013) *Govtrack.us*, available at <<http://www.gpo.gov/fdsys/pkg/BILLS-113hr2728pcs/pdf/BILLS-113hr2728pcs.pdf>> (accessed 4 Jan 2014).

226 "H.R. 2728: Protecting States' Rights to Promote American Energy Security Act" (21 November 2013) *Govtrack.us*, available at <<https://www.govtrack.us/congress/bills/113/hr2728>> (accessed 4 Jan 2014).

Another argument in favour of state regulation is that states are able to better sense and suit the needs of its citizens through fracking regulations. For example, Illinois recently passed a major comprehensive statute to regulate fracking, said to be the nation's strictest regulations for natural gas drilling.²²⁷ It touches upon most of the important environmentally sensitive aspects of fracking (with the exception of the little-understood relationship of fracking and seismic activity/earthquakes): water pollution, air pollution and so forth.²²⁸ It also leaves regulation of those aspects of fracking otherwise affecting the use of land to the local government in whose jurisdiction fracking takes place.²²⁹ Some highlights are as follows:

- (1) A high-volume horizontal hydraulic fracturing permit is required for each fracking well developed. All chemicals anticipated to be added to or used as hydraulic fracturing fluid must be listed in the permit application as well as its concentration and "mass".
- (2) Each application for a permit requires a plan for the handling, storage, transportation, disposal or reuse of the fluids, together with a traffic management, containment, and plugging and restoration plan.
- (3) Public notification and hearings are required for each planned application and well. The hearing must be of the contested case variety and is appealable under the Illinois administrative procedures act.
- (4) Emission controls are required for managing gas and hydrocarbon fluids produced during the flowback period of the extraction process.
- (5) Water quality monitoring of all water sources likely to be affected by the process of fracking.
- (6) Eventual plugging of a well and restoration of the well site is required in accordance with the Illinois Oil and Gas Act, at the expense of the permittee.
- (7) The Act creates a task force on fracking which governs both the membership and reporting duties thereof.
- (8) Lastly, the legislation also creates the Illinois Hydraulic Fracturing Tax Act which provides a rate of 3 per cent of the value of the oil or gas extracted for the first 2 years of production, and thereafter a more complicated formula which is different for gas and oil. The Tax Act also provides for a modest reduction in royalties tax rates if the process utilizes a local workforce.²³⁰

227 See Don Babwin, "Illinois Gas Drilling Rules: Governor Pat Quinn Signs New Fracking Regulations Into Law" (17 June 2013) *Huffington Post News*, available at <http://www.huffingtonpost.com/2013/06/17/illinois-gas-drilling-rules-fracking_n_3455668.html> (accessed 4 Jan 2014).

228 *Ibid.*

229 *Ibid.*

230 See Matt Kasper, "Illinois Adopts Nation's Strictest Fracking Regulations" (19 Jun 2013) *Think Progress*, available at <<http://thinkprogress.org/climate/2013/06/19/2177811/illinois-adopts-nations-strictest-fracking-regulations/>> (accessed 4 Jan 2014).

Another area in which states have taken the lead with regard to regulation is disclosure laws.²³¹ For example, Wyoming enacted laws requiring disclosure of chemicals used in fracking fluids and now requires companies to file for trade secret approval.²³² In 2011, Texas enacted the first legislation mandating disclosure, requiring that companies report the total volume of water and chemicals used in fracking (except for proprietary information) on an online chemical registry called FracFocus.²³³ Finally, Colorado has required disclosure of chemicals by frackers since 2008.²³⁴ Those engaged in fracking are required to report chemicals used to state regulators and medical personnel if an incident occurs. In December 2011, the COGCA passed new rules requiring companies to post information about the chemicals on FracFocus, including the concentration of all chemicals used (proprietary chemicals need not be disclosed, but the type of chemical must be listed).²³⁵

B. State versus Local Fracking Regulation: Varying Degrees of Preemption

In the virtual absence of comprehensive federal regulation, local governments have also responded to its citizens' concerns by enacting ordinances banning, supporting or restricting fracking. When faced with the issue of whether these local ordinances conflict with state laws governing oil and gas activity, the courts employ a preemption analysis.²³⁶ Preemption is a doctrine that “‘establishes priority between potentially conflicting laws enacted by various levels of government’ — federal, state, and local.”²³⁷ Under this doctrine, “the law enacted by the higher level of government generally will be given priority, and the law enacted by the lower level of government will be ‘preempted,’ rendering it unenforceable[.]”²³⁸ A collage of

231 Dougal (n.47), p.3.

232 See Nicholas Kusnetz, “Wyoming Fracking Rules Would Disclose Drilling Chemicals” (14 Sept 2010) *ProPublica*, available at <<http://www.propublica.org/article/wyoming-fracking-rules-would-disclose-drilling-chemicals>> (accessed 10 Jan 2014).

