Fracking: With Parts of the United States, the United Kingdom, and the European Union Fracking Themselves, Should South Africa Follow?

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INTRODUCTION

The United States is potentially destroying its environment with fracking procedures.[1] However, fracking can also result in the high yield production of massive amounts of energy and economic success.[2] Countries around the world are weighing the benefits against the repercussions of fracking.[3] While multiple countries within the European Union (E.U.) have sided with the United States and currently employ fracking procedures, numerous other countries have refused to accept the risks associated with fracking.[4] South Africa is one country that has begun to show interest in the fracking industry.[5] Initially, the environmental concerns outweighed the benefits for South Africa, and the nation ultimately placed a ban on the industry in 2011.[6] However, one year later, South Africa decided to lift its ban on fracking.[7] The ban was lifted based on a Department of Mineral Resources recommendation that stressed the economic benefit that fracking could give to the nation.[8] Nonetheless, South African citizens, while happy about the increased energy production, were not pleased about the environmental dangers that come from fracking.[9]

Hydraulic fracking has been used since the 1940s.[10] However, since the early 2000s, the United States has been able, through fracking, to extract oil and gas resources which

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[1] Joe Schremmer, *Avoidable "Fraccident": An Argument Against Strict Liability for Hydraulic Fracturing*, 60 U. KAN. L. REV. 1215, 1216 (2012).
[2] Mark Weinstein, *Hydraulic Fracturing in the United States and the European Union: Rethinking Regulation to Ensure the Protection of Water Resources*, 30 WIS. INT'L L.J. 881, 891 (2013).
[3] *Id.* at 897.
[4] *Id.* at 898–902.
[5] John Schellhase, *Fracking it in South Africa: An Argument for Shale Gas Production in the Karoo*, AFRICAN ARGUMENTS (Nov. 15, 2012), http://africanarguments.org/2012/11/15/fracking-it-in-south-africa-an-argument-for-shale-gas-production-in-the-karoo-by-john-schellhase/.
[6] *Id.*
[7] Wendell Roelf, *South Africa Fracking to Proceed After Shales Gas Moratorium is Lifted*, HUFFINGTON POST (Sept. 7, 2012, 9:29 AM), http://www.huffingtonpost.com/2012/09/07/south-africa-shale-gas-fracking_n_1864260.html.
[8] Devon Maylie & Alexis Flynn, *South Africa Lifts Fracking Ban*, WALL ST. J. (Sept. 7, 2012, 9:22 AM), http://www.wsj.com/articles/SB10000872396390444273704577637250505686904.
[9] *Id.*
[10] W. McDonald Plosser, *Into the Fracking Fray: A Balanced Approach to Regulating Hydraulic Fracturing in Tennessee*, 44 U. MEM. L. REV. 667, 670 (2014).

were previously thought to be inaccessible.[11] Not only has fracking helped the United States economically, but it has also allowed the country to become more dependent on its own domestic resources.[12] This created an increase in jobs and injected money back into the American economy; but for every positive, there must be a negative.[13]

The negatives are obvious. Hydraulic fracturing creates a harmful effect on the land and environment through the extraction of oil.[14] The United States seems so reliant upon oil that the nation is willing to ruin its own land and water for it![15] Unfortunately, the United States has only very limited laws and regulations to help prevent a disaster caused by fracking.[16]

In addition to the United States and the E.U., this article will focus on South Africa. South Africa is a developing nation with a struggling economy and a lack of energy production.[17] South Africa is considered to have the fifth largest amount of oil in its ground of the world's nations and it is considered a goldmine for fracking.[18] However, the risk associated with fracking can ruin groundwater for any country.[19] South Africa has limited groundwater. The question South Africa faces is whether to risk

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[11] Claire Thompson, *Fracking Frenzy Slows as Oil and Gas Assets Plummet in Price*, GRIST (Aug. 20, 2013), http://grist.org/news/fracking-frenzy-slows-as-oil-and-gas-assets-plummet/.
[12] Mike Malfettone, *A Nation Fractured: Drilling into the Debate Over Fracking*, 2 ARIZ. J. ENVTL. L. & POL'Y 1039 (2012).
[13] Meg Handley, *An Energy Lifeline: Fracking a Game-Changer for U.S. Economy*, U.S. NEWS (Jan. 3, 2013, 12:58 PM), http://www.usnews.com/news/articles/2013/01/03/an-energy-lifeline-fracking-a-game-changer-for-us-economy.
[14] Jenna Iacurci, *The Pros and Cons of Fracking*, NATURE WORLD NEWS (Sept. 12, 2014, 6:25 PM), http://www.natureworldnews.com/articles/9011/20140912/the-pros-and-cons-of-fracking.htm.
[15] Elizabeth Ridlington & John Rumpler, *Fracking by the Numbers: Key Impacts of Dirty Drilling at the State and National Level*, ENVT AM. (Oct. 2013), http://www.environmentamerica.org/sites/environment/files/reports/EA_FrackingNumbers_scrn.pdf.
[16] Jamal Knight & Bethany Gullman, *The Power of State Interest: Preemption of Local Fracking Ordinances in Home-Rule Cities*, 28 TUL. ENVTL. L.J. 297, 300 (2015).
[17] *Developing Countries Face Tough Transition in 2015 with Higher Borrowing Costs and Lower Prices for Oil & Other Commodities*, THE WORLD BANK (June 10, 2015), http://www.worldbank.org/en/news/press-release/2015/06/10/developing-countries-face-tough-transition-in-2015-with-higher-borrowing-costs-and-lower-prices-for-oil-other-commodities.
[18] *A Fracking Boost for the South African Economy: Inspiring Gas Exploration Across the Globe*, DELOITTE, http://www2.deloitte.com/za/en/pages/finance/articles/a-fracking-boost-for-the-south-african-economy.html# (last visited April 30, 2017) [hereinafter *Boost*].
[19] *See* Peter Gleick, *The Growing Evidence of the Threat of Fracking to the Nation's Groundwater*, SCI. BLOGS (June 27, 2013), http://scienceblogs.com/significantfigures/index.php/2013/06/27/the-growing-evidence-of-the-threat-of-fracking-to-the-nations-groundwater/.

contaminating its groundwater, which so many people depend on, to obtain economic benefit and extra energy, or not to frack and continue to figure out new ways to create energy.[20] Some would jump at the chance to frack such an abundant land, while others believe the risk is too great. South Africa could also follow in the footsteps of some states in the United States and some E.U. member states by creating similar laws and regulations for fracking.

