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HYDRAULIC FRACTURING IN THE MARCELLUS SHALE: THE NEED FOR LEGISLATIVE AMENDMENTS TO NEW YORK'S MINERAL RESOURCES LAW

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INTRODUCTION

On New Year's Day, 2009, in the small town of Dimock, Pennsylvania, Norma Fiorentino's water well exploded.[1] Other residents of the same community observed that their water was discolored and that it would bubble, foam, or give off odors.[2] Testing by the state Department of Environmental Protection revealed that nearby drilling for natural gas had exposed the aquifer to methane. The drinking water of at least nine homes was contaminated. Four were at risk of exploding.[3] In 2009, as industrial drilling for natural gas began in earnest, more than a dozen accounts of drinking water polluted by toxic contaminants surfaced throughout Dimock.[4]

Dimock is one of hundreds of local jurisdictions in the Northeast that has seen a dramatic increase in recent years of a process of drilling for natural gas known as hydraulic fracturing,

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[1] Laura Legere, *Nearly a Year After a Water Well Explosion, Dimock Twp. Residents Thirst for Gas-Well Fix*, TIMES-TRIB. (Scranton, Pa.) (Oct. 26, 2009), http://thetimes-tribune.com/news/nearly-a-year-after-a-water-well-explosion-dimock-twp-residents-thirst-for-gas-well-fix-1.365743.

[2] *Id.*

[3] *Id.*

[4] *Id.* Pennsylvania has experienced six documented explosions caused by migrating gas in the last decade, killing four people. Contamination has affected at least 60 water wells, including three municipal water supplies. *Id.*

or "fracking."[5] This "gas rush" is the result of a confluence of recent events, including high energy prices, economic recession, state budgetary shortfalls, and industry exemption from federal regulation, to name a few. Chiefly, it stems from the advancement of fracturing technology to allow for increased gas extraction from tightly-packed formations of shale.[6] The gas extraction industry has accelerated development of a formation known as the Marcellus Shale Play, a large, subterranean formation that stretches from the Southeastern corner of Ohio through West Virginia, Northwestern Pennsylvania, and into the Catskill Mountain region of New York State.[7]

As the development by natural gas extractors of the nearby West Virginia and Pennsylvania Marcellus increased, a debate began about the practical implications of hydraulic fracturing in New York State. Proponents of the practice point to studies concluding that hydraulic fracturing does not pose a significant threat to drinking water supplies.[8] They emphasize the potential benefits of the practice, noting that natural gas development could provide a desperately needed economic boost to a chronically depressed region within a state suffering from historic budget shortfalls.[9] It could also bring a cheap, clean source of energy to the nearby power-hungry metropolitan areas of New York and Philadelphia.[10] Opponents counter with numerous anecdotal accounts of poisoned wells, flammable tap-water, and deteriorating health in communities across the

[5] *See* Abrahm Lustgarten, *New York's Gas Rush Poses Environmental Threat*, PRO PUBLICA (July 18, 2008, 2:42 PM), http://www.propublica.org/article/new-yorks-gas-rush-poses-environmental-threat-722.

[6] *Id.*

[7] *See generally* J. DANIEL ARTHUR, ET AL., WATER RESOURCES AND USE FOR HYDRAULIC FRACTURING IN THE MARCELLUS SHALE REGION (2011), *available at* http://www.netl.doe.gov/technologies/oil-gas/publications/ENVreports/FE0000797_WaterResourceIssues.pdf.

[8] *See, e.g.*, U.S. ENVTL. PROT. AGENCY, EPA 816-R-04-003, EVALUATION OF IMPACTS TO UNDERGROUND SOURCES OF DRINKING WATER BY HYDRAULIC FRACTURING OF COALBED METHANE RESERVOIRS ch. 4, at 19 (2004) [hereinafter EPA IMPACT STUDY], *available at* http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_coalbedmethanestudy.cfm.

[9] *See* Mireya Navarro, *Gas Drilling is Severely Restricted in Catskill Watershed Supplying New York City*, N.Y. TIMES, Apr. 24, 2010, at A15.