233 See Randy Lee Loftis, “Texas’ New Fracking Disclosure Law Doesn’t Shed Light on Everything” (6 Aug 2012) *The Dallas Morning News*, available at <<http://www.dallasnews.com/news/community-news/dallas/headlines/20120806-new-state-law-requiring-disclosure-of-fracking-chemicals-sheds-light-on-some-processes-but-leaves-other-things-in-the-dark.ece>> (accessed 10 Jan 2014). The Texas Legislature left many loopholes in the 2011 law: (1) the law, which is not retroactive, only affects newly fracked wells, the number of which is very small; (2) the law only requires disclosure after the work is done; it does not require public notice of the use of fracking chemicals; and (3) the law allows natural gas drillers to keep some information secret as confidential business information. *Ibid.*

234 See P Solomon Banda, “Colorado to Require Disclosure of Fracking Chemicals” (15 Dec 2011) *USA Today*, available at <<http://usatoday30.usatoday.com/money/industries/energy/story/2011-12-13/colorado-fracking-two/5188292/1>> (accessed 10 Jan 2014).

235 *Ibid.*

236 Keith B Hall, “When Do State Oil and Gas or Mining Statutes Preempt Local Regulations?” [2013] 27 *Natural Resources and Environment* 13.

237 *Ibid.* (citing *Huntley & Huntley, Inc. v Borough Council of Oakmont* 964 A 2d 855, 862 (Pennsylvania 2009)).

238 *Ibid.*

state and local fracking regulations has formed a confusing picture as the limits of local regulation are interpreted on a case-by-case basis.

1. New York: No Preemption Where Local Ordinance Regulates the “Where” of Fracking

The State of New York sits on top of one of the largest shale formations in the country, the Marcellus Shale.²³⁹ Despite its prime location, New York Governor David Patterson imposed a statewide moratorium on fracking in December 2010.²⁴⁰ The moratorium will remain in effect until the New York Department of Environmental Conservation (DEC) issues its final Supplemental Generic EIS and promulgates hydraulic fracturing regulations.²⁴¹ Meanwhile, local municipalities in New York passed their own fracking regulations.²⁴² Despite a statute putting the regulation of the state’s oil, gas and mining industry in the hands of the DEC, courts have found local ordinances to be valid. Therefore, New York provides one example of fracking regulation occurring at the local government level, even when there is a state statute that arguably governs.

The Environmental Conservation Law (ECL) established the DEC and tasked it with natural resource protection in furtherance of the State’s environmental policy.²⁴³ In 1971, the Oil, Gas and Solution Mining law (OGSML) amended the ECL and extended the DEC’s authority to include regulation²⁴⁴ and issuance of permits²⁴⁵ pertaining to the State’s oil, gas and mining industry.²⁴⁶ The policy aim of the OGSML is to foster the development of New York’s natural resources, to conserve natural resources, and to protect the rights of its citizens.²⁴⁷ The OGSML leaves little to local regulation: “[t]he provisions of [Mineral Resources Article 23 of the ECL] shall supersede all local laws or ordinances relating to the regulation of the oil, gas, and solution mining industries; but shall not supersede local government jurisdiction over local roads or the rights of local governments under

239 The Marcellus Shale extends from southern New York across Pennsylvania, and into western Maryland, West Virginia, and eastern Ohio, which contains significant quantities of natural gas. Daniel J Soeder and William M Kappel, “Water Resources and Natural Gas Production from the Marcellus Shale Fact Sheet” (May 2009) *United States Geological Survey* 1, available at <<http://pubs.usgs.gov/fs/2009/3032/pdf/FS2009-3032.pdf>> (accessed 18 Jan 2014).

240 “N.Y. Exec. Order No. 41: Requiring Further Environmental Review” (13 Dec 2010), available at <<http://www.governor.ny.gov/archive/paterson/executiveorders/EO41.html>> (accessed 18 Jan 2014).

