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2013]

## WHO "SHALES" REGULATE THE FRACKING INDUSTRY?

### I. INTRODUCTION

"The question of the relation of the States to the federal government is the cardinal question of our constitutional system. At every turn of our national development, we have been brought face to face with it, and no definition either of statesman or of judges has ever quieted or decided it."<sup>1</sup>

Marcellus Shale natural gas has the potential to revolutionize the United States' energy market, but in order to maximize this potential, natural gas extraction must be effectively regulated.<sup>2</sup> This energy sector requires a streamlined regulatory system, especially in the areas of water usage, water quality, and fracking fluid disposal.<sup>3</sup> Unfortunately, effective regulation has been slow coming, and how the natural gas industry will be regulated remains uncertain.<sup>4</sup>

The Marcellus Shale is a subterranean Devonian black shale rock formation that begins in New York and extends southward through Pennsylvania, West Virginia, and Ohio.<sup>5</sup> This formation is

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1. Benjamin K. Sovacool, *The Best of Both Worlds: Environmental Federalism and the Need for Federal Action on Renewable Energy and Climate Change*, 27 STAN. ENVTL. L.J. 397, 416-17 (2008) (quoting WOODROW WILSON, CONSTITUTIONAL GOVERNMENT IN THE UNITED STATES, 173 (Columbia Univ. Press 1961) (1908)).

2. See generally *Natural Gas Drilling: Pennsylvania's Perspective, The States' Regulation of the Natural Gas Industry: Hearing Before the Subcomm. on Water Res. and Env't, Comm. on Transp. and Infrastructure*, 112th Cong. 19 (2011) (testimony of Michael L. Krancer, Sec'y, Pa. Dep't of Env'tl. Res.), available at <http://republicans.transportation.house.gov/Media/file/TestimonyWater/2011-11-16-Krancer.pdf> [hereinafter *Natural Gas Drilling*] (contextualizing current Marcellus Shale issues).

3. See Laura C. Reeder, *Creating a Legal Framework for Regulation of Natural Gas Extraction from the Marcellus Shale Formation*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 999, 1015 (2010) (expounding on current state and federal regulations problems).

4. See Jim Efstathiou Jr. & Mark Drajem, *Wyoming's Tainted Water Pressures EPA on to Act on Gas Fracking*, BLOOMBERG (Dec. 12, 2011), <http://www.bloomberg.com/news/2011-12-12/wyoming-s-tainted-water-pressures-epa-on-to-act-on-gas-fracking.html> (discussing slow movement toward efficient gas industry regulation).

5. Michael Dillon, *Water Scarcity and Hydraulic Fracturing in Pennsylvania: Examining Pennsylvania Water Law and Water Shortage Issues Presented by Natural Gas Operations in the Marcellus Shale*, 84 TEMP. L. REV. 201, 203-04 (2011) (depicting Marcellus Shale's composition and location). "Devonian" is a geologic period that dawned roughly 400 million years ago; it was marked by a period of rapid change on Earth and can be distinguished by the red-colored sediments in bedrock. See generally *Devonian Period*, NAT'L GEOGRAPHIC, <http://science.nationalgeographic.com/science/prehistoric-world/devonian/> (last visited Oct. 22, 2012).

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the second largest gas shale deposit in the United States and is among the largest in the world.<sup>6</sup> Geologists estimate that there could be between 168 and 500 trillion cubic feet of natural gas locked in this rock formation.<sup>7</sup>

Like with most natural resource discoveries, drillers and prospectors have flocked to Marcellus Shale states to capture the wealth trapped within the shale.<sup>8</sup> The Commonwealth of Pennsylvania is one of those states; a large portion of Marcellus Shale lies underneath Pennsylvania's surface, pushing the state to the forefront of this modern-day gold rush.<sup>9</sup> Pennsylvania has had previous experience with oil and natural gas extraction.<sup>10</sup> The Commonwealth saw a similar explosion of drilling activity in 1869, when Edwin Drake struck oil in Titusville, a small town located in northwestern Pennsylvania.<sup>11</sup> The Titusville discovery thrust Pennsylvania into the center of the United States' first energy boom, complete with the wealth, development, pollution, and eventual destitution that generally accompany such an event.<sup>12</sup> Pennsylvania's role in the United States' energy industry, however, was short lived; most of the oil drilling industry eventually migrated to more fertile grounds in the Southwest, leaving Pennsylvania's oil and gas industry in shambles.<sup>13</sup>

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6. Joseph F. Speelman, Margaret A. Hill, Ralph H. Johnson, Lynn K. McKay & Raymond G. Mullady Jr., *Environmental and Legal Issues Surrounding Development of the Marcellus Shale*, 2011 ASPATORE SPECIAL REP. 5 (2011) (explaining Marcellus Shale formation's importance to America).

7. Eileen Millett, *Gas Exploration in Marcellus Shale: Water Quality and Water Usage Issues*, TOXIC TORT LITIG. BLOG (Apr. 9, 2010), <http://www.toxictortlitigationblog.com/2010/04/articles/industries/natural-gas/marcellus-shale-development/gas-exploration-in-marcellus-shale-water-quality-and-water-usage-issues/> (describing importance of Marcellus Shale natural gas discovery). For perspective regarding the importance of natural gas, consider New York State uses about one trillion cubic feet of natural gas each year. *Id.*

8. See generally Lynn K. McKay & Laurie Alberts Salita, *Marcellus Shale Groundwater Claims: A Case for Scientifically-Informed Decisions*, WORLD OIL (Dec. 2010), <http://www.worldoil.com/Marcellus-groundwater-claims-A-case-for-scientifically-informed-decisions.html> (expressing Marcellus Shale's economic impact).

9. John M. Smith, *The Prodigal Son Returns: Oil and Gas Drillers Return to Pennsylvania with a Vengeance are Municipalities Prepared?*, 49 DUQ. L. REV. 1, 3-4 (2011) (clarifying Pennsylvania's role in Marcellus Shale gas extraction). A large portion of the formation lies beneath Pennsylvania; in fact, it is under forty-nine of Pennsylvania's sixty-seven counties. *Id.* at 4.

10. *Id.* at 3 (explaining Pennsylvania's first oil and gas drilling experience).

11. *Id.* (explicating Pennsylvania's gas drilling history). After the discovery of oil in Titusville, for a period during the early part of the twentieth century Pennsylvania produced roughly one-half of the world's oil. *Id.*

12. *Id.* (discussing Pennsylvania's history with oil and natural gas drilling).

13. *Id.* at 3-4 (describing downfall of Pennsylvania's first oil and gas-based economy); see also *The Story of Oil in Pennsylvania*, NEW SPIRIT, INC., <http://nsioil.com>.



The tapping of Marcellus Shale gas has resurrected Pennsylvania's gas industry, potentially spurring a second energy boom.<sup>14</sup> As a result, Pennsylvania is now confronting a range of environmental, economic, and political concerns.<sup>15</sup> The Commonwealth must effectively regulate the natural gas industry to successfully avoid the pollution and economic destruction that accompanied Pennsylvania's first energy boom.<sup>16</sup>

It is possible that, with the estimated amount of natural gas contained within the Marcellus Shale, "Pennsylvania once again has the potential to be the energy capital of the United States."<sup>17</sup> For this potential to come to fruition, it is imperative to extract this valuable resource in an efficient and environmentally sound manner.<sup>18</sup> Realistically, effective resource management may prove to be more difficult than originally thought.<sup>19</sup> In Pennsylvania, officials are aware of the regulatory difficulties, but also recognize proper regulation is paramount to maximizing the state's resource potential.<sup>20</sup> At a conference for environmental professionals, Pennsylvania Department of Environmental Protection (DEP) Secretary,

[com/history/oil-in-pennsylvania/](#) (last visited Nov. 18, 2012) (discussing Pennsylvania's history with oil). During the first boom, drilling was done in a haphazard manner; wells were drilled at random and oil derricks were drilled dangerously close to one another. *Id.* Additionally, fires were frequent in drilling towns, often burning out of control. *Id.* These once sleepy towns teemed with unregulated noise and pollution. *Id.* "One of the earliest concerns was land pollution from the salt water produced as a by-product in the oil and gas wells." Robert E. Beck, *Current Water Issues in Oil and Gas Development and Production: Will Water Control What Energy We Have?*, 49 WASHBURN. L.J. 423, 431 (2010) (footnote omitted) (explicating concerns associated with gas drilling).

14. Smith, *supra* note 9, at 1 (discussing economic impact of Marcellus Shale gas extraction in Pennsylvania).

15. *Id.* (emphasizing negatives associated with new drilling prospects in Pennsylvania).

16. *See id.* (articulating issues Pennsylvania must confront in upcoming years due to gas drilling).

17. *Id.* at 3, 5 (illuminating potential for economic expansion in Pennsylvania). "By the end of 2010, . . . estimates suggest that there were more than 1,055 Marcellus wells in Pennsylvania producing almost 2 billion cubic feet of natural gas per day, which exceeds consumption of natural gas in Pennsylvania." Timothy J. Considine, Robert Watson, & Seth Blumsack, *The Pennsylvania Marcellus Natural Gas Industry: Status, Economic Impacts, and Future Potential*, 31, (July 20, 2011), <http://marcelluscoalition.org/wp-content/uploads/2011/07/Final-2011-PA-Marcellus-Economic-Impacts.pdf> [hereinafter Considine, et al., *Status*] (providing data on gas production in Pennsylvania).

18. Millett, *supra* note 7 (highlighting need for proper gas extraction).

19. *See id.* (noting issues arising from natural gas recovery in Marcellus Shale states).

20. *See* Zack Needles, *EPA, DEP Could Be Headed for Marcellus Shale Turf War*, THE LEGAL INTELLIGENCER (May 16, 2011), <http://www.law.com/jsp/pa/PubArticlePA.jsp?id=1202494055683&slreturn=20120922203941> (highlighting regulatory differences between EPA and DEP).

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Michael Krancer, highlighted this need to effectuate adequate regulation in the Commonwealth and stressed, "We only have one chance to get this right."<sup>21</sup>

Recently, the Environmental Protection Agency (EPA) took an interest in Pennsylvania's gas industry, which has resulted in conflict between the federal and state environmental agencies.<sup>22</sup> Federal and state agencies disagree over how to "get it right," including which agency should spearhead the regulation efforts and what type of regulation and oversight should exist for the fracking industry.<sup>23</sup> While this disagreement has not halted gas extraction in Pennsylvania as it has in other Marcellus Shale states, the federal government has expressed skepticism about the Commonwealth's ability to properly regulate the industry and has begun to preempt the state's natural gas regulations.<sup>24</sup> Pennsylvania's stance regarding such federal preemption is definite - the states, not the federal government, should be permitted to oversee and regulate the gas industry within their borders.<sup>25</sup>

The dispute over water and fracking fluid regulations best illustrates this disagreement.<sup>26</sup> The federal government wants to regulate this area, but state governments have fought back, arguing they should be allowed to control the water and fracking fluids within their borders.<sup>27</sup> To complicate the fight over water regulations, federal laws currently exempt the oil and gas industry from traditional water quality and withdrawal oversights enforced under the Clean

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21. Michael Krancer, Secretary, Dep't of Env'tl. Prot., *Drilling Reception and Status Update with DEP* (Jan. 10, 2012) (noting Michael Krancer's stance on Marcellus Shale regulations).

22. Needles, *supra* note 20 (discussing EPA involvement in Pennsylvania's gas and oil industry).

23. For further discussion of the potential regulatory war between the EPA and Pennsylvania's DEP, see *infra* notes 26-43 and accompanying text.

24. *Natural Gas Drilling*, *supra* note 2, at 1-3, 5 (discussing federal government's opinion of Pennsylvania's gas regulations).

25. *Id.* at 5 (noting Pennsylvania's response to federal skepticism toward its gas regulation).