In the first section, I will explain what fracking is and how different individual nations and states practice fracking, as well as some of the risks and benefits associated with fracking. In the second section, I will explain fracking in the United States and its regulation, both federally and by individual states. In the third section I will discuss fracking and the E.U., and how only a few of the E.U. nations have permitted fracking, while others have banned it entirely. In the fourth section, I will explain the differences and similarities between the United States and the E.U. in regards to fracking and the laws and regulations. The fifth section will discuss South Africa and its view on fracking. The sixth section will explain how the nations can handle regulatory procedures in a way that balances the environmental impact with the economic surge. Lastly, the seventh section will state the opinion and conclusion of the article.

I. WHAT IS FRACKING?

Fracking is short for hydraulic fracturing. It is a process of drilling into the earth, where a blend of high-pressure water is combined with sand and chemicals, and is pointed and injected into the rock at an extremely high pressure.[21] This water, sand, and chemical mixture releases the gas located inside the rock, allowing the gas to then flow out of a well located at the earth's surface.[22]

[20] *See* Tracy Hancock, *Groundwater Management Important for South Africa*, ENG'G NEWS (Mar. 15, 2013), http://www.engineeringnews.co.za/article/groundwater-management-important-for-south-africa-2013-03-15.
[21] *What is Fracking and Why is it Controversial?*, BBC (Dec. 16, 2015), http://www.bbc.com/news/uk-14432401.
[22] *Id.*

U.S. regulations on fracking at the federal level remain virtually nonexistent.[23] Inaction by Congress has forced the states to try to regulate fracking individually, thus leading to non-uniformity between the states.[24] Some states such as Texas and Pennsylvania have allowed fracking, while others such as New York and Vermont have completely banned the industry.[25] With increasing reports of contaminated drinking water due to fracking, certain E.U. countries such as France and Bulgaria have followed the lead of Vermont and New York in issuing a moratorium.[26] Clearly, many states and countries have different views on fracking, thus industry regulation varies from state to state and nation to nation.[27]

II. FRACKING IN THE UNITED STATES

Fracking for oil in the United States is increasing at a rapid pace.[28] The International Energy Administration predicted that the United States would surpass Russia in becoming the world's number one producer of natural gas by 2015, and eventually overtake Saudi Arabia as the world's number one oil producer by 2017.[29] The prediction was correct, and in 2015, the United States became the top national producer of natural

[23] *See* Justin Miller, *Why it's So Hard to Regulate Fracking*, AMERICAN PROSPECT (June 24, 2015), http://prospect.org/article/why-its-so-hard-regulate-fracking.
[24] *See* Katherine Toan, *Not Under My Backyard: The Battle Between Colorado and Local Governments over Hydraulic Fracturing*, 26 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 1, 4 (2015) (discussing the states' predominant regulation of petroleum development).
[25] Jude Clemente, *Why New York's Fracking Ban for Natural Gas is Unsustainable*, FORBES (June 7, 2015, 6:30 PM), http://www.forbes.com/sites/judeclemente/2015/06/07/why-new-yorks-fracking-ban-for-natural-gas-is-unsustainable/.
[26] Joanna Glowacki & Christoph Henkel, *Hydraulic Fracturing in the European Union: Leveraging the U.S. Experience in Shale Gas Exploration and Production*, 24 IND. INT'L & COMP. L. REV. 133, 135 (2014) [hereinafter *Glowacki & Henkel*] (discussing European and American moratoria on fracking in the oil and gas industry).
[27] *See id.*
[28] Susan L. Sakmar, *The Global Shale Gas Initiative: Will the United States Be the Role Model for the Development of Shale Gas Around the World?*, 33 HOUS. J. INT'L L. 369, 381 (2011) [hereinafter *Sakmar*] (discussing rapid growth in the shale gas production industry).
[29] Monika Ehrman, *The Next Great Compromise: A Comprehensive Response to Opposition Against Shale Gas Development Using Hydraulic Fracturing in the United States*, 46 TEX. TECH L. REV. 423, 425 (2014) (discussing American dominance in shale gas exploration and production).

gas.[30] In the past decade, shale gas production has increased eightfold and now comprises 10% of the country's gas production.[31] Additionally, shale gas accounts for 20% of the remaining gas in the United States.[32]

Fracking not only helps the United States use domestic oil, but creates jobs and has large economic benefits.[33] In 2012, fracking accounted for $284 billion dollars of the United States' gross domestic product (GDP), and is expected to be upwards of 533 billion dollars by 2025.[34] In addition to economic benefit, the hydraulic fracking industry is expected to increase jobs from 2.1 million in 2012 to 3.9 million by 2025.[35] It is no wonder other nations around the world are trying to cash in on this economy-growing business. It is also helpful, however, that the United States is estimated to have one of the largest natural gas reserves in the entire world—reserves that may be utilized for years to come in a safe and efficient manner.[36]

While a clear economic benefit is present, however, the environmental cost of fracking is substantial.[37] The amount of water consumed per fracking well is roughly 500,000 gallons per use.[38] In most areas, roughly 60 to 90% of the water used for fracking is groundwater.[39] For places without another abundant source of water, the use of so much groundwater for fracking poses a significant problem.[40] Because of the risk of

[30] Rakteem Katakey, *U.S. Ousts Russia as Top World Oil, Gas Producer in BP Data*, Bloomberg (June 10, 2015, 6:10 AM), http://www.bloomberg.com/news/articles/2015-06-10/u-s-ousts-russia-as-world-s-top-oil-gas-producer-in-bp-report.
[31] Sakmar, *supra* note 28, at 381.
[32] *Id.*
[33] *Id*. at 399 (discussing the economic benefits and environmental issues associated with fracking).
[34] Pamela W. Carter & David Hynes, *What's the Big Fracking Deal?*, 56, No. 4 FOR THE DEFENSE 44, 45 (2014).
[35] *Id.*
[36] *Id.*
[37] Shalanda Helen Baker, *Is Fracking the Next Financial Crisis? A Development Lens for Understanding Systemic Risk and Governance*, 87 TEMP. L. REV. 229, 261 (2015).
[38] *Id.*
[39] Brian J. Smith, *Fracing the Environment?: An Examination of the Effects and Regulation of Hydraulic Fracturing.*, 18 TEX. WESLEYAN L. REV. 129, 132 (2011).
[40] Sue Blaine, *Fracking Chemicals Will Put Karoo Water at Risk, Says UK Climate Envoy*, BUSINESS DAY LIVE (Mar. 27, 2014, 6:56 AM), http://www.bdlive.co.za/business/energy/2014/03/27/fracking-chemicals-will-put-karoo-water-at-risk-says-uk-climate-envoy.