241 *Ibid.*

242 Mary Esch, “New York Fracking Decision: Cuomo Under Pressure to Rule on Hydraulic Fracturing” (6 Sept 2012) *Huffington Post*, available at <http://www.huffingtonpost.com/2012/09/06/new-york-fracking-decision_n_1862112.html> (accessed 18 Jan 2014).

243 NY Environmental Conservation Law s.1-0101 (NCL).

244 *Ibid.*, s.23-0503 (granting the DEC the power to set standards for the construction and maintenance of drilling operations and the power to specify a minimum distance between wells and sources of underground drinking water).

245 *Ibid.*, s.23-0305 (granting the DEC exclusive authority over the issuance of well permits).

246 *Ibid.*, s.23-0301.

247 *Ibid.*

the real property tax”.²⁴⁸ On its face, the OGSML appears to override “all local laws or ordinances” relating to hydraulic fracturing. However, in two recent cases regarding fracking regulation, New York courts interpreted section 23-0303 to uphold local zoning ordinances banning fracking.²⁴⁹

In both *Anschutz Exploration Corp v Town of Dryden*²⁵⁰ and *Cooperstown Holstein Corp v Town of Middlefield*,²⁵¹ the issue was whether a municipality can exercise its police powers to enact local zoning ordinances banning fracking within that municipality, given the express preemption language contained in the OGSML. Likewise, plaintiffs in both cases argued that ECL section 23-0303(2)’s “shall supersede” language both expressly and impliedly preempted municipalities from enacting any ordinance regulating the oil and gas industry, which necessarily includes ordinances banning the process of hydraulic fracturing. The municipal defendants argued that the ordinances were consistent with their power under New York’s Municipal Home Rule Law, which enable municipalities’ use of zoning to protect the health, safety and welfare of its community.²⁵²

In *Anschutz*, an oil and gas company, Anschutz Exploration Corporation (“Anschutz” or “Plaintiff”), claimed that the Town of Dryden’s local zoning ordinance outlawed the extraction of natural gas from properties to which it held mineral rights.²⁵³ Concerned with the increased use of high-volume fracking and its potential to contamination to ground water, the Town of Dryden amended its zoning ordinance to ban all activities related to the exploration of natural gas.²⁵⁴ The new ordinance left Anschutz with useless gas leases spanning over 22,200 acres and a lost investment of nearly \$1.5 million.²⁵⁵ Anschutz shortly thereafter sued to have the Amendment declared void based on express preemption by the supersession clause of the OGSML or ECL section 23-0303.²⁵⁶

The court held that the OGSML *did not* expressly preempt local regulation of land use, but only regulations dealing with operations.²⁵⁷ “The OGSML does not preempt a municipality’s authority — through the exercise of its zoning power — to completely ban operations related to oil and gas production within its borders.”²⁵⁸ Relying on *Frew Run Gravel Products, Inc v Town of Carroll*,²⁵⁹ the court found the statutes at issue in both cases to be nearly identical, and therefore:

248 *Ibid.*, s.23-0303(2).

249 See *Cooperstown Holstein Corp v Town of Middlefield* 943 NYS 2d 722, 724 (New York 2012); *Anschutz Exploration Corp v Town of Dryden* 940 NYS 2d 458, 460 (New York 2012)

250 *Anschutz* (n.249).

251 *Cooperstown* (n.249).

252 See NY Constitution, art.IX ss.(c)(i), 2(c)(11)(10).

253 *Anschutz* (n.249), p.453.

254 *Ibid.*

255 *Ibid.*

256 *Ibid.*

257 *Anschutz* (n.249), p.467.

258 *Anschutz* (n.249), p.468.

259 71 NY 2d 126 (New York 1987).

both statutes preempt only local regulations “relating” to the applicable industry, they must be afforded the same plain meaning — that they do not expressly preempt local regulation of land use, but only regulations deal with operations. Neither supersedure clause contains a clear expression of legislative intent to preempt local control over land use and zoning.²⁶⁰

In addition, the purpose of the OGSML pertained to the regulation of oil and gas operations only in locations where those activities were conducted in compliance with applicable municipal zoning ordinances.²⁶¹ The court granted the Town’s motion for summary judgment, rendering the zoning ordinance and amendment valid. *Anschutz* appealed.²⁶²