26. See generally Ashley Portero, *Natural Gas Drilling - In Marcellus Shale, Fracking Regulations May Center on Wastewater Disposal*, INT'L BUS. TIMES (Dec. 17, 2011), <http://www.ibtimes.com/articles/268912/20111217/natural-gas-drilling-marcellus-shale-fracking-regulations.htm> (exemplifying regulatory war between Pennsylvania and federal government).

27. Edward McAllister, *Pennsylvania wants in on EPA Dimock fracking probe*, FOREX NEWS (Jan. 9, 2012), <http://www.fxmemo.com/forum/thread/3608149/> (describing Pennsylvania's position on governmental regulation of water quality and fracking fluid disposal). The former Secretary of Pennsylvania's DEP has said, "[F]ederal regulators are 'clearly trying to make their presence known.'" Needles, *supra* note 20.



Water Act and Safe Drinking Water Act.<sup>28</sup> These federal exemptions have increased friction between the federal government and states over the proper balance of governmental control of the gas drilling industry.<sup>29</sup>

This battle over water resources regulation is exemplified by the dispute between the EPA and DEP over alleged groundwater contamination due to fracking in the small town of Dimock, located in the northern Pennsylvanian county of Braddock.<sup>30</sup> On January 5, 2012, in a harshly worded letter to the EPA, the DEP demanded to be a participant in the federal investigation of the possible water contamination in Dimock.<sup>31</sup> In the letter, DEP Secretary Krancer wrote, "EPA's understanding of the technical facts and the DEP's enforcement history with respect to Dimock is rudimentary," implicitly instructing the EPA to leave regulation of this matter to Pennsylvania.<sup>32</sup>

The EPA's intervention in Wyoming's gas industry has caused further friction between the EPA and the DEP.<sup>33</sup> In December 2011, the EPA released a 121 page report from a three-year study of the water quality in Pavillion, Wyoming, which indicated a possible link between groundwater pollution and hydraulic fracturing.<sup>34</sup> This was the first report from the EPA suggesting that hydraulic fracturing could cause groundwater contamination.<sup>35</sup> The study,

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28. Emily C. Powers, *Fracking and Federalism: Support an Adaptive Approach that Avoids the Tragedy of the Regulatory Commons*, 19 J.L. & POL'Y 913, 938-39 (2011) (outlining current exemptions gas industry has from federal laws); Federal Water Pollution Control Act, 33 U.S.C. § 1251(a) (1987) (providing guidelines for management of U.S. water resources); Safe Drinking Water Act, 42 U.S.C.A. § 300f (West 1996) (regulating gas industry's use of water resources for extraction processes). For further discussion on the gas industry's exemptions from federal laws, see *infra* notes 102-118 and accompanying text.

29. For further discussion on clash between EPA and DEP, see *supra* notes 26-28 and *infra* notes 30-43 and accompanying text. This regulatory confrontation is not confined to Pennsylvania. New York has placed a moratorium on natural gas drilling until an appropriate regulatory framework is determined. See Powers, *supra* note 28, at 913 (describing gas industry problems in New York).

30. See Portero, *supra* note 26 (examining potential wastewater disposal impacts on environment and human health).

31. McAllister, *supra* note 27 (describing Pennsylvania's letter to EPA demanding involvement in possible groundwater contamination investigations).

32. *Id.* (quoting Secretary Krancer's letter to EPA).

33. Christopher Helman, *Questions Emerge on EPA's Wyoming Fracking Study*, FORBES (Dec. 9, 2011), <http://www.forbes.com/sites/christopherhelman/2011/12/09/questions-emerge-on-epas-wyoming-fracking-study/> (noting EPA's current water contamination issues in Wyoming).

34. *Id.* (discussing EPA's report on Wyoming fracking issues); see also Efstathiou & Drajem, *supra* note 4 (detailing EPA's Wyoming fracking report).

35. Efstathiou & Drajem, *supra* note 4 (examining EPA's history with fracking studies).

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however, had several deficiencies.<sup>36</sup> For one, the study might not be applicable to other parts of the country due to the unique geological formations in Wyoming.<sup>37</sup> Additionally, the EPA's study was unable to conclusively determine whether groundwater contamination was the result of nearby fracking.<sup>38</sup> Furthermore, some argue that the study's lack of certainty is proof the EPA had ulterior motives for conducting the study.<sup>39</sup> Specifically, commentators have suggested that the study was part of an effort by the EPA to commandeer natural gas regulation away from the states.<sup>40</sup>

Secretary Krancer found faults with the water quality reviews in Pavillion, Wyoming and has accused the EPA of rushing to conclusions.<sup>41</sup> Challenging the EPA's control, Secretary Krancer defended Pennsylvania citizens, indicating that negative impacts of water contamination experienced by Wyoming residents due to improper oversight should not be repeated in Pennsylvania.<sup>42</sup> The regulatory war brewing between the EPA and DEP will make the establishment of regulations and the ability to "get it right" increasingly difficult in Pennsylvania.<sup>43</sup>

In the areas of water usage and water quality regulation, the lack of current federal protection, the previous failed federal regulation attempts in similar situations, and the state agency's regulatory history with the municipalities all indicate the EPA should allow the DEP to determine the proper oversight of the natural gas

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36. See Helman, *supra* note 33 (analyzing EPA's findings from Wyoming fracking study).

37. *The EPA's Fracking Scare: Breaking down the facts in that Wyoming drinking water study*, WALL ST. J., Dec. 20, 2011, at 18, available at <http://online.wsj.com/article/SB10001424052970204026804577098112387490158.html#printMode> [hereinafter *The EPA's Fracking Scare*] (highlighting unique geologic formations in Wyoming that could preclude applying EPA's study to other locales). One of the gas drilling companies in Pavillion, Wyoming responded, saying that the report was not conclusive because it did not assert exact figures, but rather relied primarily on probabilities. Efstathiou & Drajem, *supra* note 4.

38. *The EPA's Fracking Scare*, *supra* note 37 (assessing EPA study's potential applicability to other regions).

39. *Id.* (arguing EPA's study lacks credibility). In 2011, The Wall Street Journal characterized the EPA as "dominated by anticarbon true believers" and asserted that "the Obama Administration has waged a campaign to raise the price and limit the production of fossil fuels." *Id.*

40. *Id.* (opining motives underlying EPA's study are suspect).

41. Scott Detrow, *Krancer Strikes A Chilly Tone In EPA Dimock Letter*, STATEIMPACT (Jan. 9, 2012), <http://stateimpact.npr.org/pennsylvania/2012/01/09/krancer-strikes-a-chilly-tone-in-epa-dimock-letter/> (quoting Secretary Krancer's letter to EPA).

42. See *id.* (summarizing Secretary Krancer's letter to EPA).

43. See Smith, *supra* note 9, at 1 (predicting regulatory war between EPA and DEP over groundwater regulations).



industry and to enforce its own regulations.<sup>44</sup> Pennsylvania has the ability to "protect its citizens and the natural resources of the Commonwealth from the risks associated with Marcellus shale exploration and development."<sup>45</sup> State regulation of water resources associated with fracking is more suitable because states are better equipped to serve their citizens' needs.<sup>46</sup>

This Comment highlights the water usage, water quality, and fracking fluid regulatory issues emerging between the federal government and the Marcellus Shale states.<sup>47</sup> Part II explains the history, benefits, and consequences of Marcellus Shale natural gas extraction.<sup>48</sup> Part III addresses the current federal and state regulatory frameworks.<sup>49</sup> Part IV highlights issues caused by the current governing format.<sup>50</sup> Part V poses two possible theories to restructure the Marcellus Shale regulatory powers and posits a possible solution for the problem.<sup>51</sup> Finally, Part VI concludes with a discussion of the future of the Marcellus Shale gas industry in Pennsylvania and surrounding states.<sup>52</sup>

## II. MARCELLUS SHALE BACKGROUND

The geological community identified the Marcellus Shale formation as a potential natural gas source over eighty years ago.<sup>53</sup>

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44. For further discussion of federal regulations, see *infra* notes 98-118 and accompanying text. For further discussion of problems the federal government faces regarding fracking in other states, see *supra* notes 34-42 and accompanying text.

45. Joel Bolstein, *Secretary Krancer Lays Down The Law Before Congress*, PA. BROWNFIELDS & ENV'T'L L. (Nov. 21, 2011), <http://pabrownfieldsenvironmental.law.foxrothschild.com/2011/11/articles/secretary-krancer-lays-down-the-law-before-congress/> (quoting Secretary Krancer's testimony before Subcommittee on Water Resources and Environment regarding Pennsylvania's fracking regulatory programs).

46. For a discussion of the matching principle and tailoring jurisdiction to the size of the issue, see *infra* notes 193-208 and accompanying text.

47. For a discussion of water and fracking fluid regulatory issues, see *infra* notes 53-272 and accompanying text.

48. For a discussion of the history, benefits, and consequences of Marcellus Shale drilling, see *infra* notes 53-92 and accompanying text.

49. For a discussion of current federal and state statutory and regulatory framework, see *infra* notes 93-133 and accompanying text.

50. For a discussion of the current regulatory framework's impact, see *infra* notes 134-172 and accompanying text.

51. For a discussion of possible legal theories on restructuring the current federalism framework, see *infra* notes 173-244 and accompanying text.

52. For a discussion of the future of Marcellus Shale drilling industry in Pennsylvania and surrounding states, see *infra* notes 245-272 and accompanying text.

53. Dillon, *supra* note 5, at 203 (recounting natural gas history in America's northeastern region).



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Experts postulated, however, that due to the vast depths of the gas in the shale formation, there was no profitable method to extract the gas.<sup>54</sup> Before 2000, several test wells were drilled with unimpressive results, supporting the conclusion that natural gas within the Marcellus Shale was not readily accessible.<sup>55</sup> But with the arrival of higher gas prices, advances in gas extraction technology, success in other United States shale formations, and the promise of production from the early wells, the previous conclusion proved to have been premature.<sup>56</sup> In fact, there is the potential for tremendous economic success in the Marcellus Shale formation.<sup>57</sup>

#### A. Marcellus Shale Extraction Techniques

To appreciate the present regulatory issues associated with the Marcellus Shale, it is important to understand the process of natural gas extraction.<sup>58</sup> Natural gas can be found in three different locations within the Marcellus Shale: 1) within the pores of the shale rock; 2) within the vertical fractures through the shale; and 3) inside mineral grains.<sup>59</sup> The shale's pores contain the largest amount of natural gas, but retrieving the gas therefrom is difficult because the pores are small and not well connected, hampering gas flow.<sup>60</sup> To enable the free flow and extraction of the gas from the pores, gas companies typically employ hydraulic fracturing, along with the new horizontal drilling technology.<sup>61</sup>

Gas drillers often choose to use hydraulic fracturing, colloquially known as "fracking," to release natural gas that is "deeply and very tightly embedded in the shale."<sup>62</sup> Drillers worldwide have used

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54. *Id.* (summarizing prior beliefs regarding feasibility of extracting Marcellus Shale's natural gas). On average, the Marcellus Shale formation extends one mile below the surface. *Marcellus Shale - Appalachian Basin Natural Gas Play*, GEOLOGY, <http://geology.com/articles/marcellus-shale.shtml> (last visited Nov. 19, 2012) [hereinafter *Natural Gas Play*] (describing Marcellus Shale formation's breadth).

55. *Natural Gas Play*, *supra* note 54 (rationalizing prior assumption that extracting Marcellus Shale gas was uneconomical).

56. Smith, *supra* note 9, at 1 (highlighting economic and political changes making Marcellus Shale gas extraction practical).

57. *Id.* (examining economic potential of Marcellus Shale gas extraction). Currently, fracking natural gas contributes a third of the United States' gas supply. Efstathiou & Drajem, *supra* note 4.

58. For further discussion of Marcellus Shale drilling techniques, see *infra* notes 62-70 and accompanying text.

59. *Natural Gas Play*, *supra* note 54 (describing locations in shale where gas is found).

60. *Id.* (noting difficulty of extracting gas from certain shale locations).

61. *Id.* (describing techniques used to extract gas from Marcellus Shale).

