REGULATION OF HYDRAULIC FRACTURING

David L. Callies* and Chynna Stone**

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

* FAICP, Benjamin A. Kudo Professor of Law, William S. Richardson School of Law, University of Hawai‘i at Mānoa; College of Fellows, American Institute of Planners; American College of Real Estate Lawyers. BA, DePauw University, JD, University of Michigan, LLM, Nottingham University, Life Member, Clare Hall, Cambridge University.
** Managing Editor, 36 U. Haw. L. Rev. (2013); JD Candidate 2014, William S. Richardson School of Law; BA Southern Methodist University.

future and to end dependence on foreign oil. 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. 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.

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. 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.

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

---

(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

---

10 Ibid., p.294.
13 Kass (n.11).
15 Ibid.
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. 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). In October 2013, the French Constitutional Court upheld the ban as constitutional.

In October 2013, the French Constitutional Court upheld the ban as constitutional.

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”. 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”. 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. 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. 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. 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.

Hydraulic fracturing has become controversial in Germany as well. Germany is estimated to contain 1.3 trillion cubic meters of recoverable shale gas. 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.
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.


\(^{32}\) Kass (n.11).


\(^{36}\) 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 gas is an attractive asset that plays an important role in the clean energy future of the United States. Natural gas burns cleanly and emits less potentially harmful emissions than coal and oil. 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. Therefore, shale gas has the ability to reduce greenhouse gas emissions and simultaneously curtail the nation’s dependence on foreign sources of oil. 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. The rate of fracking operations expanded significantly in the 1980s and through the 1990s to reach coalbed methane (CBM)
Regulation of Hydraulic Fracturing

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. The boom in CBM led to the use of hydraulic fracturing on other sources of fuel, such as shale gas. The EIA, part of the US DOE, reports that production from shale formations is the fastest growing source of natural gas.

Since the extraction technique was introduced in 1949, nearly 2.5 million fracturing treatments have been executed worldwide. Fracking is employed as “formation stimulation practice”, which increases permeability by allowing more gas to flow to the wellbore. 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. The increased use of fracturing 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. Modern fracking has greatly increased recoverable reserves of oil and gas, by 30 and 90 per cent, respectively. 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.

According to EIA studies, the US contains over 827 tcf of recoverable shale gas reserves. 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. 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

---

49 Ibid., p.2 (citations omitted).
50 Ibid.
51 Ibid. (citation omitted).
55 Dougal (n.47), p.3.
56 Montgomery (n.52), pp.27–28.
57 Ibid.
59 Hutt (n.6).
12 million natural-gas-fired vehicles for one year. 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. 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. 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.

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. 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. The fine pores of the shale rock are not naturally permeable. 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. 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. 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. More than 10 million gallons of water may be used in shale wells during the fracking process. Fluid in the well must be pumped out of the well before extraction of gas can take place. 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”. The extraction of natural gas from shale formations has transformed the natural gas industry by exponentially increasing natural gas production and

62 Ibid.
63 US EPA, “Natural Gas Extraction-Hydraulic Fracturing” (n.43).
65 Ibid., p.15.
66 Ibid., p.56.
69 Ibid.
72 Ibid., fn.5.
energy reserve levels to unprecedented levels.\textsuperscript{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.\textsuperscript{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.

\section*{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 gases.\textsuperscript{75}

The possibility that fracking fluid may contaminate underground drinking water sources is of greatest concern to residents and municipalities surrounding fracking operations.\textsuperscript{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.\textsuperscript{77} The greatest cause for contamination concerns is the unknown concoction of chemicals and additives that compose fracturing fluids.\textsuperscript{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.\textsuperscript{79} However, given the vast amounts of fracking fluids that are utilized in each fracking well operation,\textsuperscript{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

\begin{itemize}
\item \textsuperscript{73} Hutt (n.6).
\item \textsuperscript{74} Tiemann, “Hydraulic Fracturing and Safe Drinking Water Act Issues” (n.48), p.4.
\item \textsuperscript{75} US EPA, “Natural Gas Extraction-Hydraulic Fracturing” (n.43).
\item \textsuperscript{76} US DOE, “Modern Shale Gas Development in the United States: A Primer” (n.8), p.61.
\item \textsuperscript{77} Ibid.
\item \textsuperscript{78} Ibid.
\item \textsuperscript{79} Ibid.
\item \textsuperscript{80} US DOE, “Shale Gas: Applying Technology to Solve America’s Energy Challenges” (n.54).
\end{itemize}
water supply. To calm public hysteria, the Federal government commissioned a report on the chemical additives used in fracking fluids.