contamination from the excess water used during the process, fracking raises legitimate concerns for those people who depend upon the groundwater for their livelihood.[41]
In the United States, fracking regulations on public and private lands vary.[42] On public lands, federal regulations prevail, while the states have regulatory power on private and state-owned lands.[43] The majority of fracking takes place on private land, a circumstance which has given states primary authority to regulate fracking.[44] The problem with federal regulations is that, until recently, they were more than thirty years old, and did not reflect the oil industry's advancements, especially with the introduction of fracking.[45]

A. Federal Government

The Environmental Protection Agency (EPA) sets the regulations for hydraulic fracturing in the United States, but the regulations are extremely limited in scope.[46] States have the final say as to what goes on in the regulatory process.[47] Many analysts believe that fracking regulations would be most effective and uniform if they come from the EPA, rather than individualized and varied by the states.[48]

The Obama administration created the first major regulation on fracking.[49] The regulation is only for fracking on public lands, and requires fracking companies identify and list all of the chemicals used in the process.[50] The demands of residents who live in

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[41] Kirk D. Willis, *Frack You: A Cost-Benefit Analysis of the Fracking Controversy in Texas*, 38 T. MARSHALL. L. REV. 321, 323 (2013).
[42] Coral Davenport, *New Federal Rules are Set for Fracking*, NEW YORK TIMES (Mar. 20, 2015), https://www.nytimes.com/2015/03/21/us/politics/obama-administration-unveils-federal-fracking-regulations.html?_r=3 [hereinafter *Davenport*].
[43] *Id.*
[44] *Id.*
[45] *Id.*
[46] Dr. Saby Ghoshray, *Symposium: Powering the Future: A 21st Century Guide for Energy Practitioners*: 38 T. MARSHALL L. REV. 199, 209 (2013).
[47] Jody Freeman & David Spence, *Should the Federal Government Regulate Fracking?*, WALL ST. J. (Apr. 14, 2013, 4:16 PM), http://www.wsj.com/articles/SB10001424127887323495104578314302738867078.
[48] Clarissa Bierstedt, *What's the Fracking Problem?: Hydraulic Fracturing, Silica Sand, and Issues of Regulation*, 63 DRAKE L. REV. 639, 659 (2015) [hereinafter Bierstedt].
[49] Davenport, *supra* note 42; *see also* FracFocus.com, a website which is the database for the chemicals being injected into the ground during fracking procedures.
[50] Davenport, *supra* note 42.

areas where fracking was taking place encouraged regulatory action.[51] These residents raised concerns about their groundwater being contaminated by the chemicals that are inserted into the ground to extract the shale gas.[52] The new standards and regulations also require certain government officials to inspect and validate the concrete barriers which line the fracking walls, and thus help prevent the introduction of hazardous waste into the soil resulting in contaminated groundwater. The regulation would help to protect the public's health and the natural environment during and after the fracking process, while allowing for fracking at a sufficient pace to keep up with market demand.[53] This regulation helps to promote a sense of uniformity among the states.[54] These laws and regulations created by both the federal and state governments ensure that fracking is done in a safe and efficient manner.[55]

At the federal level, the EPA has placed some very specific regulations on underground injection through the Safe Drinking Water Act (SDWA), which prohibits the underground injection endangerment of drinking sources.[56] However, the EPA has no authority to punish those in the fracking industry because the Act provides that:

> [T]he term underground injection means the subsurface emplacement of fluids by well injection; and excludes the underground injection of natural gas for purposes of storage; and the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.[57]

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[51] Allan Ingelson & Tina Hunter, *A Regulatory Comparison of Hydraulic Fracturing Fluid Disclosure Regimes in the United States, Canada, and Australia*, 54 NAT. RESOURCES J. 217, 218 (2014) [hereinafter *Ingelson & Hunter*].
[52] *Id.*
[53] Press Release, U.S. Dep't of the Interior, Interior Department Releases Final Rule to Support Safe, Responsible Hydraulic Fracturing Activities on Public and Tribal Lands (Mar. 20, 2015), https://www.doi.gov/news/pressreleases/interior-department-releases-final-rule-to-support-safe-responsible-hydraulic-fracturing-activities-on-public-and-tribal-lands.
[54] *Id.*
[55] Sakmar, *supra* note 28, at 396–97.
[56] 42 U.S.C. § 300h(d)(1) (2012).
[57] *Id.*

Thus, according to the SDWA, fracking is exempt and excluded from the laws and regulations and cannot be penalized by the EPA.[58] However, while the SDWA specifically excludes fracking from the Underground Injection Control (UIC) regulations, it still applies the UIC regulations to the diesel fuel used during the fracking process.[59] According to the EPA, "[a]ny service company that performs hydraulic fracturing using diesel fuel must receive prior authorization through the applicable UIC program."[60] However, other chemicals being used during the fracking process are not being regulated, and some of these chemicals have higher levels of benzene than diesel fuel.[61] In turn, benzene-rich alternatives to diesel fuel, which are more damaging than diesel fuel, get a free pass. This makes little sense from an environmental standpoint.[62]

This exemption, which has created controversy throughout the United States, is nicknamed, "Halliburton Loophole".[63] The exemption received this name from the efforts of past Vice President and former Halliburton CEO, Dick Cheney, who is reported to have been involved in creating the law.[64] Halliburton lobbied for the exemption, while Cheney helped create the energy plan while working under President George W. Bush.[65] There have been efforts to amend the loophole and the current regulations and change how the EPA regulates fracking.[66] However, no such change has taken place.[67]

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[58] Bierstedt, *supra* note 48, at 658–59.
[59] 42 U.S.C. § 300h (1977).
[60] Francis Gradijan, *State Regulations, Litigation, and Hydraulic Fracturing*, 7 ENVTL & ENERGY L. & POL'Y J. 47, 55 (2012).
[61] Kate Sheppard, *Loophole Allows Many Dangerous Chemicals in Fracking Fluids to Go Undisclosed: Report*, HUFFINGTON POST, http://www.huffingtonpost.com/2014/10/22/fracking-chemicals-loophole_n_6030914.html (last updated Oct. 22, 2014) [hereinafter *Sheppard*].
[62] *Id.*
[63] *Id.*
[64] *Id.*
[65] Mike Soraghan, *Hydraulic Fracturing: Senate Votes to Keep 'Halliburton Loophole'; Regulation Stays with States*, EE NEWS (Jan. 29, 2015), http://www.eenews.net/stories/1060012514.
[66] Jessica Goad, *New Bills in Congress Would Crack Down on the Fracking Industry*, GRIST (Mar. 16, 2013), http://grist.org/climate-energy/congress-makes-moves-to-close-loopholes-for-fossil-fuels/.
[67] *Id.*

Clean Water Act regulations of hydraulic fracking now prohibit the discharge of the hydraulic fluid pollutants from point sources into the waters of the United States.[68] To discharge into the waters of the United States lawfully, a company is required to have a National Pollutant Discharge Elimination System permit, from either the EPA or an authorized state agency.[69]

Hydraulic fracking operations are unregulated under the Resource Conservation and Recovery Act and, as noted, are subject to only minimal requirements under the SDWA.[70] In April 2012, the EPA announced its intention to regulate fracking using the Clean Air Act.[71] These regulations were to be complete in January 2015, and were to require natural gas producers to install and use green completion equipment to recover the excess methane from fracking.[72] However, this never came to fruition, and the regulations are not complete as of July 2016.