62. Millett, *supra* note 7 (defining hydraulic fracturing process).

this technology successfully in gas production since the 1940s.<sup>63</sup> The hydraulic fracture treatment process involves drilling into natural gas wells located thousands of feet below the surface.<sup>64</sup> Once the well is drilled, drillers inject millions of gallons of water combined with sand and chemicals under high pressure into the rock, fracturing the rock and creating fissures.<sup>65</sup> The sand particles in the injection fluids hold these fissures open, which makes the shale more permeable and allows the gas to flow more freely to the well.<sup>66</sup>

Hydraulic fracturing is often used in combination with new horizontal drilling technology.<sup>67</sup> Horizontal drilling allows for the retrieval of natural gas in areas that were previously inaccessible due to geological difficulties.<sup>68</sup> Specifically, the development of horizontal drilling now "allows multiple wellbores to be drilled into shale regions from one site, well below water tables or underground water sources," which was previously impossible.<sup>69</sup> The combination of these methods reduces negative environmental impacts because the process now requires fewer actual surface sites to extract the gas.<sup>70</sup>

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63. Speelman, et al., *supra* note 6 (discussing hydraulic fracturing's history); see also *The EPA's Fracking Scare*, *supra* note 37 (exemplifying hydraulic fracturing's importance to worldwide natural gas production). Hydraulic fracturing is not a new technique to Pennsylvania; in fact, almost all oil and gas wells in the state drilled after 1980 utilized the technique. McKay & Salita, *supra* note 8.

64. Portero, *supra* note 26 (describing hydraulic fracturing process in detail).

65. *Id.* (explaining how water is used to crack shale and extract gas).

66. William A. Ruskin, *Marcellus Shale Progress Addressing Methane Contamination*, TOXIC TORT LITIG. BLOG (Sept. 21, 2011), <http://www.toxictortlitigationblog.com/2011/09/articles/industries/natural-gas/marcellus-shale-progress-addressing-methane-contamination/> (illustrating how sand particles keep fissures in shale open for gas extraction).

67. Speelman, et al., *supra* note 6 (explaining relationship between hydraulic fracturing and horizontal drilling). "Combining horizontal drilling with hydraulic fracing [sic] has resulted in the development of unconventional shale plays, like the Marcellus and Utica in states such as West Virginia, Pennsylvania, Ohio, and New York." Armando F. Benincasa & Diana Prulhiere, *The States' Legal Framework: Northeastern Region and The Regulation of Water Use and Handling in the Oil & Gas Industry in Appalachia*, 2011 NO. 5 RMMLF-INST. PAPER NO. 3B, 3B-2 (Nov. 17, 2011) (describing industry-wide impacts of advances in gas extraction technology).

68. Speelman, et al., *supra* note 6 (explaining horizontal drilling's usefulness).

69. *Id.* (noting advantages associated with horizontal drilling).

70. *Id.* (illuminating environmental benefits of using horizontal drilling in conjunction with hydraulic fracturing).



## B. Benefits of Fracking

Federal government offices and commentators alike have touted Marcellus Shale natural gas as a key to American energy independence.<sup>71</sup> Energy independence has been a goal of every presidential administration since the 1970s, including the Obama Administration, which recently proclaimed that it is time for an American energy era.<sup>72</sup> The United States' natural gas wells can help achieve an American energy era by reducing the nation's dependence upon foreign energy sources.<sup>73</sup> Additionally, by enabling the United States to shift away from current inefficient and environmentally harmful energy sources, domestic natural gas sources can trigger a new energy era by "provid[ing] cleaner burning fuel to the nation for several hundred years."<sup>74</sup>

Furthermore, and perhaps most significantly, investment in the development of Marcellus Shale natural gas resources promises to return substantial economic benefits.<sup>75</sup> The natural gas held within the Marcellus Shale is estimated to be worth over one trillion dollars.<sup>76</sup> The Marcellus Shale gas industry also emerged as a source of domestic jobs and tax revenues in the Marcellus Shale region, as

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71. See Ayesha Rascoe & Richard Cowan, *Obama to Tout Natural Gas Benefits in State of Union*, REUTERS (Jan. 23, 2012), <http://www.reuters.com/article/2012/01/24/us-obama-energy-address-idUSTRE80N01Y20120124> (assessing potential for American energy independence if natural gas is properly extracted); see also Millett, *supra* note 7. Marcellus Shale natural gas has been championed as the resource to alleviate some of the United States' dependence on foreign energy. *Id.*

72. Rascoe & Cowan, *supra* note 71 (noting role natural gas played in presidential energy administrations).

73. See Speelman, et al., *supra* note 6 (discussing advantages of developing natural gas industry in Marcellus Shale regions). Having a domestic energy resource would be especially helpful in today's world, as it could reduce U.S. reliance on oil imported from unstable and dangerous areas of the world. See *id.*

74. *Id.* (highlighting natural gas is cleaner than other energy sources and examining its future use). Natural gas emits thirty percent less carbon than oil and sixty percent less carbon than gas. Timothy J. Considine, *The Economic Impacts of the Marcellus Shale: Implications for New York, Pennsylvania, and West Virginia*, AM. PETROLEUM INST., 1 (July 14, 2010), [http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/API\\_Economic\\_Impacts\\_Marcellus\\_Shale.pdf](http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/API_Economic_Impacts_Marcellus_Shale.pdf) [hereinafter Considine, *Economic Impacts*] (studying economic impacts of current and future Marcellus Shale development).

75. See McKay & Salita, *supra* note 8 (expounding on economic benefits of natural gas). "[T]he spending stimulus from Marcellus producers contains four major components: inter-industry supply requirements across hundreds of sectors, land payments to households, state and local tax payments to the non-education government sector, and payroll income to employees." Considine, *Economic Impacts*, *supra* note 74, at 18.

76. Speelman, et al., *supra* note 6 (estimating amount of natural gas locked in Marcellus Shale).

well as in the rest of the United States.<sup>77</sup> In 2009 alone, the Marcellus Shale industry in West Virginia and Pennsylvania brought a \$4.8 billion increase to the gross regional product and created "more than 57,000 jobs and \$1.7 billion in local, state, and federal tax collections."<sup>78</sup> Advocates of natural gas extraction in the Marcellus Shale region argue that the economic advantages outweigh any of the technology's potential negative impacts.<sup>79</sup>

### C. Consequences of Fracking

Critics of natural gas extraction argue the damaging environmental impacts caused by fracking outweigh potential economic and energy benefits.<sup>80</sup> They cite short- and long-term community impacts, ranging from increased traffic and noise pollution to the disruption of wildlife and natural habitats.<sup>81</sup> In addition to these concerns, critics emphasize the possibility that fracking may release toxins into the environment.<sup>82</sup> For example, they argue fracking is

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77. *Id.* (discussing increases in tax and job base due to increased natural gas extraction); see also Considine, *Economic Impacts*, *supra* note 74, at ii (highlighting domestic advantages of Marcellus Shale gas extraction). In Pennsylvania, the gas industry currently supports 300,000 jobs and is expected to create another 200,000 jobs in the next several years due to Marcellus Shale activity. Mark Green, *Doing the Math: E = J*, ENERGY TOMORROW BLOG (Nov. 21, 2011), <http://energytomorrow.org/blog/doing-the-math-ej?gclid=CLbGvKP5vq4CFcjc4AodykcqQA#/type/all> (discussing job creation through Marcellus Shale production).

78. Speelman, et al., *supra* note 6 (illustrating economic impact of natural gas extraction on Marcellus Shale region); see also Considine, *Economic Impacts*, *supra* note 74, at 16-26, 36 (detailing economic benefits of Marcellus Shale gas on taxes and jobs in 2009). "As the U.S. economy struggles fiscally, these assets could facilitate economic growth, create well paying and sustainable jobs, and help to restore solvency at all levels of government." *Id.* at 36.

79. See generally Green, *supra* note 77 (opining that absent drilling opponents, natural gas' energy and economic benefits could be realized); see also Considine, *Economic Impacts*, *supra* note 74, at 36-37 (highlighting positive economic impacts of natural gas industry development). "These resources could provide the region and the nation with the means to generate significant income and wealth." *Id.* at 36.

80. See generally *What's The Big Deal About Marcellus Shale Gas Drilling?*, MARCELLUSPROTEST, <http://marcellusprotest.org/sites/marcellusprotest.org/files/whats-the-big-deal.pdf> (last visited Nov. 19, 2012) [hereinafter *What's The Big Deal*] (emphasizing gas drilling opponent's position on Marcellus Shale).

81. Sec'y of Energy Advisory Bd., Shale Gas Prod. Subcomm., Second Ninety-Day Report on Shale Gas Production 8 (Nov. 18, 2011), available at [http://www.shalegas.energy.gov/resources/111811\\_final\\_report.pdf](http://www.shalegas.energy.gov/resources/111811_final_report.pdf) [hereinafter Shale Gas Prod. Subcomm.] (noting potential impacts of natural gas drilling). "Short and long term community impact range from traffic, noise, land use, disruption of wildlife and habitat, with little or no allowance for planning or effective mechanisms to bring companies, regulators, and citizens to deliberate about how best to deal with near term and cumulative impacts." *Id.*

82. Portero, *supra* note 26 (mentioning several negative environmental impacts associated with fracking).



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a hazardous technique to use in the Marcellus Shale region because the shale is comprised of black shale rock, which often contains uranium.<sup>83</sup> Trace levels of uranium end up in fracking fluids, on drilling equipment, and on other materials that may come into contact with humans.<sup>84</sup> Moreover, “huge quantities of toxic, radioactive, and caustic liquid byproducts [are used in fracking fluids] . . . [and] pose storage, treatment, and disposal hazards that could adversely affect public health.”<sup>85</sup>

The most pressing environmental concerns center around the possibilities of drinking water depletion and contamination.<sup>86</sup> As previously noted, the fracking process requires millions of gallons of water to fracture the shale.<sup>87</sup> Fracking companies, therefore, must obtain and transport large amounts of water to well sites.<sup>88</sup>

83. *Id.* (explaining theory that fracking could expose humans to uranium).

84. *Id.* (exemplifying how fracking can expose humans to uranium). In 2010, a study found that fracturing the Marcellus Shale with fracking fluid causes the uranium in the rock to become “solubilized.” Hannah Coman, *Balancing the Need for Energy and Clean Water: The Case for Applying Strict Liability in Hydraulic Fracturing Suits*, 39 B.C. ENVTL. AFF. L. REV. 131, 137 (2012) (describing study results regarding human exposure to uranium via shale fracturing). Studies note that “when the fluid come[s] back to the surface, it could contain uranium contaminants, potentially polluting streams and other ecosystems and generating hazardous waste.” *Id.* (internal quotations omitted). While uranium in small amounts does not present a risk of radioactivity, “it is still a toxic, deadly metal.” *Id.*

85. *Id.* (supplying examples of how other toxins could harm humans from fracking).

86. See generally Beck, *supra* note 13, at 433 (discussing water issues associated with gas development in Marcellus Shale regions). The effects of groundwater contamination have already been seen in Pennsylvania. See generally Berish v. Sw. Energy Prod. Co., 763 F. Supp. 2d 702, 703-04 (M.D. Pa. 2011). In 2010, thirteen families in Susquehanna County alleged in a lawsuit that hydraulic fracturing contaminated their drinking water supply with barium, manganese, strontium, and iron. *Id.* Similarly, in Washington County, Pennsylvania, residents claim hydraulic fracturing contaminated their properties with elevated levels of arsenic and benzene. Janice Crompton, *Residents reported gas odors before explosion*, PITT. POST-GAZETTE (Apr. 1, 2010), available at <http://www.postgazette.com/pg/10091/1047159-58.stm> (discussing fracking-caused contamination). Additionally, there has been possible groundwater contamination associated with fracking in other regions; the EPA released a report in December 2011 that found a possible link between fracking and water contamination in Wyoming. Efstathiou & Drajem, *supra* note 4. For further discussion of the EPA’s findings in Wyoming, see *supra* notes 33-42 and accompanying text.