[10] *See* Navarro, *supra* note 9.

country where the common factor is a local increase in fracking.[11] They note particularly that the Marcellus Shale formation lies deep underneath the Catskill watershed, which supplies drinking water to over 9 million people in the Greater New York City area.[12] Due to the high quality of that watershed, the City is able to provide unfiltered water directly from upstate, saving the billions of dollars it would otherwise be forced to spend on filtration.[13] Contamination of the Catskill watershed, fracking opponents argue, would be catastrophic.[14]

Faced with the conflict between pressure to develop one of the world's largest natural gas fields and equal pressure to protect one of its most vital sources of drinking water, the New York State Senate chose to err on the side of caution. In August of 2010 the State Senate passed a bill suspending the issuance of new permits for hydraulic fracturing in the Marcellus Shale formation in order to "continue the review and analysis of the effects of hydraulic fracturing on water and air quality, environmental safety and public health."[15] The Governor vetoed the legislation, but enacted a narrower moratorium by Executive Order.[16] The Order prohibited the issuance of permits for "high-volume, horizontal hydraulic fracturing" until July 1, 2011.[17] The ban has since remained in place pending the further revision of State regulations.[18]

Barring further action by the legislature or the Governor's office, fracking in the New York Marcellus will soon be a reality. Should the ban on the practice be lifted, it will be regulated

[11] *See* Clifford Krauss & Tom Zeller, Jr., *When a Rig Moves in Next Door*, N.Y. TIMES, Nov. 7, 2010, at BU1.

[12] *See* Navarro, *supra* note 9.

[13] *Id.*

[14] *See* Sandy Long, *America's Most Endangered River: the Upper Delaware*, RIVER REPORTER (June 3, 2010), http://www.riverreporter.com/issues/10-06-03/head1-endangered.html.

[15] N.Y.S. 8129B, 233d Sess. (2010).

[16] Tom Zeller, Jr., *New York Governor Vetoes Fracking Bill*, N.Y. TIMES GREEN BLOG (Dec. 11, 2010, 7:35 PM), http://green.blogs.nytimes.com/2010/12/11/new-york-governor-vetoes-fracking-bill.

[17] *Id.*

[18] Governor Andrew Cuomo's office described reports that it would seek to reinstate the practice of fracking in July 2011 as "baseless speculation and premature." Edith Honan & Joan Gralla, *New York Seeks To Lift Fracking Moratorium*, REUTERS (June 30, 2011, 2:14 PM), http://www.reuters.com/article/2011/06/30/natgas-newyork-fracking-idUSN1E75T16420110630. For more on the revision of New York's regulations, see infra, Part I.C.1.

under New York State law.[19] This Note explores the regulatory framework currently in place in the state and tests it against several issues of practical application evident from the experiences of other states that have dealt with the matter.[20]

The statute governing regulation of the hydraulic fracturing process in New York State contains a number of internal contradictions. The statute states its policy goals as follows: first, to regulate the development of oil and gas "in such a manner as will prevent waste"; second, to develop properties "in such a manner that a greater ultimate recovery of oil and gas may be had"; and third, to protect fully "the correlative rights of all owners and the rights of all persons including landowners and the general public."[21] The policy objectives listed illustrate the overarching contradiction contained in the statute: The state may choose to prevent waste and thereby achieve a greater recovery of oil and gas, or it may choose to protect fully the rights of all persons. It cannot do both at once. The conflicts between the statute's stated policies are illustrated by examining three main subjects.

First, limiting the statutory definition of "waste" to only the physical waste of oil and gas fails to account for the overall impact and resource expenditure of excess drilling. Second, the New York statute does not sufficiently address likely conflicts of interest between lease-holders and property owners, both of whom hold correlative rights in produced gas. Specifically, the statute is inconsistent on two issues: first, the inevitable question of whether fracking constitutes a trespass on—or rather under—another's land; and second, the tension between the rights of landowners and the State's policy of compulsory integration of

[19] *See infra*, Part I.B.