Liz Purchia of the EPA stated, "[T]he EPA does not have authority over all hydraulic fracturing, but we use the authorities we have, consistent with the law and best available science, to protect communities."[73] Nonetheless, environmentalists do not believe the current regulations are sufficient to protect public and environmental health.[74]

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[68] Prof. William J. Brady & James P. Crannell, *Hydraulic Fracturing Regulation in the United States: The Laissez-Faire Approach of the Federal Government and Varying State Regulations*, 14 VT. J. ENVTL. L. 39, 48 (2012).
[69] Jeffrey M. Gaba, *Flowback: Federal Regulation of Wastewater from Hydraulic Fracturing*, 39 COLUM. J. ENVTL. L. 251, 283 (2014).
[70] Rebecca Jo Reser & David T. Ritter, *State and Federal Legislation and Regulation of Hydraulic Fracturing*, 57 THE ADVOC. 31, 31-32 (2011).
[71] Dan Vergano, *EPA Issues Air Pollution Rules for Fracking Wells*, USA TODAY (Apr. 18, 2012, 9:04 PM), http://usatoday30.usatoday.com/money/industries/energy/environment/story/2012-04-18/fracking-pollution-rules-epa/54396226/1 (last updated Apr. 20, 2012, 10:31 AM).
[72] Renee Cho, *The Fracking Facts*, ST. OF THE PLANET BLOG (June 6, 2014), http://blogs.ei.columbia.edu/2014/06/06/the-fracking-facts/.
[73] Sheppard, *supra* note 61.
[74] Michael E. Kraft, *New Fracking Rules Not Enough*, NORTH JERSEY (June 6, 2015), http://www.northjersey.com/news/new-fracking-rules-not-enough-1.1350417 (last updated June 6, 2015, 1:21 AM).

B. State Government

Each state has a unique approach to regulating the fracking industry that balances potentially large economic benefits with potential harm to the environment or even human health.[75] For example, Louisiana requested a switch from groundwater to surface water for fracking because they were afraid that groundwater withdrawals could affect the drinking water supplies for their state.[76] Wyoming, home to Yellowstone National Park and other national parks, initially had very little environmental protection and regulations with respect to fracking.[77] However, in response to public criticism, Wyoming became the first state to require the complete disclosure of hydraulic fracking fluid contents to the Wyoming Oil and Gas Conservation Commission in September 2010.[78] Nonetheless, this measure was ineffective, as the fracking fluid contents are recognized as trade secrets, and were not required to be released to the public.[79]

Like Wyoming, other states—Arkansas, Colorado, Louisiana, Mississippi, Montana, Oklahoma, Tennessee, and Texas—require that fracking companies disclose the chemical additives located in their hydraulic fracking fluid.[80] Meanwhile, in Indiana, Louisiana, Michigan, Mississippi, Montana, and New Mexico, information requiring disclosure is limited to hazardous chemicals, which are also regulated under the United States Occupational Safety and Health Administration.[81]

Inconsistencies among the states can cause confusion to those companies who work in multiple states and the public as well.[82] Only a few states have specific laws regarding

[75] Weinstein, *supra* note 2, at 891.
[76] Louisiana Reservoir Priority and Development Program, *Louisiana Statewide Perspective on Water Resources* (Apr. 2010), *reprinted in* LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT PUBLIC WORKS AND WATER RESOURCES DIVISION (Apr. 2010), http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Public_Works/Dam_Safety/RPDP_Reports/La_Statewide_Perspective_On_Water_Resources_April_2010.pdf.
[77] Ingelson & Hunter, *supra* note 51, at 230.
[78] *Id.*
[79] *Id.* at 231.
[80] *Id.* at 233.
[81] *Id.*
[82] Ingelson & Hunter, *supra* note 51, at 233.

groundwater withdrawal and disposal in relation to fracking.[83] However, other states have regulations for every aspect of the fracking process.[84]

Pennsylvania, for instance, is located on the Marcellus Shale—a specific shale area with an abundance of shale rock used for fracking—and it is one of the states with very strong fracking regulations.[85] In Pennsylvania, the fracking controls are part of the oil and gas regulations, while the fracking regulations and the management practices were created to reduce environmental harm.[86]

By contrast, Texas does not have such formal regulations for the fracking industry.[87] In Texas, the Railroad Commission of Texas regulates natural gas production and exploration.[88] The Commission does not require any special permitting for hydraulic fracking, nor does it require an environmental assessment for the drilling activities.[89] Rather, the local groundwater authority decides if permits are required.[90] Even with its limited regulation of fracking, however, Texas was one of the first states to require fracking operators to disclose chemicals used while fracking.[91]

New York also serves as a contrast to Pennsylvania. New York—which is also located on the Marcellus Shale—recently enacted a fracking ban.[92] New York believes that just because one *can* frack there, does not mean one *should* because the environmental and potential health risks are too great to leave it to chance.[93]

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[83] Weinstein, *supra* note 2, at 892.
[84] *Id.*
[85] *Id.* at 893.
[86] *Id.*
[87] *Id.*
[88] Lauren Jaynes, *The Effectiveness of Water Recycling Efforts by the Texas Railroad Commission*, 67 BAYLOR L. REV. 300, 316–17 (2015).
[89] *Id.* at 311–12.
[90] Kate Galbraith, *Ambiguities Reign in Regulations for Groundwater Fracking*, TEX. TRIB. (Mar. 13, 2013), http://www.texastribune.org/2013/03/13/fracking-groundwater-rules-reflect-legal-ambiguiti/.
[91] *Texas Adopts Rules on Fracking Chemical Disclosure*, SAN DIEGO TRIB. (Dec. 13, 2011, 11:41 AM), http://www.sandiegouniontribune.com/sdut-texas-adopts-rules-on-fracking-chemical-disclosure-2011dec13-story.html.
[92] James Gerken, *Gov. Andrew Cuomo to Ban Fracking in New York State*, HUFFINGTON POST, (Dec. 17, 2014, 1:26 PM), http://www.huffingtonpost.com/2014/12/17/cuomo-fracking-new-york-state_n_6341292.html (last updated Dec. 18, 2014).
[93] *Id.*