87. *Drilling for Natural Gas in the Marcellus Shale Formation: Frequently Asked Questions*, PA. DEP’T OF ENVTL. PROT., <http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/MarcellusShale/MarcellusFAQ.pdf> (last visited Nov. 19, 2012) [hereinafter *Frequently Asked Questions*] (describing hydraulic fracturing process). Fracking’s use of water poses several problems: impacts on water quality, possible release of heavy metals in the rock formation into groundwater, determination of the appropriate amount of water to be withdrawn from sources, and disposal of the fracking fluids. *Id.*

88. Benincasa & Prulhiere, *supra* note 67 (assessing fracking’s water needs).

Due to the quantity of water needed, determining the most appropriate source of water to use for fracking is a significant issue.<sup>89</sup> Moreover, after the appropriate source is determined, measures must be taken to prevent depleting the source.<sup>90</sup>

Additionally, due to the chemicals and sand particles added to the fracking fluids, concerns persist over the proper treatment, management, and disposal of fracking wastewater.<sup>91</sup> Communities affected by Marcellus Shale fracturing are grappling with these water quality issues; they are facing three major issues: 1) determining what authority controls and regulates water use and water withdrawals; 2) coping with the potential impact on bodies of water accepting contaminated wastewater; and 3) establishing adequate water treatment facilities.<sup>92</sup>

### III. CURRENT REGULATORY FRAMEWORK

State governments traditionally had jurisdiction over the promulgation of environmental regulations.<sup>93</sup> The federal government, however, eventually became involved with environmental governance over the oil and gas industry starting in 1924 with the passage of the Oil Pollution Act.<sup>94</sup> Beginning in the late 1960s, "[m]indful of the critical impact of man's tremendous technological advance upon nature," the federal government enacted additional environmental legislation that imposed safeguards to protect

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89. *Id.* (noting issues arising from fracking's water usage rate).

90. *Id.* (expounding on possible water depletion due to fracking).

91. *Frequently Asked Questions*, *supra* note 87 (describing mandatory restorative measures imposed on gas companies that disrupt water resources).

92. *See* Millett, *supra* note 7 (emphasizing concerns fracking communities face). Communities are not handling this alone; Pennsylvania has begun to protect these communities by implementing rules requiring drilling companies to safely dispose of fracking water. *Frequently Asked Questions*, *supra* note 87. Additionally, the DEP, the Susquehanna River Basin Commission (SRBC), and the Delaware River Basin Commission (DRBC) have guidelines for water usage and disposal to further protect communities from severe water depletion. *Id.* Furthermore, some drillers are attempting to prevent water quality impacts by developing their own water treatment processes to remove the toxic chemicals from the wastewater, thereby "enabling them to reuse the water in drilling operations instead of dumping the contaminated water into other water sources or injecting it deep underground." Portero, *supra* note 26.

93. *See* Beck, *supra* note 13, at 429-34 (highlighting state environmental laws preceding federal laws); *see also* Speelman, et al., *supra* note 6 (outlining traditional methods of regulating natural gas). States have traditionally taken the lead in regulating natural gas. Speelman, et al., *supra* note 6.

94. Beck, *supra* note 13, at 433 (describing federal government involvement in gas industry).



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natural resources and enhance the environment.<sup>95</sup> “These statutes have engendered considerable discussion and disagreement over how to balance federal, state, and local roles in the execution of the laws” while satisfactorily protecting the intended resources.<sup>96</sup> The statutes do not adequately define the roles of state and federal governments regarding environmental matters, thereby resulting in overlapping and inefficient regulations, specifically with respect to water regulation.<sup>97</sup>

#### A. Federal Statutes and Regulations

Beginning with the enactment of the National Environmental Protection Act (NEPA) in 1969 and continuing through the 1980s, Congress passed a series of environmental statutes and regulations to protect natural resources.<sup>98</sup> None of these statutes, however, solely addresses groundwater contamination, and “[i]t is widely recognized that the federal pollution control laws that regulate groundwater discharges do not add up to a comprehensive protection strategy.”<sup>99</sup> A patchwork of federal statutes, therefore, has been interpreted to govern groundwater regulation.<sup>100</sup> Two laws predominantly control the regulation of water: the Safe Drinking Water Act and the Clean Water Act.<sup>101</sup> While “[h]ydrofracking is not entirely beyond the scope of federal oversight . . . significant federal involvement is unlikely given the structure of potentially ap-

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95. *Cape May Cnty. Chapter, Inc. v. Macchia*, 329 F. Supp. 504, 506 (D.N.J. 1971) (noting increase in environmental legislation beginning in 1970s). In particular, the court discussed the National Environmental Policy Act of 1969 (effective January 1, 1970), 42 U.S.C. § 4321, et seq. (NEPA) (2012) and the Environmental Quality Improvement Act of 1970, 42 U.S.C. §§ 4371-74 (2012). *Id.*

96. Powers, *supra* note 28, at 929 (outlining regulatory problems associated with implementing federal statutes).

97. See Speelman, et al., *supra* note 6 (discussing oil and gas legislative history).

98. Powers, *supra* note 28, at 929 (describing history of federally enacted statutes).

99. Dan Tarlock & Robert L. Glicksman, *EPA Groundwater Protection Strategy*, 1 RATHKOPF'S THE LAW OF ZONING AND PLANNING § 8:49 (4th ed. 2012) (analyzing ability of federal environmental laws to strategically regulate groundwater discharges).

100. Benincasa & Prulhiere, *supra* note 67 (attempting to resolving problems created by patchwork federal groundwater governance).

101. Safe Drinking Water Act, 42 U.S.C.A. § 300f (West 1996) (limiting gas industry's water usage); Federal Water Pollution Control Act, 33 U.S.C. § 1251(a) (1987) (stating guidelines for handling United States' waters). For further discussion on the federal Safe Drinking Water Act and the Clean Water Act, see *infra* notes 104-118 and accompanying text.

plicable laws."<sup>102</sup> The oil and gas industry successfully lobbied to exempt hydraulic fracturing from these laws under the Energy Policy Act of 2005.<sup>103</sup>

### 1. *Safe Drinking Water Act*

The Safe Drinking Water Act (SDWA), passed by Congress in 1974, was the first attempt to regulate underground injections, which are similar to the techniques used in hydraulic fracturing.<sup>104</sup> The statute outlines criteria and procedures to protect public water systems by establishing water quality levels and setting the maximum amount of contaminants that can be released into a public water system.<sup>105</sup> The SDWA also governs Marcellus Shale drilling through the Underground Injection Control Program.<sup>106</sup> This program aims to prevent contamination of underground drinking water sources by underground injection fluids.<sup>107</sup> Under this program, the EPA sets minimum requirements that states must implement in their own underground injection control programs.<sup>108</sup> The EPA then approves the state's program and delegates the ad-

102. Powers, *supra* note 28, at 940 (describing lacking federal oversight of oil and gas industry).

103. *Id.* at 938-39 (explaining federal environmental laws that impact hydrofracking). In 2005 Congress exempted fracking from federal water protection laws, a move health advocates labeled the "Halliburton Loophole" after the company Halliburton, which is the world's largest provider of fracking services. *Id.*

104. Beck, *supra* note 13, at 429-34 (discussing historic regulations relating to water usage in oil and gas development).

105. Safe Drinking Water Act, 42 U.S.C.A. § 300h (West 1996) (delineating procedures required to discharge water into public drinking water systems).

106. Benincasa & Prulhiere, *supra* note 67 (highlighting possible loopholes in federal statute); *see also* 42 U.S.C.A. § 300h (West 1996) (defining what fluids are included under "underground injection"). The program was implemented to prevent underground drinking water sources, like wells, from being contaminated by underground injections used for oil and gas development. Powers, *supra* note 28, at 939. In order for a state agency to administer any part of the Underground Injection Control Program, the state needs to have obtained federal approval, or "primacy." Benincasa & Prulhiere, *supra* note 67. Pennsylvania does not have primacy from the EPA to administer any part of the program, "but it does regulate oil and gas drilling and production fluid disposal through the Oil and Gas Act and the Clean Streams Law, requiring both a well permit from DEP and a [Underground Injection Control] permit from USEPA." *Id.* For further discussion of Pennsylvania's gas regulatory programs, *see infra* notes 119-133 and accompanying text.

107. Powers, *supra* note 28, at 939 (recounting goals of SDWA's Underground Injection Control Program).

108. Safe Drinking Water Act, National Drinking Water Regulations, 42 U.S.C.A. § 300g-1 (West 1996) (prescribing rules for setting of maximum level of contaminants allowed in primary drinking water systems); *see also* Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 142 (2009) [hereinafter Wiseman, *Untested Waters*] (illustrating lack of federal regulations in fracking industry).



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ministration of the Underground Injection Control program to the state “unless the state fails to meet the minimum requirements.”<sup>109</sup>

Section 322 of the Energy Policy Act of 2005, commonly referred to as the “Halliburton Loophole,” however, exempts hydraulic fracking from SDWA oversight because, as it stands now, “underground injection” does not cover hydraulic fracturing fluids unless the fluids contain diesel.<sup>110</sup> SDWA’s regulations do not effectively regulate the natural gas industry, because hydraulic fracturing fluids rarely include diesel.<sup>111</sup>

## 2. Clean Water Act

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), endeavors to “restore and maintain the chemical, physical, and biological integrity of the [n]ation’s waters.”<sup>112</sup> The CWA attempts to attain “water quality which provides for the protection and propagation of fish, shellfish and wildlife and . . . recreation in and on the water.”<sup>113</sup> Like the SDWA, the CWA does not effectively regulate the Marcellus Shale gas industry.<sup>114</sup> First, the Energy Policy Act exempts hydraulic fracturing from the National Pollutant Discharge Elimination System (NPDES) under the CWA.<sup>115</sup> This means that the federal government does not regulate the oil and gas industry’s construction of wellpads.<sup>116</sup> In addition to the statutory “Halliburton Loophole,” the current interpretation of the CWA does not allow the federal government to regulate groundwater water unless there is a “significant nexus” between the groundwater and “navigable waters.”<sup>117</sup>

109. Wiseman, *Untested Waters*, *supra* note 108, at 142-43 (describing cooperation among EPA and states to implement SDWA minimum requirements); *see also* 42 U.S.C.A. § 300g-1 (West 1996) (articulating standards for drinking water).

110. Powers, *supra* note 28, at 939 (describing impacts of Energy Policy Act on hydraulic fracturing governance); *see also* Benincasa & Prulhiere, *supra* note 67 (discussing SDWA’s governance of Marcellus Shale drilling); 42 U.S.C.A. § 300h (West 1996) (structuring federal Underground Injection Control program). For further discussion of the “Halliburton Loophole,” *see supra* note 103 and accompanying text.

111. *See* Benincasa & Prulhiere, *supra* note 67 (articulating problem with SDWA’s fracking regulation).

112. Federal Water Pollution Control Act, 33 U.S.C. § 1251(a) (1987) (noting Clean Water Act’s goals).

113. 33 U.S.C. § 1251(a)(2) (1987) (expressing additional CWA goals).

114. *See* Powers, *supra* note 28, at 939 (remarking on CWA’s inability to regulate Marcellus Shale gas industry).

115. *Id.* (describing CWA’s gas industry exemptions).

116. *Id.* (explaining how CWA gas industry exemptions affect businesses).