The appellate division affirmed, holding that “the OGSML *does not preempt*, either expressly or impliedly, a municipality’s power to enact a local zoning ordinance banning all activities related to the exploration for, and the production or storage of, natural gas and petroleum within its borders”.²⁶³ The appellate court agreed with the lower court’s interpretation of the supersession clause as prohibiting municipalities from enacting laws or ordinances “relating to the *regulation* of the oil, gas and solution mining industries”²⁶⁴ Although the zoning ordinance and amendment may have an incidental effect on the oil and gas industries, it did not regulate the details or procedure of those operations.²⁶⁵ The ordinance also did not conflict with the state’s interest in establishing uniform procedures for oil and gas exploration and operations, but only established permissible and prohibited uses of land within the Town.²⁶⁶ Thus, the OGSML supersession clause did not expressly preempt the Town’s zoning amendment.²⁶⁷

Similarly, in *Cooperstown*,²⁶⁸ the court upheld the municipalities’ ability to exclude fracking as a permissible use of land through zoning ordinances. The ECL preempted local laws governing “how,” but not those governing “where.”²⁶⁹ Plaintiff was a landowner in Cooperstown who entered into natural gas leases with energy companies.²⁷⁰ Middlefield amended its zoning ordinance in June 2011 to effectively ban oil and gas drilling within the borders of the township.²⁷¹ The landowner sought

260 *Anschutz* (n.249), p.467.

261 *Anschutz* (n.249), p.470.

262 *Norse Energy Corp USA v Town of Dryden* 108 AD 3d 25 (New York 2013). During the pendency of the appeal, *Anschutz* assigned its interest in certain oil and gas leases in the Town of Dryden to Petitioner, Norse Energy Corp, USA, who was thereafter substituted in the proceeding. *Ibid.*, p.28.

263 *Ibid.*, p.36. (Emphasis added.)

264 *Norse* (n.262), p.31 (internal quotations and citations omitted). (Emphasis added.)

265 *Norse* (n.262), p.32.

266 *Norse* (n.262), p.34.

267 *Norse* (n.262), p.38.

268 *Cooperstown* (n.249).

269 *Cooperstown* (n.249), p.777.

270 *Cooperstown* (n.249), pp.770–771.

271 *Cooperstown* (n.249), p.769.

to declare the law void due to preemption and asserted that the purpose of the leases would be frustrated by the enforcement of the ordinance.²⁷² The Court examined two court cases^{273 274} where the courts held municipalities were *not preempted* by clauses similar to ECL section 23-0303(2) from enacting local zoning ordinances which may prohibit oil- and gas-related exploration.²⁷⁵ After a detailed review of the ECL's legislative intent and legislative history, the court held that “[t]he state maintains control over the ‘how’ of such procedures while the municipalities maintain control over the ‘where’ of such exploration”.²⁷⁶ The court denied Cooperstown’s motion for summary judgment and upheld the Town’s zoning ordinance.

2. Pennsylvania: State Law Expressly Preempts Local Regulation.²⁷⁷

The Pennsylvania Oil and Gas Act (POGA) contains a provision addressing the role of local ordinances:

[e]xcept with respect to ordinances adopted pursuant to ... the Municipalities Planning Code ... all local ordinances and enactments purporting to regulate oil and gas well operations regulated by this act are hereby superseded. No ordinances or enactments adopted pursuant to the aforementioned acts shall contain provisions which impose conditions, requirements or limitations on the same features of oil and gas well operations regulated by this act or that accomplish the same purposes as set forth in this act. The Commonwealth, by this enactment, hereby preempts and supersedes the regulation of oil and gas wells as herein defined.²⁷⁸

On the same day, the Pennsylvania Supreme Court decided two cases with contrasting outcomes — finding local regulations were not preempted in *Huntley*²⁷⁹ and finding local regulations preempted by POGA in *Range Resources-Appalachia, LLC v Salem Township*.²⁸⁰

²⁷² *Cooperstown* (n.249), p.770.

²⁷³ *Frew Run* (n.259) — Court of Appeals while addressing the breadth of the supersession clause of the Mining Land Reclamation Law (MLRL), ECL ss.23–2703(2) found that the zoning regulations of the Town of Carroll did not frustrate the state’s “purposes of the statute ... to foster a healthy, growing mining industry.”

²⁷⁴ *Gernatt Asphalt Products, Inc v Town of Sardinia* 87 NY 2d 668, 681–682, confirmed the *Frew Run* holding and stands for the proposition that a municipality may ban a particular activity, such as mining, in furtherance of its land use authority.