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. Fourteen industry leaders engaged in fracking were invited to disclose the types, volumes and chemical compositions of the fracturing fluid they used in their respective operations. 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.” Even more problematic for regulation, a majority of the companies refused to disclose selected chemicals and additives used in the fracturing fluids because it was deemed proprietary or a trade secret.

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. 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.

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. 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.

---

83 Ibid., p.3.
84 Ibid.
85 Ibid. (Emphasis added.)
86 Ibid., p.4.
88 Ibid., p.58.
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.\(^9\) As of 2012, the hydraulic fracturing process itself is exempt from federal regulation under seven different statutes.\(^9\) 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).\(^9\) 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.\(^9\) 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.\(^9\) 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.\(^9\) 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

---

91 Text to s.II.
92 Ibid.
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

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.)
102 42 USC s.300h(b)(1); SDWA s.1421.
104 Ibid.
106 SDWA s.300h(b)(1)(b).
state UIC program or in the absence of competent management, federal control and management is permissible.\textsuperscript{107}

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

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

\textsuperscript{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. \textit{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. \textit{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. \textit{Ibid.}


\textsuperscript{109} \textit{Ibid.}


\textsuperscript{111} \textit{Ibid.}


\textsuperscript{116} \textit{Ibid.}


\textsuperscript{118} Other requirements for state UIC programs are contained in 40 CFR ss.144-147.

\textsuperscript{119} US EPA (n.105). Information on each state may be found at 40 CFR s.147.
shared. 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. 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). 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. 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. 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. 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. 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”.

---

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).
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”. Accordingly, the court remanded the case to the EPA for reconsideration of LEAF’s petition for withdrawal of Alabama’s UIC program approval. 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. The EPA subsequently commenced processes to withdraw approval of Alabama’s Class II UIC program. Meanwhile, Alabama submitted its revised UIC program for the EPA’s approval under the alternative demonstration provision in section 1425 of the SDWA. 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).

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. 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). 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.

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. 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. Hydraulic fracturing must fall within one of the five classes set forth in EPA regulations. 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.

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., pp.1256–1257.
141 Ibid.
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. 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)”.

The Court, rejecting LEAF’s interpretation of the SDWA, found that LEAF’s argument undervalued the term “relates to” under the alternate path. The Court ultimately upheld the EPA’s approval of Alabama’s revised UIC program.

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. In 2004, the EPA concluded that the injection of fracking fluids into CBM wells posed little or no threat to USDW. This study was widely criticized by the public, environmental groups and EPA employees.


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. Section 332 of the EPAct amended the SDWA to specifically exempt hydraulic fracturing from regulation.

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]” — raised the possibility that the EPA could be required to regulate fracking under the SDWA. 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.
154 Ibid., ES-16.
157 EPAct § 322.
158 LEAF I (n.94), p.1475.
the SDWA as part of the EPAct\(^{160}\) 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) \textit{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

---

\(^{160}\) EPAct, s.1(a), 119 Stat 594 (2005) (amended [1] of s.1421(d) of the SDWA (42 USC s.300h(d)).

\(^{161}\) EPAct, 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/epa­looks-to-regulate-potential-water-threats-from-fracking/> (accessed 12 Feb 2014).

\(^{164}\) US DOE (n.87), p.57.


\(^{166}\) 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”).

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. 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.

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. 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.

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. These new rules would apply only to fracking on federal lands, which contains only 13 per cent of shale production and formations. 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. 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).
173 Ibid.
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.
1. Clean Water Act

The CWA\textsuperscript{183} regulates unpermitted discharges of soil, chemicals or other materials to wetlands or surface waters.\textsuperscript{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.\textsuperscript{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”.\textsuperscript{186} Regulation by the CWA, if at all, will likely come into play with flowback or fracking wastewater.\textsuperscript{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”.\textsuperscript{188} Section 112 of the CAA addresses potentially hazardous air pollutants, including emissions from oil and gas drilling operations.\textsuperscript{189} Section 112 regulates “major sources” of pollutants, defined as:

\begin{quote}
[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.\textsuperscript{190}
\end{quote}

For these “major sources”, the EPA is required to promulgate standards for technology that will yield the “maximum degree of reduction in emissions”.\textsuperscript{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”.\textsuperscript{192}

\begin{itemize}
  \item \textsuperscript{183} 33 USC ss.1251–1387.
  \item \textsuperscript{184} Ibid., s.1251(a)(1).
  \item \textsuperscript{185} Water Quality Act 1987 s.401; 33 USC s.1342(1)(2).
  \item \textsuperscript{186} 33 USC s.1362.
  \item \textsuperscript{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.
  \item \textsuperscript{188} CAA s.101(b)(1) (codified as 42 USC s.7401 ff).
  \item \textsuperscript{189} 42 USC s.7412.
  \item \textsuperscript{190} Ibid., s.7412(a)(1).
  \item \textsuperscript{191} Ibid., s.7412(d)(2).
  \item \textsuperscript{192} Ibid., s.7412(n)(4)(A).
\end{itemize}
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 RCRA\(^ {195}\) 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 CERCLA\(^ {201}\) 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


\[^{195}\] 42 USC ss.6901–6992k.