117. *Id.* at 940 (noting additional loophole available to gas industry under CWA interpretation). Proving the CWA should regulate hydrofracking under the

This narrow jurisdictional grant results in a lack of regulation over groundwater that may be impacted by natural gas extraction.<sup>118</sup>

#### B. Pennsylvania's Regulatory Scheme

In Pennsylvania, the DEP is the primary agency responsible for the administration of environmental laws and regulations.<sup>119</sup> The DEP utilizes several state statutes to regulate natural gas extraction: the Oil and Gas Act, the Air Pollution Control Act, the Dam Safety and Encroachments Act, and the Solid Waste Management Act.<sup>120</sup> These statutes implicitly grant the DEP the authority to review and approve Marcellus Shale drillers' water management plans.<sup>121</sup> For instance, the Pennsylvania Oil and Gas Act grants the DEP authority to approve extraction proposals.<sup>122</sup> The Act requires gas drillers to obtain permits prior to commencing operations and provides instructions for receiving a permit.<sup>123</sup> Moreover, the Oil and Gas Act allows the DEP to review "[well] location[s] relative to structures, protection of water supplies, plugging of wells, permitting, well site restoration and the use of safety devices."<sup>124</sup>

Pennsylvania, like the federal government, lacks a comprehensive permitting program for water withdrawal.<sup>125</sup> Pennsylvania uses the Clean Streams Law (CSL) and the Safe Drinking Water Act (PSDWA), in conjunction with the Pennsylvania Oil and Gas Act, to grant gas drilling permits and protect water resources involved in

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"significant nexus" theory is very difficult because it requires establishing a connection between groundwater and navigable waters. *Id.*

118. *See id.* (discussing additional loopholes preventing natural gas drilling from being fully regulated).

119. Benincasa & Prulhiere, *supra* note 67 (noting Pennsylvania's structure for implementing gas industry regulations). Within the DEP, the Bureau of Oil and Gas is responsible for "statewide oil and gas conservation and environmental programs." *Id.* The Bureau "develops policies and programs for the regulation of oil and gas development and production, and oversees the oil and gas permitting inspection programs." *Id.* The DEP often works in conjunction with the DRBC and SRBC; these commissions have jurisdiction over the rate and volume of water withdrawals from the rivers they govern. *Id.*

120. *Id.* (noting laws and regulations Pennsylvania employs to regulate gas industry); *see also* *Natural Gas Drilling*, *supra* note 2, at 5 (discussing Pennsylvania's regulatory program).

121. Benincasa & Prulhiere, *supra* note 67 (articulating implications of combining several water-regulating laws).

122. Reeder, *supra* note 3, at 1015-16 (outlining natural gas extraction approvals under Oil and Gas Act).

123. *Id.* (delineating permitting process under Oil and Gas Act).

124. Smith, *supra* note 9, at 13 (analyzing Oil and Gas Act).

125. Benincasa & Prulhiere, *supra* note 67 (examining several statutes regulating water withdrawal).



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fracking.<sup>126</sup> The CSL and PSWDA address concerns much like their federal counterparts and often regulate identical issues.<sup>127</sup> Similar to the CWA, the CSL presides over Pennsylvania's waterways, protecting them from pollution.<sup>128</sup> The CSL "sets standards for the discharge of industrial wastes and requires that permits be obtained for any waste that will flow into Pennsylvania's water systems."<sup>129</sup> Mimicking the federal statutory structure, the CSL is used in conjunction with the PSDWA "to ensure the safety of potable water."<sup>130</sup>

In addition to the aforementioned acts, the DEP recently promulgated additional oversight for natural gas operations within the Commonwealth.<sup>131</sup> New regulations include stricter requirements for casing and cementing wells, additional obligations for well control, procedures for immediate gas migration response, and routine inspection requirements.<sup>132</sup> To ensure comprehensive supervision over the gas industry, regulators considered several issues to properly balance all interests, including numerical data illustrating possible risks and assessments taken by the industry.<sup>133</sup>

#### IV. IMPLICATIONS OF POTENTIAL JURISDICTIONAL PROBLEMS

Currently, the incongruity of fracking laws, the redundancy of regulations, and the wide, unrestrained range of federal and state authority create "inefficiency and confusion when a company seeks to capitalize on a new source of natural gas such as the Marcellus Shale formation."<sup>134</sup> The present statutory framework is not conducive for efficient oversight or effective protection of natural resources.<sup>135</sup> Such poor framework slows development and even risks

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126. *Id.* (comparing Pennsylvania regulatory system to federal government regulatory system).

127. *See id.* (noting federal and state laws often overlap).

128. Reeder, *supra* note 3, at 1016-17 (defining additional laws granting authority to DEP to regulate natural gas industry).

129. *Id.* (summarizing Clean Streams Law).

130. Benincasa & Prulhiere, *supra* note 67 (noting how DEP uses combinations of statutes to regulate gas drilling).

131. Speelman, et al., *supra* note 6 (describing Pennsylvania efforts to reduce risks associated with gas drilling).

132. *Id.* (describing new regulations in Pennsylvania governing gas drilling).

133. *Id.* (expounding on proper approach to address current and future issues).

134. Reeder, *supra* note 3, at 1015 (arguing current regulations prevent optimal results).

135. *See* Speelman, et al., *supra* note 6 (highlighting overlapping and inconsistent regulations currently in place).

rendering natural gas extraction economically infeasible.<sup>136</sup> Industry officials, public interest groups, and government representatives have all called for realignment of regulatory powers to avoid the potential loss of this newly tapped natural resource.<sup>137</sup> Failing to tap the Marcellus Shale formation would mean "that the biggest natural gas find in the world, in the most stable political environment in the world, closest to the sources of constant need for reasonably priced and reasonably stable energy sources in the United States, will not be developed . . . ."<sup>138</sup>

Under the United States' present regulatory framework, the federal government regulates local concerns, while the state and local governments have begun to reach into arenas that traditionally fall under federal jurisdiction.<sup>139</sup> The coextensive federal and state jurisdictions and overlapping federal and state regulations can produce crippling inefficiency.<sup>140</sup> This type of intermingled, inefficient framework "is simply unacceptable as a long-term environmental protection strategy for a large and diverse nation committed to the market and decentralized ordering."<sup>141</sup> Such a scheme fails to stimulate investment and innovation while simultaneously encouraging costly litigation to solve the resulting disputes.<sup>142</sup> Moreover, it does not fully realize advantages that accompany a competitive system.<sup>143</sup> The system also severely delays operations and hampers the expansion of private choice.<sup>144</sup> In response, both government representatives and industry officials advocate for the

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136. *Id.* (flagging potential problems that could result if current regulations are not streamlined).

137. See Efstathiou & Drajem, *supra* note 4 (noting push from industry officials for states to govern fracking).

138. Speelman, et al., *supra* note 6 (discussing risks involved with Marcellus Shale fracking).

139. Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. 23, 24 (1996) (noting current environmental regulatory framework); see also David E. Adelman & Kirsten H. Engel, *Adaptive Federalism: The Case Against Reallocating Environmental Regulatory Authority*, 92 MINN. L. REV. 1796, 1796 (2008) (articulating current environmental regulatory problems).

140. See Beck, *supra* note 13, at 429-34 (noting issues with overlapping jurisdictions).

141. Smith, *supra* note 9, at 25 (suggesting alternative environmental oversight should be implemented); see also Richard B. Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153, 154 (1988) (detailing potential regulatory scheme).

142. Smith, *supra* note 9, at 24 (noting problems with current federal regulatory program).

143. *Id.* at 26 (highlighting economic advantages associated with matching principle theory of federalism).

144. *Id.* at 25 (calling for change in environmental regulatory systems).



realignment of regulatory powers to better address these issues; specifically, both recommend that states take on a more prominent role in governing the natural gas industry.<sup>145</sup> Water quality, water quantity, and fracking fluid regulations could be the best place to start regulatory realignment.<sup>146</sup>

The town of Dimock, Pennsylvania, best illustrates the need for regulatory realignment.<sup>147</sup> A regulatory war is currently brewing in this rural town.<sup>148</sup> In Dimock, a water well spontaneously combusted, causing drinking water to turn brown and animals to lose their hair – allegedly due to fracking.<sup>149</sup> Recently, sixty-three individuals sued Cabot Oil & Gas Corporation (Cabot), alleging that the corporation's nearby fracking operations contaminated their drinking water wells with methane.<sup>150</sup> In September of 2009, nearly eight thousand gallons of Cabot's fracking fluid leaked into a nearby creek, contaminating the plaintiffs' groundwater with methane, natural gas, and other toxins.<sup>151</sup> The Commonwealth quickly responded to the release.<sup>152</sup> The DEP investigated the spill and found the potentially harmful chemicals were sufficiently diluted

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145. Efstathiou & Drajem, *supra* note 4 (offering arguments supporting state governance of fracking).

146. *See generally* Benincasa & Prulhiere, *supra* note 67 (discussing fracking water regulations).

147. Portero, *supra* note 26 (detailing conflict between EPA and DEP in Dimock, PA).

148. *See* Needles, *supra* note 20 (discussing issues between DEP and EPA in Dimock).

149. Christopher Bateman, *A Colossal Fracking Mess: The Dirty Truth Behind The New Natural Gas*, VANITY FAIR (June 21, 2010), <http://www.vanityfair.com/business/features/2010/06/fracking-in-pennsylvania-201006> (reviewing gas drilling's impacts on Dimock, PA).

150. Portero, *supra* note 26 (noting ongoing groundwater contamination situation in Dimock); *see also* Fiorentino v. Cabot Oil & Gas Corp., 750 F. Supp. 2d 506, 508 (M.D. Pa. 2010) (discussing plaintiff's complaint against Cabot Oil and Gas Corporation). All the plaintiffs signed leases with Cabot, granting Cabot the right to extract natural gas located on their properties. *Id.* at 509. In their complaint, the families alleged Cabot's hydraulic fracturing operations dispersed hazardous chemicals into the environment. *Id.* at 508. The plaintiffs made several claims against Cabot, including: (I) a claim under the Hazardous Sites Cleanup Act; (II) negligence; (III) private nuisance; (IV) strict liability; (V) breach of contract; (VI) fraudulent misrepresentation; (VII) medical monitoring trust funds; and (VIII) gross negligence. *Id.*

151. Jon Hurdle, *Penn. charges Cabot with natgas chemical spills*, REUTERS (Sept. 22, 2009, 6:20pm), <http://www.reuters.com/article/companyNews/idUKN2236809420090922> (outlining contamination events in Dimock). Failed pipe connections caused the contamination. *Id.*

152. *See* Wes Deweese, *Fracturing Misconceptions: A History of Effective State Regulation, Groundwater Protection, and the Ill-Conceived Frac Act*, 6 OKLA. J. L. & TECH. 49, 56-57 (2010) (discussing Pennsylvania's reaction to Cabot's fracking fluid spills).

and therefore, not harmful to the nearby residents.<sup>153</sup> Despite these findings, Cabot and the DEP signed a consent order and agreement in November 2009 in which Cabot was presumed to be responsible for the contamination of ten water sources.<sup>154</sup> Under the consent order, the DEP forced Cabot to deliver potable water to ten affected households, improve its drilling procedures, and develop a plan to restore clean water sources to the affected residents.<sup>155</sup> Furthermore, the DEP fined Cabot more than \$360,000 and ordered Cabot to suspend drilling as punishment for contaminating Dimock's groundwater and failing to fix the leaks that caused the problem.<sup>156</sup>

Notwithstanding the DEP's close involvement, the EPA stepped into the Dimock investigation, accusing the DEP of mishandling the situation.<sup>157</sup> The EPA reviewed test results taken by Cabot after the incident.<sup>158</sup> Initially, the federal agency found that the releases from the gas wells posed no health threat.<sup>159</sup> Even after arriving at this conclusion, the EPA continued reviewing Cabot's test results.<sup>160</sup> In the later tests, the EPA found the water contained elevated levels of barium, arsenic, and other hazardous substances.<sup>161</sup> The DEP and Cabot both disagreed with the results.<sup>162</sup> This was the first of several battles waged between the EPA and the DEP over water management in Dimock.<sup>163</sup>

Another disagreement between the DEP and the EPA in Dimock stemmed from the DEP's decision to terminate Cabot's consent order requirement to provide water to affected Dimock re-

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153. Hurdle, *supra* note 151 (discussing DEP's involvement with Dimock's groundwater contamination).