²⁷⁵ *Cooperstown* (n.249), p.778.

²⁷⁶ *Cooperstown* (n.249), pp.777–778.

²⁷⁷ Aaron Stemplewicz, “Developing the Marcellus Shale: Legal, Regulatory, and Infrastructure Challenges and Their Effect on Downstream Energy Markets” [2012] 19 *Buffalo Environmental Law Journal* 107, 117.

²⁷⁸ Pa. Oil and Gas Act, 58 Pa Cons Stat ss.1–701.7, 601.602 (2011) (POGA).

²⁷⁹ *Huntley* (n.237).

²⁸⁰ 964 A 2d 869.

In *Huntley*,²⁸¹ an oil and gas company sought a permit to drill and operate a natural gas well on a residential property.²⁸² The city council denied the conditional use application, and the company sought review.²⁸³ The court found that the POGA *did not* preempt the zoning ordinance designating where natural gas drilling is permitted because the ordinance “serves different purposes from those enumerated in the Oil and Gas Act”.²⁸⁴ Local zoning ordinances may contain provisions including or excluding natural gas extraction operations from certain locations, and that “location” is not a “feature” as defined by the POGA.²⁸⁵ The court emphasized that a “municipality could permit drilling in a particular district but then make that permission subject to conditions addressed to features of well operations regulated by the Act”.²⁸⁶ Therefore, while *Huntley* left municipalities with some un-preempted power, the holding is limited to restricting natural gas drilling *only for aesthetic reasons*, such as preserving the character of neighbourhoods and encouraging beneficial use and compatible land uses.²⁸⁷

In *Range Resources*,²⁸⁸ the Pennsylvania Supreme Court held that POGA preempted the local ordinances enacted by Salem Township.²⁸⁹ Energy companies sought declarative and injunctive relief from a zoning ordinance that regulated certain activities associated with oil and gas drilling operations, including permitting procedures specifically for oil and gas wells, bonding requirements, regulation of well heads, site restoration after drilling is completed, pre-operation water testing, pipeline and depth markings, and slope and construction of access roads.²⁹⁰ The zoning ordinance contained a separate appendix directly relating to oil and gas drilling, seemingly to create a comprehensive scheme to regulate activities of that sort.²⁹¹ The court held the regulations were “a regulatory apparatus parallel to the one established by the [POGA]”, and thus preempted by the POGA.²⁹² However, the court did not address, whether the ordinance would be valid if it had only regulated commercial development generally.²⁹³

In *Penneco Oil Co, Inc v County of Fayette*,²⁹⁴ the final case in the trio of Pennsylvania case law, the court held the state law (POGA) *did not* preempt a local ordinance that targeted natural gas drilling.²⁹⁵ Fayette County adopted a zoning

281 *Huntley* (n.237).

282 *Ibid.*, p.857.

283 *Ibid.*

284 *Ibid.*, p.866.

285 *Ibid.*, pp.865–867.

286 *Ibid.*, p.866.

287 *Huntley* (n.237), pp.867–868.

288 *Range Resources* (n.280).

289 *Ibid.*, p.877.

290 *Ibid.*, pp.872–873.

291 *Ibid.*

292 *Ibid.*, p.875.

293 *Ibid.*, pp.876–877.

294 4 A 3d 722.

295 *Ibid.*, p.733.

ordinance that oil and gas wells were a “permitted use” in some zoning districts, but in all districts, oil and gas wells were a “special exception”.²⁹⁶ If oil and gas wells were within “special exception” zones, they were subject to four requirements: (1) an oil or gas well shall not be located within the flight path of a runway facility of an airport; (2) an oil or gas well shall not be located closer than 200 feet from residential dwelling or 50 feet from any property line or right of way; (3) an oil or gas well shall provide fencing and shrubbery around the perimeter of the pump head and support frame and (4) the Zoning Hearing Board may attach additional conditions pursuant to this section, in order to protect the public’s health, safety and welfare.²⁹⁷ An oil and gas company engaged in natural gas drilling within Fayette County challenged the ordinance, arguing that POGA preempted the ordinance and it was therefore invalid.²⁹⁸