[20] This Note does not seek to advocate for or against the utilization of this method by the fossil fuel extraction industry in New York State, nor to question the wisdom of the exemption of the fracking process from federal regulation. These subjects have been, and will no doubt continue to be, discussed at length by other commentators. *See, e.g.*, 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 (2009); Laura C. Reeder, Note, *Creating a Legal Framework for Regulation of Natural Gas Extraction from the Marcellus Shale Formation*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 999 (2010); Aaron Stultz Heishman, Recent Development, *Recent Developments in Environmental Law*, 23 TUL. ENVTL. L.J. 561 (2010).

[21] N.Y. ENVTL. CONSERV. LAW § 23-0301 (McKinney 2011).

property to facilitate a greater recovery of gas. Lastly, the statute fails to delineate clearly the rights of the municipalities that most directly represent the local public.

In the interest of maximizing the efficacy of the law's stated policy objectives—a greater recovery of gas, protection of the correlative rights of property owners, and the full protection of the rights of all persons, including producers and the general public[22]—and minimizing the need for court action in addressing potential conflicts, this Note concludes by recommending the following discrete amendments to the current regulatory framework. First, the legislature should adopt a more comprehensive definition of waste that includes environmental waste and disposal. Second, legislators must reconcile the conflict between landowners' rights and the practice of compulsory integration in one of two ways: either by recognizing that the rights of landowners are subservient to the state's interest in facilitating the recovery of gas, or by preserving the right of landowners to keep their land free from industrial drilling and ending the practice of compulsory integration. Third, legislators should define the rights of operators on land compulsorily integrated under the present system. Finally, recognizing that the municipality is the political entity most receptive to the will of the public at the local community level, the power of local governments to determine what procedures may be imposed on industry to safeguard their local resources must be made clear. The state legislature should define the term "regulation" in Article 23's supersession clause to specify how much control local governments may exercise over the location of drilling and the traffic to drilling sites.

I. BACKGROUND

A. Fracking: The Process

Hydraulic fracturing allows for effective extraction in areas where conventional drilling would otherwise be inefficient and uneconomical. Conventional drilling is achieved by the boring of a shaft into the ground until it taps a pool of oil or gas.

[22] *Id.*

Extraction continues until that pool is exhausted.[23] But because of the extremely low natural permeability of shale, in a formation like the Marcellus, vast reserves of natural gas are effectively captured, bound up in the many stratified layers of rock, and unable to collect in large, unitary pools.[24] A conventional well, therefore, can extract only a very limited amount of gas from the area beneath it. Given the high cost of drilling, the extraction industry has understandably refrained from embarking on conventional drilling ventures likely to return only a meager yield.[25]

The fracking process, on the other hand, provides a technological means of extracting gas from shale more efficiently. The process begins in much the same way as conventional drilling: the extractor bores a hole into the ground, but at a somewhat horizontal slope, cutting across a wide area of the shale formation rather than straight down into it. Wells can extend laterally as far as 5,000 feet.[26] The extractor then injects water treated with a mixture of chemicals and solid particles—called propping agents or "proppants"[27]—into the well with high-pressure pumps. The pressure causes the rock to crack, allowing deeper penetration by the treated water and breaking the shale into small pieces.[28] The chemical compounds with which the

[23] *See* ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-TR-0565, DRILLING SIDEWAYS—A REVIEW OF HORIZONTAL WELL TECHNOLOGY AND ITS DOMESTIC APPLICATION 1–2 (1993), *available at* ftp://ftp.eia.doe.gov/petroleum/tr0565.pdf.

[24] *See, e.g.*, *Marcellus Shale: The Enviormental Review Process for Natural Gas Exploration in the Marcellus Shale*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION [hereinafter *Marcellus Shale*], http://www.dec.ny.gov/energy/46288.html (last visited Apr. 15, 2012).

[25] The total costs of extraction, from exploration through to production, transport, storage, and distribution, are incredibly high and have increased over the last several decades. The nominal cost per natural gas well drilled in 2008 is nearly 50 times what it was in 1960. *See* ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-0383(2009), ANNUAL ENERGY REVIEW 2009 112 fig.4.8 (2010), *available at* http://wilcoxen.maxwell.insightworks.com/pages/3427/oil-mdc-data.pdf.