154. *Congress Takes on "Fracking"*, 273 ENV. COUNS. 11, 11 (2011) (illustrating possible negative impacts of natural gas drilling); see also *Dimock, Pa: "Ground Zero" in the Fight over Fracking*, STATEIMPACT, <http://stateimpact.npr.org/pennsylvania/tag/dimock/> (last visited Nov. 22, 2012) [hereinafter *Dimock, Pa*] (discussing consent agreement between Cabot and DEP). Although Cabot did not agree with DEP's findings, it agreed to the consent agreement's terms in December 2010. *Id.*

155. *Dimock, Pa*, *supra* note 154 (expounding on Cabot's requirements under Consent Order).

156. Dewese, *supra* note 152, at 56 (describing punishment DEP imposed on Cabot).

157. *Dimock, Pa*, *supra* note 154 (describing EPA's involvement in Dimock).

158. *Id.* (presenting EPA's findings from water testing).

159. *Id.* (noting EPA's initial water contamination findings).

160. *Id.* (reviewing change in EPA's findings).

161. *Id.* (detailing chemicals found in EPA's study).

162. *Dimock, Pa*, *supra* note 154 (examining DEP's and Cabot's opinion of EPA's conclusions).

163. See Needles, *supra* note 20 (reviewing issues between DEP and EPA over handling of Dimock).



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sidents.<sup>164</sup> Following the decision, several Dimock residents turned to the EPA for assistance.<sup>165</sup> The EPA informed sixty Dimock residents that it would provide them with potable water.<sup>166</sup> The EPA did not fulfill this promise at first, but reasserted the promise within a week.<sup>167</sup> The DEP responded to this inconsistency with a sternly written letter to the EPA.<sup>168</sup> DEP Secretary Krancer called the EPA's knowledge of Dimock "rudimentary" and stressed the DEP's familiarity with the situation.<sup>169</sup>

The EPA's sporadic involvement in Dimock has been problematic.<sup>170</sup> The EPA's response to Dimock demonstrates the need for a solution to the conflicting state and federal authorities.<sup>171</sup> Consequently, the regulatory powers must be definitively allocated and federal and state roles must be better defined.<sup>172</sup>

#### V. POSSIBLE SOLUTIONS – WHO SHOULD BE THE "WE" TO REGULATE THE FRACKING INDUSTRY?

The current state of our federalist system, with concurrent federal and state governance, has resulted in inefficient regulation of fracking.<sup>173</sup> The natural gas regulatory schemes require greater co-

164. See *Dimock, Pa Water Testing Results Expected to Impact Fracking Debate*, HUFFPOST GREEN (Mar. 5, 2012, 10:14 AM), [http://www.huffingtonpost.com/2012/03/05/dimock-pa-water-testing-results\\_n\\_1320978.html](http://www.huffingtonpost.com/2012/03/05/dimock-pa-water-testing-results_n_1320978.html) [hereinafter *Water Testing Results*] (articulating disagreement between EPA and DEP over water testing results).

165. *Dimock, Pa, supra* note 154 (describing residents' reactions to DEP terminating Cabot's obligation to provide potable water).

166. *Id.* (discussing EPA's answer to Dimock residents' requests).

167. *Id.* (examining EPA's inconsistent actions in Dimock).

168. Scott Detrow, *EPA Responds to Krancer's Letter; Krancer Says Missive "Speaks For Itself"*, STATEIMPACT (Jan. 11, 2012), <http://stateimpact.npr.org/pennsylvania/2012/01/11/epa-responds-to-krancers-letter-krancer-says-missive-speaks-for-itself/> (evaluating DEP's response to EPA's involvement in Dimock).

169. *Id.* (highlighting Secretary Krancer's position on EPA involvement in Dimock).

170. See *Dimock, Pa, supra* note 154 (noting EPA's inconsistency in Dimock). For the first six months of 2012, "EPA sampled private drinking water wells serving 64 homes, including two rounds of sampling at four wells where EPA was delivering temporary water supplies as a precautionary step in response to prior data indicating the well water contained levels of contaminants that pose a health concern." *EPA Completes Drinking Water Sampling in Dimock, Pa.*, EPA (July 25, 2012), <http://yosemite.epa.gov/opa/admpress.nsf/0/1A6E49D193E1007585257A46005B61AD> (providing final results from EPA's study of Dimock's water quality). From the testing results of the four wells, in July of 2012, the EPA determined Cabot no longer needed to provide potable water to Dimock residents. *Id.*

171. See *id.* (discussing EPA's involvement in Dimock, PA).

172. See Beck, *supra* note 13, at 429-34 (highlighting need for better regulations).

173. See Reeder, *supra* note 3, at 1015-16 (outlining current regulatory system).

ordination and more streamlined regulations.<sup>174</sup> While reform has commenced in some parts of the country, the coordinating efforts have begun to deteriorate in Pennsylvania.<sup>175</sup> Contributing to this deterioration is a growing animosity between Pennsylvania agencies and federal agencies because Pennsylvania believes the federal government is overstepping its jurisdictional boundaries.<sup>176</sup> Pennsylvania and its agencies argue that they are the more appropriate parties to address concerns regarding Marcellus Shale drilling within the state.<sup>177</sup> DEP Secretary Krancer has stated on several occasions, including in his January 5th, 2012 letter to the EPA and his testimony in front of Congress in 2011, that Pennsylvania would prefer to regulate its gas and oil industry without interference from the EPA.<sup>178</sup> Secretary Krancer continues to maintain that "Pennsylvania is already showing that the balance of the environmental protection and the development of this world class resource are being accomplished[.]" and therefore, federal government intervention is unnecessary.<sup>179</sup> Scholars have proposed several solutions to correct this overlapping, inefficient patchwork of governance.<sup>180</sup> Among these solutions are the matching principle and adaptive federalism.<sup>181</sup>

#### A. Application of Federalism Theories to Guide Realignment of Regulatory Authority

In reaction to calls for regulatory power realignment, discussions have increased over the best federalism theory for the crea-

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174. See *id.* at 1020 (offering suggestions to more appropriately regulate developing Marcellus Shale industry).

175. See generally *id.* (noting DEP and EPA's failure to coordinate); see also Detrow, *supra* note 168 (exhibiting jurisdictional dispute between EPA and DEP).

176. See Reeder, *supra* note 3, at 1020 (articulating source of tension between DEP and EPA).

177. For further discussion of Pennsylvania's position on proper jurisdiction to enforce drilling regulations, see *supra* notes 30-32, 147-172 and accompanying text.

178. *Natural Gas Drilling*, *supra* note 2, at 19 (informing Congress of DEP's current work with oil and gas companies in Pennsylvania); see also McAllister, *supra* note 27 (discussing Secretary Krancer's letter to EPA regarding DEP's involvement in Dimock's groundwater contamination issues).

179. *Natural Gas Drilling*, *supra* note 2, at 19 (quoting Secretary Krancer's testimony before Congress regarding Pennsylvania's gas drilling regulations).

180. See Powers, *supra* note 28, at 934-37 (highlighting two possible solutions to overlapping, ineffective state and federal regulations).

181. For further discussion of adaptive federalism and the matching principle, see *infra* notes 193-223 and accompanying text.



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tion, enactment, and enforcement of environmental laws.<sup>182</sup> Despite the consensus that reform is necessary, there is widespread disagreement over the best way to implement existing environmental laws and the most effective entity to institute new ones.<sup>183</sup> Such disagreement is not new.<sup>184</sup> Disagreement started in the 1970s when Congress passed a series of environmental laws, including the CWA.<sup>185</sup> Congress passed these acts in reaction to competition between the states and federal government over power to promulgate and enforce environmental regulations.<sup>186</sup> The enactment of these federal laws, however, did not quell this competition; instead, the current federal and state governments have expanded their regulations into each other's domains, causing present day environmental federalism to be inefficient and redundant.<sup>187</sup> Scholars have called attention to the redundancy of the current system and have demanded regulatory reform.<sup>188</sup>

To determine the most appropriate way to allocate regulatory powers here, scholars have formulated several approaches, each one focusing on a different set of problems.<sup>189</sup> Two main principles of thought have emerged as frontrunners: the matching principle and adaptive federalism.<sup>190</sup> The former approach uses economics and efficiency to determine which level of government should have primacy on certain regulatory issues; the latter is a more flexible system and provides an ecological approach to determine where primacy should lie.<sup>191</sup> The matching principle theory is the most appropriate for Pennsylvania's Marcellus Shale environ-

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182. See Powers, *supra* note 28, at 933-34 (noting discord regarding proper regulatory structure).

183. See *id.* (describing current federalism issues).

184. See Beck, *supra* note 13, at 433-34 (providing federal and state environmental legislative history).

185. See *id.* (noting events motivating enactment of federal environmental laws).

186. See Adelman & Engel, *supra* note 139, at 1818 (assessing efficiency of U.S. environmental regulations).

187. See *id.* (reviewing current state of environmental federalism). The federal government is currently regulating purely local issues, including "remediation of contaminated industrial sites, which have few direct interstate connections and few benefits from federal uniformity." *Id.* at 1796. Alternatively, state governments are reaching into federal environmental issues; for instance, many states are developing their own climate change policies. *Id.* at 1796-97.

188. See *id.* at 1798, 1802-11 (analyzing scholarly theories regarding distribution of regulatory power).

189. See Powers, *supra* note 28, at 934-37 (presenting various approaches to allocate regulatory primacy).

190. *Id.* (defining two main approaches to environmental federalism).

191. *Id.* (differentiating federalism approaches).

mental issues because it explicitly states where jurisdiction lies for an issue and thus avoids the promulgation of overlapping and superfluous regulations.<sup>192</sup>

### 1. *The Matching Principle*

In the mid-1990s, two law professors developed the matching principle in response to, what they felt, was a nationally mismanaged environmental control system.<sup>193</sup> The matching principle posits, "the size of the geographic area affected by a specific pollution source should determine the appropriate governmental level for responding to the pollution."<sup>194</sup> The matching principle is anchored in the belief that the regulating jurisdiction should be tailored to the size of the regulated activity, allowing the federal government to intervene only when it is deemed imperative.<sup>195</sup> For instance, "regulation of intrastate groundwater ought to be regulated by state and local governments, whereas climate change should be addressed at the international level."<sup>196</sup>

The theory fundamentally focuses on "how to allocate regulatory authority so that political institutions and processes will yield policies that achieve the optimal or efficient level of pollution without imposing unnecessary costs on productive economic activity."<sup>197</sup> Advocates of this position often cite four advantages for its adoption: 1) it allows for more experimentation and innovation; 2) it allocates state governments more flexibility to address the pressing environmental concerns in their areas; 3) it creates competition between the states to offer better environmental protection; and 4) it grants states more autonomy, thereby forcing more accountability

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192. *See id.* (illustrating problems inherent in federalism approaches).

193. Butler & Macey, *supra* note 139, at 24-25 (discussing rationale for completing study of current environmental control system). The matching principle is not novel. *Id.* In fact, it has origins in the beginning of this nation; at the Pennsylvania ratifying convention, James Wilson argued, "Whatever object of government is confined in its operation and effect, within the bounds of a particular State, should be considered as belonging to the government of that State." *Id.* at 26 (quoting Michael McConnell, *Federalism: Evaluating the Founders' Design*, 54 U. CHI. L. REV. 1484, 1495 (1985)).

194. *Id.* at 25 (defining new approach to environmental regulation).