\[^{196}\] Ibid., ss.6921–6939e.

\[^{197}\] Ibid., s.6921(b)(2)(A).

\[^{198}\] Ibid., s.6921(b)(2)(B).


\[^{200}\] Ibid.

\[^{201}\] 42 USC s.1906 et seq. (CERCLA).

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

5. National Environmental Policy Act

The NEPA 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. NEPA also establishes the Council on Environmental Quality (CEQ). 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. In 2005, the EPAct effectively exempted certain oil and gas activities from stringent environmental review under NEPA. The EPAct 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. In addition, in 2006 and 2007, the US BLM granted this exemption from EISs to oil and gas companies who lease federal lands.

203 42 USC §1906 et seq.
204 42 USC §9601(14) (a list of over 600 CERCLA hazardous substances is provided in 40 CFR 302.4).
206 42 USC 4321 et seq. (NEPA).
208 The CEQ promulgated regulations implementing NEPA, codified at 40 CFR parts 1500–15081.
210 Earthworks (n.205), p.2 (citation omitted).
211 Murrill (n.209), p.2.
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*\(^{220}\) 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.


\(^{219}\) 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) and Interstate Oil and Gas Compact Commission (IOGCC) 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. In July 2013, however, the 113th Congress saw the introduction of the Protecting States’ Rights to Promote American Energy Security Act. 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”. The bill passed in the House in November 2013 and goes on to the Senate next. 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.


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.\textsuperscript{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.\textsuperscript{228} It also leaves regulation of those aspects of fracing otherwise affecting the use of land to the local government in whose jurisdiction fracking takes place.\textsuperscript{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.\textsuperscript{230}


\textsuperscript{228} Ibid.

\textsuperscript{229} Ibid.

Another area in which states have taken the lead with regard to regulation is disclosure laws. For example, Wyoming enacted laws requiring disclosure of chemicals used in fracking fluids and now requires companies to file for trade secret approval. 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. Finally, Colorado has required disclosure of chemicals by frackers since 2008. 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).

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

In the virtual absence of comprehensive federal regulation, local governments have also responded to their 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. Preemption is a doctrine that “establishes priority between potentially conflicting laws enacted by various levels of government — federal, state, and local.” 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[.]” A collage of

231 Dougal (n.47), p.3.
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.
235 Ibid.
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. Despite its prime location, New York Governor David Patterson imposed a statewide moratorium on fracking in December 2010. 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. Meanwhile, local municipalities in New York passed their own fracking regulations. 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. In 1971, the Oil, Gas and Solution Mining law (OGSML) amended the ECL and extended the DEC’s authority to include regulation and issuance of permits pertaining to the State’s oil, gas and mining industry. 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. 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

241 Ibid.
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”. 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.

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 preemp[t] 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).
\(^{250}\) 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
effectively preempt local regulation of land use, but only regulations deal
with operations. Neither supersede 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

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.\textsuperscript{272} The Court examined two court cases\textsuperscript{273} \textsuperscript{274} where the courts held municipalities were \textit{not preempted} by clauses similar to ECL section 23-0303(2) from enacting local zoning ordinances which may prohibit oil- and gas-related exploration.\textsuperscript{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."\textsuperscript{276} The court denied Cooperstown's motion for summary judgment and upheld the Town’s zoning ordinance.

\section*{2. Pennsylvania: State Law Expressly Preempts Local Regulation.\textsuperscript{277}}

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

\begin{quote}
\begin{small}
except 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.\textsuperscript{278}
\end{small}
\end{quote}

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

\begin{footnotes}
\textsuperscript{272} \textit{Cooperstown} (n.249), p.770.
\textsuperscript{273} \textit{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."
\textsuperscript{274} \textit{Gernatt Asphalt Products, Inc v Town of Sardinia} 87 NY 2d 668, 681–682, confirmed the \textit{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.
\textsuperscript{275} \textit{Cooperstown} (n.249), p.778.
\textsuperscript{276} \textit{Cooperstown} (n.249), pp.777–778.
\textsuperscript{277} Aaron Stemplewicz, "Developing the Marcellus Shale: Legal, Regulatory, and Infrastructure Challenges and Their Effect on Downstream Energy Markets" [2012] 19 \textit{Buffalo Environmental Law Journal} 107, 117.
\textsuperscript{279} \textit{Huntley} (n.237).
\textsuperscript{280} 964 A2d 869.
\end{footnotes}
In Huntley, an oil and gas company sought a permit to drill and operate a natural gas well on a residential property. The city council denied the conditional use application, and the company sought review. 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.” 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. 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.” 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.