The Pennsylvania Commonwealth Court found none of the provisions to be preempted by the POGA. The first three provisions fell directly within the sphere of traditional zoning restrictions and thus are not preempted by the POGA, and the final provision to protect “the public’s health, safety, and welfare” is also not preempted.²⁹⁹ After reviewing the reasoning in *Huntley* and *Range Resources*, the court determined that the fourth provision did not relate to “technical aspects of well functioning”, but was instead similar to the *Huntley* ordinance because it attempted to preserve the character of residential neighbourhoods and encourage beneficial and compatible land uses.³⁰⁰ However, the court’s limited holding “does not provide Fayette County or its zoning hearing board with virtually unbridled discretion to deny permission to drill an oil and gas well even after compliance with the applicable zoning regulations”.³⁰¹

3. West Virginia: State Law preempts Local Regulation of Fracking

In *Northeast Natural Energy, LLC v City of Morgantown*,³⁰² a dispute arose over a city’s ordinance banning fracking within a mile of Morgantown, West Virginia.³⁰³ Plaintiffs Northeast Energy, LLC, and Emrout Properties, LLC, argued that the ordinance was unenforceable because state law preempted it.³⁰⁴ The City contended that under West Virginia’s Home Rule, it could regulate fracking process as a nuisance.³⁰⁵ The Circuit Court of Monongalia County struck down the ban as preempted by the state law.

296 *Ibid.*, p.730.

297 *Ibid.*

298 *Ibid.*, pp.723–724.

299 *Ibid.*, p.730.

300 *Ibid.*, p.732.

301 *Ibid.*, p.731.

302 (2011) WL 3584376 (West Virginia).

303 *Ibid.*, p.*1.

304 *Ibid.*, p.*1.

305 *Ibid.*, p.*2.

Morgantown's ordinance prohibited the drilling of any oil or gas well within one mile of the corporate limits of Morgantown on grounds that fracking constituted a public nuisance.³⁰⁶ The ordinance effectively prohibited Plaintiffs from completing wells that had been permitted through the West Virginia Department of Environmental Protection (WVDEP).³⁰⁷ Plaintiffs sought to prohibit the City's enforcement of the ordinance, arguing that the regulations of the WVDEP preempted the local ordinance.³⁰⁸

The court held that the city could not completely ban fracking because the industry is regulated solely by the WVDEP. Under West Virginia law, the purpose of the WVDEP is to "consolidate environmental regulatory programs in a single state agency", and WVDEP has sole discretion to perform all duties related to the exploration, development, production, storage and recovery of oil and gas in the states.³⁰⁹ The State law "sets forth a comprehensive regulatory scheme with no exception carved out for a municipal corporation to act in conjunction with the WVDEP[.]"³¹⁰

In late 2011, West Virginia enacted emergency rules to regulate horizontal gas drilling while it develops long-term regulations.³¹¹ West Virginia now has casing and cement standards for wells and also requires permits for horizontal fracking, erosion and sediment control plans, well safety plans, and planned management and disposition of wastewater from fracking operations. The state also requires a 30-day public notice period for well permit applications. Although temporary, West Virginia's emergency rules have received praise and support from EPA, particularly because they address water issues.

4. Colorado: An Attempt at Cooperation Between State and Local Regulation

Local governments in Colorado include both statutory and home-rule counties and municipalities, and thus possess only the regulatory authority "expressly conferred upon [them] by the constitution and statutes...."³¹² Colorado preemption cases are centred on the issue of whether local ordinances regulating oil and gas operations are preempted by state law, the Colorado Oil and Gas Conservation Act (COGCA).³¹³ Colorado courts hold that the COGCA does not preempt (either expressly or impliedly) local regulation of oil and gas operations.³¹⁴ However, some

306 *Ibid.*, p.*1 (citing Morgantown, W Va Ordinance s.721.03).

307 *Ibid.*, p.*3.

308 *Ibid.*, p.*3.

309 WV Code ss.22-1-1(b)(2)-(3), 22-6-2(c)(12).

310 *Morgantown* (n.302), p.*6.