195. *See id.* (explaining jurisdictional extent under matching principle theory). "In other words, when a particular polluting activity is limited to a particular locality or state, there is very little justification for federal environmental regulation." *Id.* A federal response should be as limited as possible. *Id.*

196. Adelman & Engel, *supra* note 139, at 1798 (discussing alternative approaches to environmental federalism).

197. Butler & Macey, *supra* note 139, at 25 (explicating matching principle theory's primary focus).



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and equity.<sup>198</sup> There is also the added advantage of removing regulatory redundancy, which streamlines regulation by eliminating the need to shift regulatory work between the states and the federal government.<sup>199</sup> Additionally, this approach provides several economic benefits, including increasing competition among localities to attract new business, new jobs, and increased revenues; also, localities would try to draw more residents by offering a higher quality environment.<sup>200</sup>

The matching principle suggests that state and local governments should maintain greater autonomy to address the environmental issues impacting their citizens.<sup>201</sup> By permitting local governments to manage their own pressing environmental needs, more efficient environmental regulations will be promulgated.<sup>202</sup> The localities know their jurisdictions better than the federal government and therefore can better tailor policies to local preferences and concerns.<sup>203</sup> Proponents of the matching principle argue that “[d]ecentralized government through a federalist system is far more responsive to local needs and concerns.”<sup>204</sup>

This theory, however, may not be applicable to all environmental problems.<sup>205</sup> The matching principle concedes that, in some instances, the federal government may be the more appropriate regulator.<sup>206</sup> Additionally, the matching principle theory may fail to perceive all the social benefits and costs at stake because it divides regulatory powers based on markets, economics, and geo-

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198. Sovacool, *supra* note 1, at 429-30 (explaining why decentralized federalism may be more advantageous than centralized federalism); *see also* Butler & Macey, *supra*, note 139, at 66 (noting matching principle’s potential for increased state autonomy).

199. *See* Adelman & Engel, *supra* note 139, at 1798 (evaluating matching principle’s applicability to environmental federalism).

200. *See* Butler & Macey, *supra* note 139, at 66 (outlining matching principle’s possible economic benefits).

201. *See id.* (allocating government roles under matching principle theory of federalism).

202. *See id.* (advocating for local governmental power over local environmental issues).

203. *See id.* (questioning federal government’s implementation of environmental policies).

204. Butler & Macey, *supra* note 139, at 66 (discussing advantages of local governments controlling environmental programs).

205. *See* Powers, *supra* note 28, at 935-36 (opposing matching principle’s use in environmental matters).

206. *See id.* at 935 (highlighting matching principle’s advantages and disadvantages); *see also* Butler & Macey, *supra* note 139, at 66 (admitting instances exist where federal government should intervene in environmental regulation).

graphical boundaries.<sup>207</sup> While advocates of this form of federalism argue that it is the most efficient approach, the theory may not be able to "fully address the iterative possibilities created by a three-tiered system or the potential for exploitation of institutional differences across levels of government to increase efficiency of the existing environmental framework."<sup>208</sup>

## 2. Adaptive Federalism

In reaction to the matching principle's shortcomings, other scholars began to promote a more dynamic approach to environmental problems.<sup>209</sup> Adaptive federalism is a more flexible approach than the economically focused matching principle.<sup>210</sup> This theory mimics dynamic federalism in that there are environmental policies mirroring each other at multiple levels of government.<sup>211</sup> The principle framework for adaptive federalism combines two processes found in ecological studies: "1) weeding out less-fit organisms, . . . and 2) maint[aining] . . . the biological diversity essential to long-term adaptability to environmental change."<sup>212</sup> Advocates argue that, through the application of these processes, policymaking can be more innovative and responsive.<sup>213</sup> The theory provides that by having multiple levels of government with different environmental policies, government responsiveness would be heightened, innovation would be increased, and policies would be more adaptable to the changing environmental landscape.<sup>214</sup> This rationale stems from the underlying thought that regulators are able to be more reactive and flexible than markets when presented with a new set of facts and figures.<sup>215</sup>

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207. See Powers, *supra* note 28, at 934-36 (explaining pitfalls associated with matching principle theory).

208. *Id.* at 936 (rationalizing not using matching principle for environmental problems).

209. See generally *id.* at 913 (advocating for adaptive federalism theory's application to all environmental problems); see also Adelman & Engel, *supra* note 139, at 1796-98 (discussing adaptive federalism's advantages over matching principle theory).

210. See Adelman & Engel, *supra* note 139, at 1799 (describing adaptive federalism).

211. See *id.* at 1849 (reviewing adaptive federalism model).

212. *Id.* at 1800 (providing framework for implementing adaptive federalism).

213. See *id.* at 1800-01 (elucidating advantages of adaptive federalism).

214. See *id.* at 1849 (advocating for adaptive federalism's adoption).

215. See Powers, *supra* note 28, at 936-37 (defining adaptive federalism).



In addition to more innovation and faster response times, an adaptive approach facilitates a wide range of policies.<sup>216</sup> The theory demands federal regulation that does not impose limitations on states' abilities to enforce stricter standards.<sup>217</sup> Moreover, supporters argue that, due to the complex nature of environmental regulation, the matching principle is too simplistic to deal with environmental issues.<sup>218</sup> They contend that adaptive federalism is more responsive to environmental issues and complexities because the matching principle tends to explain away many critical variables in environmental problems.<sup>219</sup> According to some scholars, environmental matters are multifaceted and all variables must be considered in order to handle the issue properly, thus rendering the inflexible matching principle inappropriate.<sup>220</sup>

Despite its advantages, critics maintain that the adaptive approach advocates similar regulations at multiple levels of government, which furthers the redundancies of the current system.<sup>221</sup> Additionally, this approach of governing risks the possibility of rent seeking and increases incentives for capture.<sup>222</sup> The model of adaptive federalism mirrors the present model, and because the current system has been unable to address the problem of redundancy, adaptive federalism may be unable to alleviate the problem of inefficient regulations.<sup>223</sup>

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216. See Adelman & Engel, *supra* note 139, at 1801 (supporting adaptive federalism's implementation).

217. See *id.* at 1801 (favoring regulatory system that permits states to enact more stringent standards). Further, the authors advocate for the use of state standards to temper federal regulation. *Id.*

218. *Id.* at 1798-1800 (advocating against applying matching principle theory to complex environmental issues).

219. Powers, *supra* note 28, at 936-37 (comparing adaptive federalism to matching principle).

220. Adelman & Engel, *supra* note 139, at 1798-99 (providing foundation for adaptive federalism).

221. See Sovacool, *supra* note 1, at 451-52 (criticizing adaptive federalism).

222. See *id.* (addressing concerns with top down governing). Rent seeking often involves manipulation of the economic environment in order to obtain "rents." Robert D. Tollison, *Rent Seeking: A Survey*, 35 KYKLOS 575, 575 (1982). "Rents" are the difference between the raw costs of producing a good and the actual price. *Id.* Rents can be created in two possible ways: 1) naturally, through a shift in supply or demand; or 2) "artificially, through for example, government action." *Id.* The latter is where the economy can be manipulated to increase profits. *Id.*

223. See Sovacool, *supra* note 1, at 451-52 (arguing against applying adaptive federalism to fracking water regulations).

## B. Best Approach

DEP Secretary Michael Krancer has said of Pennsylvania's regulation of the oil and gas industry generally, "Simply put, because of [its] long history of oil and gas development and comprehensive regulatory structure, Pennsylvania does not need federal intervention to ensure an appropriate balance between resource development and environmental protection is struck."<sup>224</sup> With regard to fracking, the primary issue is the protection of water resources, which are often confined within state borders.<sup>225</sup> Consequently, the matching principle theory should be applied; the jurisdiction in charge of regulating the problem should be equal in size to the problem.<sup>226</sup> Applying the matching principle to this problem, the state government is the more appropriate forum for protecting the water supply.<sup>227</sup> Secretary Krancer, in his January 2012 letter to the EPA, correctly stated that the DEP is the more appropriate agency to spearhead a gas industry regulatory framework in Pennsylvania.<sup>228</sup> State agencies are more informed about the issues affecting the state's residents than a federal agency, thereby making states better suited to address the affected communities' needs.<sup>229</sup>

Support for state regulation in the natural gas area has grown.<sup>230</sup> For instance, in its most recent study, the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) highlighted that states can effectively govern this industry.<sup>231</sup> It re-

224. *Natural Gas Drilling*, *supra* note 2, at 5 (quoting Secretary Krancer on his position regarding Pennsylvania's ability to regulate Marcellus Shale gas drilling).

225. See McAllister, *supra* note 27 (analyzing DEP's letter to EPA asserting groundwater contamination issues should be left to states).

226. See Butler & Macey, *supra* note 139, at 66 (describing how to allocate regulatory jurisdiction based on issue size).

227. See *id.* (discussing allocation of jurisdiction over groundwater).

228. See generally McAllister, *supra* note 27 (discussing Secretary Krancer's letter to EPA).

229. See *id.* (noting Secretary Krancer's opinion regarding Pennsylvania's ability to regulate in-state drilling).

230. See *Pennsylvania Hydraulic Fracturing State Review*, State Review of Oil and Natural Gas Envtl. Regs. (2010), available at <http://www.strongerinc.org/documents/PA%20HF%20Review%20Print%20Version.pdf> [hereinafter *State Review*] (supporting state autonomy over fracking water regulations).

231. See generally *id.* (reporting STRONGER's review of Pennsylvania's hydraulic fracturing program); see also *Marcellus Shale Caucus Hears From STRONGER*, CONGRESSMAN TOM REED, 29TH D. N.Y. (May 9, 2011), <http://reed.house.gov/press-release/marcellus-shale-caucus-hears-stronger> (identifying STRONGER's background and relationship with federal government). STRONGER assists states in documenting the environmental regulations associated with the exploration, development and production of crude oil and natural gas. *Id.* STRONGER is "a non-profit which has received funding from the Environmental Protection Agency, the Department of Energy, and from oil and gas industry sources." *Id.*



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marked that “[c]entralizing decision making with EPA . . . complicates and delays decision making about matters that are inherently local.”<sup>232</sup> STRONGER’s report also stated that “[r]ecent actions taken by Pennsylvania regulators demonstrate a thoughtful and reasonable approach to enhancing environmental safeguards based on actual experience.”<sup>233</sup> Furthermore, industry groups have also endorsed state governance.<sup>234</sup> These groups argue that “regulation should remain in the hands of state officials who are closest to local concerns and know the most about differences in geology that affect drilling.”<sup>235</sup>

Even departments within the federal government have supported the return of authority to the state level for the gas and oil industry.<sup>236</sup> The Department of Energy, in its November 2011 final report on shale gas safety and environmental protection, concluded that state and local governments should take the lead in responding to immediate environmental impacts associated with the shale gas industry.<sup>237</sup> The subcommittee conducting the study on the shale gas industry concluded the regulatory issues at stake are not likely amenable to resolution in courts or with federal regulations.<sup>238</sup> The Department of Energy lobbied for state and local governments to take the lead in “experimenting with different mechanisms for engaging these issues in a constructive way, seeking to be beyond discussion to practical mitigation.”<sup>239</sup>

Rather than involving itself in oil and gas regulation, the federal government should focus on advising state agencies and help-

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232. Andrew P. Morriss, Bruce Yandle, & Roger E. Meiners, *The Failure of EPA’s Water Quality Reforms: From Environment-Enhancing to Uniformity and Polluter Profits*, 20 UCLA J. ENVTL. L. & POL’Y 25, 66 (2001/2002) (arguing EPA’s intervention in local issues is detrimental). “The regulatory framework proposed by EPA, with its combination of command-and-control, technology-based regulation with offsets and trading has not succeeded in meeting water quality goals in the past and is not likely to succeed now.” *Id.*

233. Speelman, et al., *supra* note 6 (demonstrating Pennsylvania’s approach to current contamination issues); *see also State Review*, *supra* note 230 (assessing Pennsylvania’s regulatory controls over the hydraulic fracturing industry).

234. *See Efstathiou & Drajem, supra* note 4 (noting industry groups’ viewpoints on fracking regulations).

235. *Id.* (articulating industry officials’ position on state and federal regulatory programs).

236. *See Shale Gas Prod. Subcomm., supra* note 81, at 2 (articulating federal agencies’ stance on state autonomy).

237. *Id.* (quoting Department of Energy’s opinion on state and local governments regulating gas drilling within their borders).

238. *Id.* at 8 (explaining subcommittee’s findings regarding current gas production regulations).