In Range Resources, the Pennsylvania Supreme Court held that POGA preempted the local ordinances enacted by Salem Township. 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. 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. The court held the regulations were “a regulatory apparatus parallel to the one established by the [POGA]”, and thus preempted by the POGA. However, the court did not address, whether the ordinance would be valid if it had only regulated commercial development generally.

In Penneco Oil Co, Inc v County of Fayette, 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. Fayette County adopted a zoning
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”. 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.

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.

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. 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. 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”.

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

In Northeast Natural Energy, LLC v City of Morgantown, a dispute arose over a city’s ordinance banning fracking within a mile of Morgantown, West Virginia. Plaintiffs Northeast Energy, LLC, and Emrout Properties, LLC, argued that the ordinance was unenforceable because state law preempted it. The City contended that under West Virginia’s Home Rule, it could regulate fracking process as a nuisance. 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.\textsuperscript{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.”\textsuperscript{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”.\textsuperscript{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”.\textsuperscript{318}

In \textit{Colorado Mining Association v Board of County Commissioners of Summit County},\textsuperscript{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).\textsuperscript{320} The District Court, Summit County, ruled that the MLRA preempted the ordinance.\textsuperscript{321} The county and two intervening environmental groups appealed.\textsuperscript{322} The Court of Appeals reversed.\textsuperscript{323}

The State Supreme Court held that while the county ordinance was not expressly preempted by the MLRA, it was impliedly preempted.\textsuperscript{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

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{315} Board of County Commissioners, \textit{La Plata County v Bowen/Edwards Associates}, 830 P 2d 1045 (Colorado 1992).
\item \textsuperscript{316} \textit{Colorado Mining Association v Board of County Commissioners of Summit County} 199 P 3d 718, 723 (Colorado 2009) (quoting \textit{Voss v Lundvall Brothers, Inc} 830 P 2d 1061, 1067 (Colorado 1993)).
\item \textsuperscript{317} \textit{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).
\item \textsuperscript{318} \textit{Bowen/Edwards} (n.315), pp.1056–1057.
\item \textsuperscript{319} \textit{Summit County} (n.316).
\item \textsuperscript{320} Ibid., p.722.
\item \textsuperscript{321} Ibid.
\item \textsuperscript{322} Ibid.
\item \textsuperscript{323} Ibid.
\item \textsuperscript{324} Ibid., p.730.
\end{itemize}
\end{footnotesize}
by state or local government and (4) whether the Colorado Constitution specifically commits the particular matter to state or local regulation.\footnote{Ibid., p.737 (citation omitted).}

The Court cited two cases, \textit{Voss v Lundvall Bros. Inc.}\footnote{\textit{Voss} (n.316), p.1067.} a 1992 oil and gas case discussed below, and \textit{City of Northglenn v Ibarra,}\footnote{62 P 3d 151, 155–156 (Colorado 2003).} 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.\footnote{Summit County (n.316), pp.723–724.} However, in neither of the cases were the factors to be considered limited to four.\footnote{Ibid., p.724.} The \textit{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.\footnote{\textit{Ibarra} (n.327), p.156 (internal citations omitted).}

In \textit{Bowen/Edwards}, the state’s highest court addressed the issue of preemption with respect to the state’s oil and gas laws, the COGCA.\footnote{\textit{Bowen/Edwards} (n.315).} The court first reviewed the purposes of the COGCA:\footnote{\textit{Bowen/Edwards} (n.315).}

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.\footnote{\textit{Bowen/Edwards} (n.315).}

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

\begin{itemize}
  \item \textit{Voss} (n.316), p.1067.
  \item 62 P 3d 151, 155–156 (Colorado 2003).
  \item Summit County (n.316), pp.723–724.
  \item Ibid., p.724.
  \item \textit{Ibarra} (n.327), p.156 (internal citations omitted).
  \item \textit{Bowen/Edwards} (n.315).
  \item Ibid., p.1046.
  \item Colo Rev Stat s.34-60-102(1).
  \item Ibid., p.1049.
\end{itemize}
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 expressly 337 or impliedly 338 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 fracturing 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.\(^\text{346}\)

\(^{346}\) Griffith (n.9).