311 WV DEP (WVDEP) Rules, ss.35-8-3, -4, -5.1.

312 Adam S Cohen and Shannon Stevenson, "Hydraulic Fracturing: Regulatory and Litigation Update For the Rocky Mountain States" (2012) *Rocky Mountain Mineral L Foundation J.*

313 Colo Rev Stat ss.34-60-100 *et seq.* (COGCA).

314 *Town of Frederick v North American Resources Co* 60 P 3d 758, 763 (Colorado 2002).

local regulation may be preempted depending on the nature of the local government and the degree of conflict with state law.³¹⁵ Home rule in Colorado has led courts to develop a four-part test to determine whether a local ordinance or regulation is valid in the face of an alleged state conflict: “whether there is a need for statewide uniformity of regulation; whether the municipal regulation has an extraterritorial impact; whether the subject matter is one traditionally governed by state or local government; and whether the Colorado Constitution specifically commits the particular matter to state or local regulation”.³¹⁶

By contrast, in cases involving statutory non-home rule counties or municipalities, “we have applied the ordinary rules of statutory construction to determine whether a state statute and a local ordinance can be construed harmoniously or whether the state statute preempts the local ordinance. If a conflict exists and the state statute contains a specific provision addressing the matter, the state statute controls over the statutory county’s general land use authority”.³¹⁷ “A county ordinance and a statute may both remain effective and enforceable as long as they do not contain express or implied conditions that are irreconcilably in conflict with each other”.³¹⁸

In *Colorado Mining Association v Board of County Commissioners of Summit County*,³¹⁹ a State mining association sued Summit County seeking a declaration that the county ordinance, which banned the use of cyanide or other toxic/acidic chemicals in oil and gas operations for all zoning districts in the county, was preempted by the Mined Land Reclamation Act (MLRA).³²⁰ The District Court, Summit County, ruled that the MLRA preempted the ordinance.³²¹ The county and two intervening environmental groups appealed.³²² The Court of Appeals reversed.³²³

The State Supreme Court held that while the county ordinance was not expressly preempted by the MLRA, it was impliedly preempted.³²⁴ The Colorado Supreme Court set out a four-part test to determine into which of the three categories a land use regulation falls: (1) whether there is a need for statewide uniformity of regulation; (2) whether the municipal regulation has an extraterritorial effect; (3) whether the subject matter is one traditionally governed

315 *Board of County Commissioners, La Plata County v Bowen/Edwards Associates*, 830 P 2d 1045 (Colorado 1992).

316 *Colorado Mining Association v Board of County Commissioners of Summit County* 199 P 3d 718, 723 (Colorado 2009) (quoting *Voss v Lundvall Brothers, Inc* 830 P 2d 1061, 1067 (Colorado 1993)).

317 *Summit County* (n.316), p.724 (internal citations omitted); Colo Rev Stat s.30-15-411 (prohibiting a statutory county from adopting an ordinance that is in conflict with any state statute).

318 *Bowen/Edwards* (n.315), pp.1056–1057.

319 *Summit County* (n.316).

320 *Ibid.*, p.722.

321 *Ibid.*

322 *Ibid.*

323 *Ibid.*

324 *Ibid.*, p.730.

by state or local government and (4) whether the Colorado Constitution specifically commits the particular matter to state or local regulation.³²⁵

The Court cited two cases, *Voss v Lundvall Bros, Inc*,³²⁶ a 1992 oil and gas case discussed below, and *City of Northglenn v Ibarra*,³²⁷ a 2003 zoning case concerning registered sex offenders. In these cases, the Colorado Supreme Court discussed various factors to be considered in determining whether a matter is of state, local or a combination of both.³²⁸ However, in neither of the cases were the factors to be considered limited to four.³²⁹ The *Ibarra* court stated:

This is not an exhaustive list. All of these factors are “directed toward weighing the respective state and local interests implicated by the law,” a process that lends itself to flexibility and consideration of numerous criteria.³³⁰

In *Bowen/Edwards*,³³¹ the state’s highest court addressed the issue of preemption with respect to the state’s oil and gas laws, the COGCA.³³² The court first reviewed the purposes of the COGCA:³³³

The declared purposes of the [COGCA] are as follows: to promote the development, production, and utilization of the natural resources of oil and gas in the state; to protect public and private interests against the evils of waste; to safeguard and enforce the coequal and correlative rights of owners and producers in a common source or pool of oil and gas so that each may obtain a just and reasonable share of production therefrom; and to permit each oil and gas pool to produce up to its maximum efficient rate of production subject to the prohibition of waste and subject further to the enforcement of the coequal and correlative rights of common-source owners and producers to a just and equitable share of profits.³³⁴

The Colorado Oil and Gas Conservation Commission (COGCC) has authority to issue permits for oil and gas drilling operations, and has authority to regulate all “drilling, production, and plugging of wells, the shooting and chemical treatment

325 *Ibid.*, p.737 (citation omitted).

326 *Voss* (n.316), p.1067.

327 62 P 3d 151, 155–156 (Colorado 2003).