239. *Id.* (advocating for state control over drilling laws and rules).

ing states form appropriate, effective regulatory frameworks.<sup>240</sup> Otherwise, the "EPA might develop a one-size-fits-all approach that doesn't take into account the unique characteristics of individual states."<sup>241</sup> The federal government must recognize that each state has different concerns regarding Marcellus Shale natural gas extraction; thus, federal regulations of this industry might not effectively cover all necessary areas.<sup>242</sup> The matching principle concept of tailoring the regulating jurisdiction to the size of the regulated activity is most appropriate to the environmental issues faced by the Marcellus Shale drilling states.<sup>243</sup> By applying the matching principle, local issues will be better addressed.<sup>244</sup>

## VI. CONCLUSION

Currently, it is not clear what form gas regulations will take.<sup>245</sup> Opposition to industry hydraulic fracturing, production, and waste management practices continues to increase; uncertainty about future gas regulations and speculation over a possible connection between hydraulic fracturing and groundwater contamination has also grown.<sup>246</sup> It is therefore imperative to promptly implement a solution for fracking regulation in Pennsylvania.<sup>247</sup> The surround-

240. See Butler & Macey, *supra* note 139, at 26 (asserting Framers intended limited federal role in local matters). "[I]f the federal government wants to intrude on local decision-making authority . . . it should confine itself to lending expertise and providing funding." *Id.*

241. Sean Murphy, *Fracking Wastewater Rules: Congress Eyes Natural Gas Issue*, HUFFPOST GREEN (Nov. 16, 2011, 5:03 PM), [http://www.huffingtonpost.com/2011/11/16/fracking-wastewater-rules-congress-natural-gas\\_n\\_1098186.html](http://www.huffingtonpost.com/2011/11/16/fracking-wastewater-rules-congress-natural-gas_n_1098186.html) (quoting Oklahoma Corporation Commissioner Dana Murphy regarding EPA and state government interactions).

242. See *id.* (elucidating problems with 'one-size-fits-all' regulations).

243. See Butler & Macey, *supra* note 139, at 66 (highlighting advantages of tailoring jurisdiction to problem size).

244. See *id.* (advocating matching principle ensures attention is paid to local issues).

245. See Wiseman, *Untested Waters*, *supra* note 108, at 194 (noting impact of federal and state regulations "remains to be seen"). Currently, there is litigation over the appropriateness of state and local regulating. See, e.g., *Anschutz Exploration Corp. v. Town of Dryden*, 940 N.Y.S.2d 458, 474 (N.Y. Sup. Ct. 2012) (deciding constitutionality of local government's utilization of land use prohibitions to regulate gas industry). A New York county court recently ruled in favor of local governments, holding that it is constitutional for a local government to regulate land use to prohibit exploration for, and production of, oil and natural gas. *Id.*

246. McKay & Salita, *supra* note 8 (describing opposition to fracking).

247. See Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 VILL. ENVTL. L.J. 229, 290 (2010) [hereinafter Wiseman, *Regulatory Adaptation*] (explaining need for effective regulations). Regulations must be put in place "to effectively regulate this practice . . . in a manner that ensures production of an



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ing Marcellus Shale states are also struggling with this problem and are waiting to see how it is resolved in Pennsylvania.<sup>248</sup> The solution to the regulatory war in Pennsylvania could set precedent for fracking in the rest of the country.<sup>249</sup> More than any other Marcellus Shale state, Pennsylvania has made significant “progress in its efforts to accommodate the needs of the oil and gas industry.”<sup>250</sup>

Despite the progress made, Pennsylvania, along with the other shale states, will continue to wrestle with the federal government for regulatory control.<sup>251</sup> The federal government continues to intervene, attempting to gain jurisdiction within the natural gas area.<sup>252</sup> For instance, in early 2011, U.S. Representative Jared Polis of Colorado sponsored the Fracturing Responsibility and Awareness of Chemicals Act, H.R. 1084, in the House of Representatives.<sup>253</sup> Pennsylvania’s Robert Casey introduced a companion bill, Section 587, in the Senate in response to the improperly processed wastewater from fracking that may be leaching hazardous substances into rivers, streams, and the drinking water supply.<sup>254</sup> While Congress did not pass either bill, the introduction of such bills indicates there is a movement toward greater federal oversight.<sup>255</sup>

In addition to the Congressional movement to increase federal control over the natural gas industry, the EPA is considering implementing three possible fracking rules over the next two years, thereby potentially expanding the federal government’s jurisdic-

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important fuel resource and the simultaneous protection of natural resources and human health.” *Id.*

248. See Reeder, *supra* note 3, at 1021 (discussing New York State’s current approach to fracking regulations). “Development in New York . . . has been stalled by government hold-ups.” *Id.*

249. See Portero, *supra* note 26 (addressing Pennsylvania’s role in future Marcellus Shale regulations). The path taken in Pennsylvania will impact the future of hydrofracking regulations throughout the country. *Id.*

250. See Reeder, *supra* note 3, at 1021 (acknowledging Pennsylvania’s work regarding fracking).

251. See *id.* (noting Pennsylvania must continue working to perfect its fracking regulatory framework).

252. See generally *Congress Takes on ‘Fracking’*, *supra* note 154. For further discussion of possible groundwater contamination, see *supra* notes 80-92 and accompanying text.

253. See generally *Congress Takes on “Fracking”*, *supra* note 154 (noting federal attempts to enact fracking legislation).

254. *Id.* (discussing reasons for introducing new fracking legislation). “Even low concentrations of the chemicals used in fracking may lead to severe health and environmental consequences if they enter the groundwater.” *Id.*

255. See generally *id.* (summarizing bill’s legislative history).

tion over the gas industry.<sup>256</sup> Furthermore, there has been a push within the EPA to require natural gas producers to release the composition of the fracking fluids they use.<sup>257</sup> These issues raise local concerns and therefore should be left to the states as suggested by the matching principle.<sup>258</sup> The matching principle should be applied, and the states should be allowed to govern the gas industry.<sup>259</sup>

Pennsylvania has begun to show its ability to regulate the gas industry without federal assistance. In early 2012, the Pennsylvania legislature passed House Bill 1950, colloquially known as Act 13.<sup>260</sup> Act 13 "enacted stronger environmental controls, authorized local governments to adopt an impact fee and built upon the state's ongoing efforts to move towards energy independence as unconventional gas development continues."<sup>261</sup> Act 13's environmental controls require the disclosure of fracking fluid chemicals on a chemical disclosure registry.<sup>262</sup> More importantly, the Act's environmental controls require that a well operator who impacts a local water supply by pollution or diminution must remedy the problem through restoration or replacement.<sup>263</sup> Additionally, the Act increased the presumption of liability for water supply contamination for unconventional wells, meaning the Act presumes a well operator is responsible for pollution of a water supply if the water supply

256. Efstathiou & Drajem, *supra* note 4 (describing EPA's impending fracking regulations). The first rule was implemented in April 2012. John M. Broder, *U.S. Caps Emissions in Drilling Fuel*, NEW YORK TIMES (Apr. 18, 2012), available at <http://www.nytimes.com/2012/04/19/science/earth/epa-caps-emissions-at-gas-and-oil-wells.html> (summarizing new regulations over air emissions resulting from natural gas production). It, however, will not be fully effective until January 2015. *Id.* "The new rule would reduce emissions of volatile organic compounds by 190,000 to 290,000 tons per year and toxic air pollutants by 12,000 to 20,000 tons a year." *Id.*

257. Efstathiou & Drajem, *supra* note 4 (highlighting controversy surrounding potential regulations that would require publicly releasing fracking fluid contents).

258. See Butler & Macey, *supra* note 139, at 24 (advocating matching principle's application water regulations).

259. See *id.* (contending matching principle would best suit water regulatory schemes).

260. See *Act 13 Frequently Asked Questions*, PA. DEP'T OF ENVTL. PROT., [http://www.portal.state.pa.us/portal/server.pt/community/act\\_13/20789/act\\_13\\_faq/1127392](http://www.portal.state.pa.us/portal/server.pt/community/act_13/20789/act_13_faq/1127392) (last visited Nov. 22, 2012) (noting highlights of Pennsylvania's newly passed fracking statutes).

261. *Id.* (describing provisions of Act 13).

262. *Id.* (noting bill requires fracking chemical disclosure on [fracfocus.org](http://fracfocus.org)).

263. *Id.* (explaining well operator's obligation to restore polluted or diminished water supply). The replaced or restored water supply must conform to the water quality and quantity standards proscribed by the Pennsylvania Safe Drinking Water Act. *Id.*



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is within 2,500 feet of the well.<sup>264</sup> These new regulations over the gas industry will help to control and monitor wastewater and water contamination from unconventional wells.<sup>265</sup> Furthermore, these regulations demonstrate that Pennsylvania is capable of regulating the industry within its borders without federal assistance.<sup>266</sup>

The success of Marcellus Shale exploration and development depends upon striking a proper balance between state and federal regulations and understanding natural gas extraction's potential impact on the environment.<sup>267</sup> If extracted correctly, the energy production from the Marcellus Shale could last for generations, and its blueprint could be used to properly develop the other promising shale formations.<sup>268</sup> Natural gas resources could provide the northeast region, as well as the nation, with a method to generate significant energy reserves, new forms of income, and increased wealth.<sup>269</sup> By attempting to regulate hydraulic fracturing, the federal government will only serve to impose costly regulatory hurdles that will inhibit the development of the United States' vast natural gas resources.<sup>270</sup> Moreover, "[e]ach state has a vested interest in

264. *Id.* (explaining how Act 13's presumption of contamination operates).

265. *See Act 13 Frequently Asked Questions*, *supra* note 260 (illustrating Pennsylvania's ability to regulate its gas industry).

266. *Id.* (explaining Pennsylvania's new rules for gas industry). Although Act 13 was passed in February 2012, the Act's local control provisions were appealed. David Raichel, *Act 13 Litigation Update: Judge Put a Hold on Portion of Law that Would Eviscerate Local Control*, NAT'L RES. DEF. COUNCIL STAFF BLOG (Apr. 12, 2012), [http://switchboard.nrdc.org/blogs/draichel/act\\_13\\_litigation\\_update\\_judge.html](http://switchboard.nrdc.org/blogs/draichel/act_13_litigation_update_judge.html) (summarizing recent litigation appealing Act 13's local control provisions). The Act requires Pennsylvania municipalities to allow fracking activities "as close as 300 feet from a home, a school, or a hospital." *Id.* On July 26, 2012, this portion of the Act was struck down by a Pennsylvania court. Paul J. Gough, *Corbett Appeals Ruling on Act 13 Zoning*, PITT. BUS. TIMES (July 27, 2012), <http://www.bizjournals.com/pittsburgh/blog/energy/2012/07/corbett-appeals-ruling-on-act-13-zoning.html> (discussing recent ruling on Act 13). State government appealed the July 26 ruling to the Pennsylvania Supreme Court. *Id.* Thus, until the court rules on this appeal, the status of the Act remains uncertain. *Id.* The portions discussed in this section of the article, however, have not been overruled and thus are still in effect.

267. *See Wiseman, Untested Waters*, *supra* note 108, at 193-94 (explicating importance of basing regulations on science). "A scientific report will inform the need for regulation and in many regions may bolster the claims that fracking does not require more regulation than already exists." *Id.* at 194.

268. *See Considine, Economic Impacts*, *supra* note 74, at 36 (expounding on potential expansion into Utica Shale and larger gas industry growth). "[T]he resource base [from these rock formations] could extend well into the later part of this century and even perhaps the next." *Id.* Utica Shale has the potential to create over 200,000 new jobs in eastern Pennsylvania. Green, *supra* note 77.

269. *See Considine, Economic Impacts*, *supra* note 74, at 36 (hypothesizing Marcellus Shale gas drilling will result in wealth and income growth).

270. Deweese, *supra* note 152, at 80 (outlining current regulatory framework's problems).

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the protection of its natural environment."<sup>271</sup> To that end, states should be allowed to continue to regulate the natural gas industry in the twenty-first century.<sup>272</sup>

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271. *Id.* at 51 (discussing reasons why states should regulate fracking).

272. *Id.* at 80 (opining states should be allowed to continue regulating fracking).

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