Since fracking has been such an energy efficient and economically beneficial industry, the U.S. Department of State has realized that many other countries would try to replicate the United States' laws and regulations.[94]

"Unconventional shale gas has 'dramatically changed the energy landscape in the United States, and there is no reason to think that the United States is the only place where this resource can be developed safely and responsibly.'"[95] Unconventional gas extraction demonstrates that even the slightest amount of shale gas can be extremely beneficial.[96] In Ohio, state geologists believe that if only 5% of the shale gas is extracted from the shale Ohio sits on top of, it could provide power to Ohio for twenty-one years.[97]

III. HYDRAULIC FRACKING IN THE EUROPEAN UNION

> It is clear that the future development of shale gas will depend on the extent of public acceptance of fracking. Addressing health and environmental risks will be of paramount importance for the industry to gain broad public acceptance and a 'public license to operate' in Europe. Our challenge is to make the right and balanced choices. Studies carried out indicate that there are a number of uncertainties or gaps in current EU legislation . . . .[98]

Once established, all E.U. member states must comply with the applicable E.U. rules and obtain permits in accordance with fracking rules.[99] However, while the E.U. has a comprehensive legislative framework for environmental protection and access to hydrocarbon resources, it lacks clear and uniform regulation regarding fracking.[100] In fact, the E.U. regulations do not even mention the term "fracking."[101] This produces a gap among E.U. member states' jurisdictions by creating uncertainty with regard to the

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[94] Sakmar, *supra* note 28, at 373.
[95] Gina Tincher, *The Unconventional Gas Technical Engagement Program: How to Ensure the United States Shares its Experience in a Socially and Environmentally Responsible Manner*, 36 ENERGY L.J. 113, 113 (2015) [hereinafter *Tincher*].
[96] Jason T. Gerken, *What the Frack Shale We Do? A Proposed Environmental Regulatory Scheme for Hydraulic Fracturing*, 41 CAP. U. L. REV. 81, 84 (2013).
[97] *Id.*
[98] Eur. Comm'n Press Release MEMO/12/885, Eur. Comm'n, Statement by Commissioner Potočnik Following the Vote in the European Parliament on Shale Gas (Nov. 21, 2012).
[99] Glowacki & Henkel, *supra* note 26, at 154.
[100] *Id.*
[101] *Id.*

regulatory laws a member nation must abide by within the E.U.[102] The rest has been unfairness between nations still working under the E.U. rules.[103]

Eagerness to turn to fracking within the E.U. is due, in part, to the overdependence on Russian oil.[104] Those within the E.U. have attempted to wean themselves away from Russian oil.[105] Since Moscow's annexation of Ukraine's Crimea region, the E.U. member states have been hoping to become more dependent on domestic energy.[106] Chevron's Vice President Ian MacDonald states, "This resource could certainly enhance energy security within Europe and also bring enormous economic benefits."[107] Beyond MacDonald, fracking supporters within European nations believe that shale gas is the way to enhance their own energy security by becoming more energy independent rather than relying on Russia.[108]

On January 22, 2014, the European Commission published minimum principles for shale gas exploration.[109] These principles are merely recommendations for the nations to follow and are not legally binding.[110] Nonetheless, the E.U. nations would do well to implement the recommendations, which are as follows:

> Plan ahead of developments and evaluate possible cumulative effects before granting licenses; carefully perform strategic environmental assessments and assess risks; ensure that the integrity of the well is up to best practice standards; capture methane emissions; check the quality of the local water, air, and soil before operations start in order to monitor any changes and deal with emerging risks; control air

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[102] *Id.*
[103] *Id.*
[104] Henry Chu, *Pressure builds against France's ban on fracking*, L.A. TIMES (June 22, 2014, 9:00 AM), http://www.latimes.com/world/europe/la-fg-france-fracking-20140622-story.html#page=1 [hereinafter *Chu*].
[105] *Id.*
[106] *Id.*
[107] Joao Peixe, *Chevron Resumes Fracking After Romania Protests*, OIL PRICE (Dec. 10, 2013, 11:01 PM), http://oilprice.com/Energy/Energy-General/Chevron-Resumes-Fracking-After-Romania-Protests.html [hereinafter *Peixe*].
[108] Tincher, *supra* note 96, at 114.
[109] Wheeler *et al*., *European Commission Publishes Minimum Principles for Shale Gas Exploration*, HOGAN LOVELLS (Feb. 3, 2014), http://www.hlregulation.com/2014/02/03/european-commission-publishes-minimum-principles-for-shale-gas-exploration/.
[110] *Id.*

> emissions, including greenhouse gas emissions, by capturing the gases; inform the public about chemicals used in individual wells; and ensure that operators apply best practices throughout the project.[111]

Since the recommendation is not now binding, individual nations may still choose to ban the fracking industry, or even introduce and use their own national measures.[112] This approach will re-establish non-uniformity throughout the E.U.[113]

Environmental Commissioner Janez Potocnik stated, "Shale gas is raising hopes in some parts of Europe, but is also a source of public concern . . . ."[114] There are reports showing that hydraulic fracking causes water contamination, air pollution, and seismic disruptions.[115] The environmental concerns and the worries of the dangers to the vital water supplies are what have slowed the adoption of fracking throughout most of Europe.[116] The United Kingdom (U.K.) placed a temporary ban on shale gas exploration in 2011-12 due to earth tremors in North West England, which were partially blamed on fracking.[117] Prior to the temporary ban, discussions of fracking in the U.K. were taking place due to the lack of domestic oil.[118] In the U.K., it's estimated that without fracking, by the year 2025, the country will import 70% of its oil.[119] The domestic oil boom in the United States as a result of fracking has thus raised some eyebrows within the U.K.[120]

A. France

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[111] *Id.*
[112] *Europe's Fracking Failure*, WALL ST. J. (July 1, 2015, 7:21 PM), http://www.wsj.com/articles/europes-fracking-failure-1435777685.
[113] *Id.*
[114] European Commission Press Release IP/14/55, Environment: European Commission Recommends Minimum Principles for Shale Gas (Jan. 22, 2014).
[115] Morgan R. Whitacre, *An Environmentally Hazardous Process: Why the United States Should Follow France's Lead and Ban Hydraulic Fracturing*, 23 IND. INT'L & COMP. L. REV. 335, 336 (2013) [hereinafter *Whitacre*].
[116] David Jolly, *France Upholds Ban on Hydraulic Fracturing*, N.Y. TIMES (Oct. 11, 2013), http://www.nytimes.com/2013/10/12/business/international/france-upholds-fracking-ban.html?_r=1.
[117] Katy Barnato, *AMEC CEO Flags Barriers to UK Fracking*, CNBC (Dec. 31, 2013, 4:58 AM), http://www.cnbc.com/2013/12/31/amec-ceo-flags-barriers-to-uk-fracking.html [hereinafter *Barnato*].
[118] *Id.*
[119] *Id.*
[120] *Id.*