328 *Summit County* (n.316), pp.723–724.

329 *Ibid.*, p.724.

330 *Ibarra* (n.327), p.156 (internal citations omitted).

331 *Bowen/Edwards* (n.315).

332 *Ibid.*, p.1046.

333 Colo Rev Stat s.34-60-102(1).

334 *Ibid.*, p.1049.

of wells, the spacing of wells, and the disposal of salt water and oil field wastes, ... as well as to limit production from any pool or field for the prevention of waste and to allocate production from a pool or field among or between tracts of land having separate ownership on a fair and equitable basis so that each tract will produce no more than its fair and equitable share.”³³⁵ In addition, the COGCC has the authority to enforce all of its technical requirements for oil and gas extraction operations and to “promulgate rules and regulations to protect the health, safety, and welfare of the general public in the drilling, completion, and operation of oil and gas wells and production facilities”³³⁶.

Despite the COGCC’s broad powers, the court held that the COGCA does not expressly³³⁷ or impliedly³³⁸ preempt local ordinances governing oil and gas development. There was no express preemption because the COGCA did not contain a clear statement of legislative intent to prohibit a county from exercising traditional land use authority in areas where oil and gas operations may take place.³³⁹ There was also no implied preemption because the “state’s interest in oil and gas activities is not so patently dominant over a county’s interest in land-use control, nor are the respective interests of both the state and county so irreconcilably in conflict, as to eliminate by necessary implication any prospect for a harmonious application of both regulatory schemes”³⁴⁰. However, the case was remanded for a determination of whether there was any partial preemption by operation, affording Bowen/Edwards the opportunity to specify *particular* county regulations which the county statute may be operationally in conflict with, and thus preempted by, state law.³⁴¹

In *Town of Frederick*,³⁴² an oil and gas corporation challenged the Town of Frederick’s regulations, which imposed a requirement that the company obtain a permit; pay a \$1,000 application fee; and comply with certain location and setback requirements, noise mitigation, and visual impact and aesthetics regulations.³⁴³ The court applied the *Bowen/Edwards* test: “state preemption by reason of operational conflict can arise where the effectuation of a local interest would ‘materially impede or destroy the state interest’.”³⁴⁴ The court concluded that the regulations imposed technical conditions on the drilling of oil and gas wells, and no such conditions were imposed by state regulation, and thus were preempted by state law.³⁴⁵

335 *Ibid.*

336 *Ibid.* (citing Colo Rev Stat s.34-60-106(11)).

337 *Ibid.*, p.1058.

338 *Ibid.*, p.1059.

339 *Ibid.*, pp.1057–1058.

340 *Ibid.*, p.1058.

341 *Ibid.*, p.1060.

342 *Town of Frederick* (n.314).

343 *Ibid.*, p.760.

344 *Ibid.*, p.764 (citing *Bowen/Edwards*).

345 *Ibid.*, p.765.

IV. Conclusion

The recent explosion in hydraulic fracturing as a means for extracting natural gas and oil has resulted in a flurry of regulatory activity in the United States. While the federal government may well be a logical locus of such regulation given the plethora of direct federal legislation either regulating the underground injection of non-natural substances, like the SDWA, or indirectly regulating fracking activity on or below the surface, like the CAA and the CWA, the US has fashioned a blanket exception for fracking in the former despite early case law upholding US statutory regulation, and the latter is not particularly effective. As a result, most regulation of fracking takes place at either the state or local government levels. But while most states in which fracking occurs have comprehensive oil and gas regulation statutes, few of these actually regulate fracking, like Illinois, which has recently passed one of the most extensive such statutes in the nation. Therefore, much of the effective regulation so far appears to come from local government through existing zoning and other land use ordinances.

The relatively few cases dealing with fracking do not yet demonstrate a clear pattern, however. Issues of preemption of local government regulation by state statutes along with basic authority for such local regulation are largely unresolved. Some states courts, like New York, have clearly and unequivocally declared that local zoning ordinances may regulate not just the location surface infrastructure, but all aspects of fracking. Other state courts have held that the authority belongs to the states.

In summary, the US experience in regulating hydraulic fracturing runs the gamut, not only in terms of which levels of government should regulate fracking, but also the legal issues which arise in the struggle to decide which level prevails. This experience represents a useful, if cautionary, paradigm for other countries also struggling with the issue of how to regulate the industry.³⁴⁶

³⁴⁶ Griffith (n.9).