[26] N.Y. STATE DEP'T OF ENVTL. CONSERV., PRELIMINARY REVISED DRAFT: SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS, AND SOLUTION MINING REGULATORY PROGRAM ch. 5, at 24–25 (2011) [hereinafter PRDSGEIS], *available at* http://www.dec.ny.gov/data/dmn/ogprdsgeisfull.pdf.

[27] *Marcellus Shale, supra* note 24. Common proppants include sand, resin-coated sand, aluminum pellets, and man-made ceramics. A proppant is typically selected because its permeability is greater than the rock in the surrounding formation.

[28] *Id.*

water has been treated allow the proppant to congeal, forming fissures in the rock around the well. These fissures cause the natural gas that would otherwise remain trapped in the shale to flow into the well where it can be extracted, stored, and ultimately transported for use in the energy market.[29]

Although recovery of natural gas by hydraulic fracturing has been highly lauded by many industrialists and politicians as a cleaner energy alternative to coal and oil, as well as a key component of American energy independence,[30] several environmental concerns cloud fracking's "green energy" pedigree. Chief among these concerns is the fact that the fracking process requires the use of massive amounts of water. Drilling a well can require as many as 600,000 gallons of water, and each frack of an individual well requires between 50,000 and 350,000 gallons of water.[31] This water can be transported via pipeline, but is more often trucked to extraction sites. Transporting this quantity of water requires the use of hundreds of tanker trucks for the drilling and initial frack of a single well. Given that each well is likely to be fracked up to eighteen times before it is closed and abandoned, the amount of water consumed per well can exceed five million gallons.[32] This level of water usage, along with the fuel expenditure and resultant emissions commensurate with the trucking of that water, thus gives the hydraulic fracturing process a significant environmental footprint.

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[29] *Id.*

[30] The number of large shale plays in the United States, most notably the Bakken, Barnett, Montney, and Haynesville formations, have made the United States a world leader in natural gas production. *See Natural Gas: An Unconventional Glut*, ECONOMIST, Mar. 13, 2010, at 12. This abundance has led some to call America "the Saudi Arabia of natural gas." Joe McKendrick, *America, the Saudi Arabia of Natural Gas*, SMARTPLANET (Mar. 18, 2010, 9:13 AM), http://www.smartplanet.com/business/blog/business-brains/america-the-saudi-arabia-of-natural-gas/5606.

[31] *See* Chesapeake Energy, *Hydraulic Fracturing Facts: Water Usage*, HYDRAULIC FRACTURING, http://www.hydraulicfracturing.com/Water-Usage/Pages/Information.aspx (last visited Apr. 15, 2012).

[32] *Id.* Using the ranges provided by industry, the variance between the potential minimum and maximum amount of water usage is notable. Calculated using the numbers at the smaller end of the range, the minimum amount of water used over the life of a well is 965,000 gallons. The numbers from the higher end of the range, though, yield an estimated water usage of 6.9 million gallons of water for a single well. In the information it supplies to the public on the subject, New York's Department of Environmental Conservation provides numbers decidedly nearer to the bottom of this range. *Marcellus Shale*, *supra* note 24 ("Each well may use more than one million gallons of water.").

But the issue of the sheer amount of water—itself an increasingly scarce resource—that the fracking process requires is directly connected to a second key environmental concern: how to handle that volume of water after it has been used. The extraction industry describes water that has been treated for hydraulic fracturing as produced water or "flowback."[33] Produced water contains both proppants and a chemical "cocktail": a blend of chemical agents not typically disclosed to the public because extractors regard individual chemical blends as trade secrets.[34] Although the specific composition of many of these compounds is unknown, commonly used components include benzene and ethylene—known carcinogens.[35] Fracking fluid is further contaminated during the pumping process because it is exposed to the methane gas that it is intended to help extract.[36] Extractors can recover between 68 and 82 percent of the water used in the drilling and fracturing processes, but the remainder of this produced water remains in the ground.[37] Produced water thus creates two distinct environmental issues: first, the potential impacts of the unrecoverable water on the surrounding areas; and second, the question of how best to handle the water that has been recovered.