France is a different story. France is estimated to be located directly on top of the biggest shale gas deposits in all of Western Europe.[121] There is enough shale gas to supply itself and even some neighboring countries with enough energy for decades.[122] Even so, in the summer of 2011, France became the first country in the E.U.—and world—to pass a total nationwide ban on fracking.[123] France has not just banned extraction, but also any means of exploration of shale gas, making it nearly impossible to properly estimate the amount of shale gas located within France's borders.[124] This ban has made France a leader in environmental protectionism.[125]

B. Bulgaria

Bulgaria has followed France by placing a ban on fracking, becoming the second E.U. nation to do so.[126] This ban stipulates a fine of 100 million levs, or roughly 66 million dollars, for anyone who violates the ban.[127] This was not the case at first, as Bulgaria had given Chevron a permit to check for shale gas in the northeast region of the country.[128] However, after a mass protest by citizens in the region, the permit was revoked.[129] In response to this revocation, the United States ambassador to Bulgaria, James Warlick, stated, "Chevron could provide millions in investments in Bulgaria and create jobs."[130] Warlick believes that Chevron has no other interests in Bulgaria other

[121] Chu, *supra* note 105.
[122] *Id.*
[123] Whitacre, *supra* note 116, at 336–37.
[124] Chu, *supra* note 105.
[125] Whitacre, *supra* note 116, at 336.
[126] *Bulgaria Bans Shale Gas Drilling with 'Fracking' Method*, BBC (Jan. 19, 2012), http://www.bbc.com/news/world-europe-16626580.
[127] *Id.*
[128] *Bulgaria Bans Chevron from Using 'Fracking'*, CNS NEWS (Jan. 12, 2012, 11:20 AM), http://cnsnews.com/news/article/bulgaria-bans-chevron-using-fracking.
[129] Mariah Blake, *How Hillary Clinton's State Department Sold Fracking to the World*, MOTHER JONES (Sept. & Oct. 2014), http://www.motherjones.com/environment/2014/09/hillary-clinton-fracking-shale-state-department-chevron.
[130] Elizabeth Konstantinova & Joe Carroll, *Bulgaria Bans Gas Fracking, Thwarting Chevron Drilling Plan*, BLOOMBERG BUS. (Jan. 18, 2012, 2:14 PM), http://www.bloomberg.com/news/articles/2012-01-18/bulgaria-votes-to-ban-gas-fracking-thwarting-chevron-1-.

than shale gas and thus they would leave if the opportunities are curbed.[131] Shortly thereafter, Bulgaria issued a total ban on fracking throughout the entire nation due to environmental concerns associated with the industry.[132] Initially, Bulgaria attempted to utilize shale gas to become less dependent on Russian oil, however, the environmental impact and risk, especially to the groundwater, seemed to be too great.[133]

C. Poland and Romania

Romania gave American energy giant Chevron a permit to check for shale gas, in a region located 2 blocks from the Bulgarian border.[134] Bulgaria feared for its land, as the fracking was to take place so close to its soil.[135] Due to environmental concerns, Romanian citizens were also displeased with the fracking permits.[136] Weighing these concerns against economic interests, Romania sided with the latter in deciding not to enact environmental regulations for fracking.[137]

In Poland, as in Romania, no regulations apply to fracking.[138] However, in Poland, fracking has changed from being very promising to quite difficult as the government administration has been slow to create and process regulations for the nation to follow.[139] In 2011 the U.S. Energy Information Administration stated that Poland had roughly 5.3

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[131] Mat McDermott, *Bulgaria Bans Fracking - Second Nation in World to Restrict Natural Gas Extraction Technique*, TREE HUGGER (Jan. 19, 2012), http://www.treehugger.com/fossil-fuels/bulgaria-bans-fracking.html.
[132] Mirel Bran, *Bulgaria Becomes Second State to Impose Ban on Shale-Gas Exploration*, GUARDIAN (Feb. 14, 2014, 9:09 AM), http://www.theguardian.com/world/2012/feb/14/bulgaria-bans-shale-gas-exploration.
[133] *Id.*
[134] *Bulgarians Rise Against Romania Shale Gas 'Fracking' Permit*, NOVINITE (May 11, 2013, 1:21 PM), http://www.novinite.com/articles/150254/Bulgarians+Rise+against+Romania+Shale+Gas+'Fracking'+Permit.
[135] *Romania Gives Green Light to Shale Gas Fracking Near Bulgarian Border*, NOVINITE (May 8, 2013,7:36PM), http://www.novinite.com/articles/150172/Romania+Gives+Green+Light+to+Shale+Gas+Fracking+near+Bulgarian+Border.
[136] Peixe, *supra* note 108.
[137] Georgeta Ionescu, *Romania: A Different View on Fracking*, NAT. GAS WOR. (Feb. 7, 2013, 12:05 AM), https://www.naturalgasworld.com/georgeta-ionescu-romania-fracking.
[138] J.C., *Shale Fail*, ECONOMIST (Nov. 14, 2014, 10:29 AM), http://www.economist.com/blogs/easternapproaches/2014/11/polish-fracking.
[139] *Id.*

trillion cubic meters of shale gas, easily the largest deposit in all of Europe.[140] This started a fracking frenzy throughout Poland.[141] Poland allowed the fracking of wells with depths of up to 5000 meters without assessment of potential environmental impacts.[142] This practice has fallen out of favor with the rest of the E.U., however, based on a lack of environmental research that supports this approach.[143]

Poland has drilled about 200 wells since fracking began there.[144] Additionally, it has sold 100 locations for future wells.[145] This fracking boom was started because of the strained relationship between Poland and Russia, and fracking gave hope to Poland that it, too, can become independent from Russia.[146] Also, the close diplomatic ties between the United States and Poland gave the new industry life within Poland.[147]

D. Germany

According to Germany's Environmental Minister, Barbara Hendricks, in early 2015, Germany proposed "the strictest conditions for fracking."[148] The German cabinet passed a nationwide fracking ban for specific areas to protect drinking water, health, and the environment.[149] The law would ban all fracking processes with depths below 3000 meters, and any fracking located in nature reserves or national parks.[150] Hendricks also

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[140] *Id.*
[141] *President Signs Hydrocarbon Act, but has Polish Shale Dream Soured?*, SHALE GAS INT'L (Aug. 5, 2014), http://www.shalegas.international/2014/08/05/president-signs-hydrocarbon-act-but-has-polish-shale-dream-soured/.
[142] *Id.*
[143] *Id.*
[144] *EC Begins Legal Proceedings Against Poland Over Shale Laws*, SHALE GAS INT'L (July 30, 2014), http://www.shalegas.international/2014/07/30/ec-begins-legal-proceedings-against-poland-over-shale-laws/.
[145] Glowacki & Henkel, *supra* note 26, at 153.
[146] Dimiter Kenarov, *Poland: After the Shale Gas Bubble*, PULITZER CENTER (Dec. 2, 2013), http://pulitzercenter.org/reporting/poland-pennsylvania-energy-shale-gas-fracking-farming-water-bubble.
[147] *Id.*
[148] Ari Phillips, *With First Nationwide Fracking Law, Germany Approaches a Ban*, THINKPROGRESS (Apr. 2, 2015, 8:30 AM), http://thinkprogress.org/climate/2015/04/02/3641790/german-fracking-law-close-to-ban/.
[149] Christina Sarich, *Germany Set to Ban Fracking in Unprecedented Legislation*, NATURAL SOCIETY (Apr. 5, 2015), http://naturalsociety.com/germans-win-first-nationwide-anti-fracking-law-ban-to-come/.
[150] *Id.*

stated: "This law will enable us to circumscribe fracking so that it no longer represents a danger to people or the environment. As long as the risks cannot be fully evaluated, fracking will be banned."[151] Similar to Romania and Poland, Germany relies heavily on the natural gas supplied by Russia, and currently uses only 12% of its own natural gas.[152] In Germany's forthcoming regulation, if there is an environmental incident, the burden of proving that they were not responsible will be on the shale gas firms, and not on the public.[153] This is a step in the right direction, even though oil companies believe these rules are "over the top", and environmental groups are unhappy because there is no complete ban on fracking, as they had hoped.[154]

As mentioned, this law passed through the German cabinet. However, it still needs to pass through Germany's parliament, the Bundestag, and a cabinet passed law is only rejected if one third or more of the 600 members of parliament vote against it.[155] Although, there are members of the Bundestag who are not content with the law, the consensus is that there is little chance of a rebellion.[156] Therefore, the law is expected to pass.[157]

IV. SIMILARITIES AND DIFFERENCES BETWEEN THE UNITED STATES, THE EUROPEAN UNION, AND THE UNITED KINGDOM

The E.U. and United States each have member states, and both have "federal laws" which the member states must abide by, but the individual states and member states may then choose whether to have additional regulations.[158]

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[151] *Id.*
[152] *Id.*
[153] Craig Morris, *German Fracking Law Takes Shape*, ENERGY TRANSITION (Apr. 14, 2015), http://energytransition.de/2015/04/german-fracking-law-takes-shape/ [hereinafter *Morris*].
[154] *Id.*
[155] *Id.*
[156] *Id.*
[157] *Id.*
[158] Glowacki & Henkel, *supra* note 26, at 147–54.

Within the E.U. and in the U.K., land ownership is different than that in the United States.[159] In the United States, land ownership includes mineral rights.[160] However, in the U.K., an owner of the land owns "maybe a slab of grass."[161]

Also in the U.K. and E.U., although there is much excitement with fracking within some member states, like Poland,[162] there is very little public support for fracking across Europe.[163] This fact has prevented Europe from experiencing a shale revolution such as that experienced in the United States.[164] Some member states may be on the fracking path. However, roughly two years of production in each of these member states will yield only as much oil as can be extracted in a week's worth of fracking in Eagle Ford, Texas.[165] Obviously, the fracking industry in the United States is far more advanced than in the E.U.[166] The E.U., like most other "organizations" with limited experience with shale gas development, looks to the United States to be a potential model for the regulatory framework for such a controversial industry.[167]

V. SOUTH AFRICA

"85% of South Africa's current electricity originates from coal and therefore shale gas, with a cheaper cost and a relatively smaller carbon footprint could well be a long-term solution to South Africa's crippling power situation."[168] According to Gideon Steyl, an associate professor at the University of Free State, the exploitation of 24 trillion cubic foot of shale rock would power roughly 20 GW of cycle gas turbines, which would generate about 130,000 GWh of electricity per year for twenty years.[169] This amount of

[159] Barnato, *supra* note 118.
[160] *Id.*
[161] *Id.*
[162] Steven Erlanger, *As Drilling Practice Takes Off in U.S., Europe Proves Hesitant*, N.Y. TIMES (Oct. 9, 2013), http://www.nytimes.com/2013/10/10/world/europe/as-drilling-practice-takes-off-in-us-europe-proves-hesitant.html?_r=0 [hereinafter *Erlanger*].
[163] Peixe, *supra* note 108.
[164] *Id.*
[165] Erlanger, *supra* note 164.
[166] *Id.*
[167] Glowacki & Henkel, *supra* note 26, at 181.
[168] *Boost*, *supra* note 18.
[169] *Id.*

energy is more than half of the current electricity production throughout South Africa, and with many fewer emissions.[170] Also, similar to the U.K., South Africans only own the surface rights to their land.[171]

Fracking could be the answer to the South African energy crisis. Additionally, it can contribute significantly to the GDP by adding an estimated 23 billion dollars and creating nearly 700,000 jobs.[172] Unfortunately, there are high risks associated with fracking, including the potential destruction of the ever so fragile Karoo.[173] Treasure Karoo Action Group CEO, Jonathon Deal, said, "[T]he government would not be prepared to predict or deal with the potential consequences."[174]

In a quick reaction to the environmental concern, South Africa implemented a moratorium on issuing shale gas fracking exploration in 2011.[175] Soon after, a government-funded study showed that shale gas fracking was safe.[176] Thus, in September 2012, South Africa lifted its moratorium and permitted shale gas exploration.[177] In October 2014, the Petroleum Agency South Africa (PASA) announced that it would begin processing previously existing applications for permits for shale gas exploration within the Karoo basin.[178] PASA also mentioned that it would not be processing new applicants, instead processing only those with existing applications.[179]

Dineo Pooe, spokeswomen for Shell, stated this in regards to South Africa fracking: "[I]t is well known that the exploration of oil and gas requires significant investment and as such the hydrocarbon extraction industry needs a stable as well as attractive legal,

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[170] *Id.*
[171] *Shale Development in South Africa*, VINSON & ELKINS, http://www.velaw.com/Shale---Fracking-Tracker/Global-Fracking-Resources/South-Africa/ (last visited April 30, 2017).
[172] *Boost*, *supra* note 18.
[173] *Id.*
[174] *Published Fracking Regulations Inadequate*, TREASURE THE KAROO (June 8, 2015), http://www.treasurethekaroo.co.za/news/press-statements.
[175] *South Africa*, U.S. ENERGY INFORMATION ADMINISTRATION, http://www.eia.gov/beta/international/analysis_includes/countries_long/South_Africa/south_africa.pdf (last updated Apr. 29, 2015).
[176] *Id.*
[177] *Id.*
[178] *Id.*
[179] *Id.*

fiscal and regulatory environment to encourage investment."[180] In February 2015, South Africa's Finance Manager Nhlanhla Nene announced that there was a 15.4 million dollar investment for research and regulatory requirements specifically for licensing and the exploration of shale gas hydraulic fracturing.[181] Local environmentalists, however, strongly oppose the development of the shale resources potentially located in the Karoo.[182] The main concern is the potential contamination of the Karoo's already scarce water supply.[183] In response to these concerns, the director general in the department of mineral resources, Thibedi Ramontja stated, "[W]e have taken into consideration the issues of water and regulations are going to address this sufficiently, providing proper guidance on how to undertake hydraulic fracturing."[184]

Shortly after, in May 2015, South Africa announced the final regulations for fracking were close to being complete and would be released sometime in June 2015.[185] Finally, on June 3, 2015, the South African government released its hydraulic fracking exploration regulations.[186] These regulations were created by the standards of the American Petroleum Institute.[187] They favored the industry at the cost of the environment.[188]

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[180] Ayanda Mdluli, *State's 'Grab' Powers Worry Private Sector*, CITIZEN (Mar. 17, 2014, 7:00 AM), http://citizen.co.za/uncategorized/144937/states-grab-powers-worry-private-sector/.
[181] *South Africa: Shale Regulations Finalized, Licencing Imminent*, SHALE GAS INT'L (May 11, 2015), http://www.shalegas.international/2015/05/11/south-africa-shale-regulations-finalised-licencing-imminent/ [hereinafter *Finalized*].
[182] *Id.*
[183] *Id.*
[184] *South Africa Prepares to Give Shale Gas Go Ahead*, REUTERS (May 7, 2015, 10:45 AM), http://www.reuters.com/article/2015/05/07/safrica-shale-idUSL5N0XY3BX20150507.
[185] *Finalized*, *supra* note 183, at 1.
[186] *Hydraulic Fracking Regulations Published*, NORTON ROSE FULBRIGHT (June 3, 2015), http://www.nortonrosefulbright.com/knowledge/publications/129431/hydraulic-fracking-regulations-published.
[187] Melanie Gosling, *Fracking Given the Green Light*, IOL, June 11, 2015, 7:36 AM, http://www.iol.co.za/scitech/science/environment/fracking-given-the-green-light-1.1870080#.Va75JcZViko [hereinafter *Gosling*].
[188] *Id.*

The new Mineral and Petroleum Resources Development Regulations apply to onshore exploration only, and include environmental impact assessments.[189] Under section 122 of the Mineral and Petroleum Resources Development Regulation, "A holder must, prior to and during all the phases of drilling and hydraulic fracturing operations, ensure that the operation does not pollute a water resource or reduce such a resource and where such an incident occurs, a holder must implement the necessary remedial measures."[190] This regulation completely overlooks the environmental hazards and allows the government to process applications to permit massive American companies to explore for shale gas throughout South Africa, including the pristine Karoo.[191]

CONCLUSION

Unfortunately, it isn't until catastrophe strikes that environmental regulations are enacted. A need for regulation is not perceived until there is a major problem that must be fixed. The BP oil spill in 2010 is a perfect example of this phenomenon.

It seemed at first that South Africa followed the path of France, Germany, New York, and Vermont in believing that fracking was more trouble environmentally than it was worth economically, and decided momentarily to ban it. However, when the dollar signs started appearing, South Africa quickly changed its mind and started thinking how economically beneficial it is and looked to Texas and Pennsylvania for inspiration. To South Africa, money and energy are too valuable and are worth much more than the environment. As the saying goes, "When the last tree is cut down, the last fish eaten, and the last stream poisoned, you will realize that you cannot eat money."[192] South Africa had a chance to take a stand for their pristine environment, and it failed to do so by creating regulations allowing the companies to frack. It is too early to say that the regulations will

[189] Mineral and Petroleum Resources Development Act 28 of 2002 (S.Afr.), http://www.eisourcebook.org/cms/South%20Africa%20Mineral%20&%20Petroleum%20Resources%20Development%20Act%202002.pdf.
[190] *Id.*
[191] Gosling, *supra* note 189 at 10.
[192] Janet Townsend, *The Last Tree*, N.Y. TIMES, Aug. 17, 1995, http://www.nytimes.com/1995/08/17/opinion/l-the-last-tree-420195.html.

be a failure or a success, since South Africa is one of the few nations with regulations specifically for hydraulic fracturing. However, from the reactions of disgruntled people, and the shortage of ground water in South Africa, disaster seems likely.

Germany, on the other hand, has had, and continues to have, the right mindset. Prior to the complete ban of fracking, Germany had placed the burden of proof on the fracking companies for the potential contamination. This makes financial and resource-rich companies prove that they are not the ones causing the contamination.[193] That burden is not placed on the typical citizen, who is not only nowhere near as wealthy as these oil companies, but may also be injured and sick from the contamination caused by the oil company.[194] This is the opposite of what it is like in the United States, where the burden is placed on the public to prove that the fracking companies are the ones who contaminated the surrounding environment.[195]

If only the United States had an umbrella policy which balanced environmental and economic factors equally. If so, many countries, including South Africa, would be able to use it as a template and modify it according to their geography. Unfortunately, the United States is also limited with its fracking regulations, and thus is not a significant asset to other countries looking for fracking regulations.

In sum, there are very limited regulations concerning hydraulic fracturing, and this needs to be changed. Without regulation, there is nothing telling companies what they can and cannot do, and for such a fast growing, environmentally unfriendly industry, regulations need to be created, and quickly, or it may be too late. There is no reason why fracking should not be allowed, especially from an economic standpoint. However, fracking must be done in an environmentally friendly way. When both economic and environmental factors can be balanced and regulated, great things can be achieved.

[193] Morris, *supra* note 155, at 4-9.
[194] *Id.*
[195] *Id.*