The potential environmental and health impacts of unrecovered fracking fluid in deep shale formations are largely unknown. In 2004, the EPA conducted a study of the practice of hydraulic fracturing in underground coal formations. The study raised the possibilities of artificial fractures extending to an underground source of drinking water ("USDW") or facilitating the movement of produced water through natural formations into a USDW as "scenarios . . . of potential concern."[38] The EPA

[33] *See* PRDSGEIS, *supra* note 26, ch. 5, at 98.

[34] Abrahm Lustgarten, *Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?*, PROPUBLICA (Nov. 13, 2008, 2:00 PM), http://www.propublica.org/article/buried-secrets-is-natural-gas-drilling-endangering-us-water-supplies-1113 (" 'It is like Coke protecting its syrup formula for many of these service companies[.]' " (quoting Scott Rotruck, Vice President of Corporate Development at Chesapeake Energy)).

[35] On benzene, see U.S. Dep't of Health & Human Servs., *Testing Status Benzene 10389-Y*, NAT'L TOXICOLOGY PROGRAM, http://ntp.niehs.nih.gov/index.cfm?objectid=BCB630F7-123F-7908-7BB1B8384496F5B8 (last visited Apr. 15, 2012) ; on ethylene, see *id.* at http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/EthyleneOxide.pdf.

[36] EPA IMPACT STUDY, *supra* note 8, ch. 4, at 15, 17.

[37] *Id.* ch. 4, at 15–16.

[38] *Id.* ch. 3, at 5–6.

concluded, though, that "the injection of hydraulic fracturing fluids into coalbed methane wells poses little or no threat to USDWs" and that "[a]lthough potentially hazardous chemicals may be introduced into USDWs when fracturing fluids are injected into coal seams that lie within USDWs, the risk posed to USDWs by introduction of these chemicals is reduced significantly by groundwater production and injected fluid recovery . . . ."[39] Still, the EPA did not rule out the potential for contamination of drinking water sources by fracking fluids. Rather, the Agency's study concluded only that among the incidents of drinking water contamination, the study found no "confirmed evidence that drinking water wells have been contaminated by hydraulic fracturing fluid injection."[40] Recognizing the acute toxicity of at least one common additive to fracking fluid—diesel fuel—the Agency "reached an agreement with the major service companies to voluntarily eliminate diesel fuel from hydraulic fracturing fluids that are injected directly into USDWs for coalbed methane production."[41]

The environmental and health impacts of produced water that has been recovered, though also largely untested, are potentially even more profound. Unlike the fracking fluid that remains underground, often thousands of feet beneath potential drinking water sources, produced water that is recovered must be stored above ground until transportation to a long-term storage or treatment facility can be arranged.[42] One common method used by the industry is the storage of produced water in open containment pits or tanks, where it awaits trucks to carry it away.[43] Potential for spillage or leakage into the surrounding environment is high any time the water is moved from one location to another.[44] Due to the interconnectedness of water systems, spills or leaks of produced water can easily travel significant distances and ultimately affect drinking water, as well as animal and plant life, far from the drilling site.[45]

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[39] *Id.* ch. 7, at 5.

[40] *Id.* ch. 7, at 6.

[41] *Id.* ch. 7, at 5.

[42] *See* PRDSGEIS, *supra* note 26, ch. 5, at 98–99, 118, 120, 123, 130–31.

[43] *See* Galen Sanford, *'Produced' Water an Economic Opportunity*, GREENTECH MEDIA (May 13, 2010), http://www.greentechmedia.com/articles/read/produced-water-an-economic-opportunity/.

[44] *See* EPA IMPACT STUDY, *supra* note 8, ch. 4, at 16.

[45] *Id.*

In addition to water use and contamination concerns, gas wells utilizing the fracking process pose potential problems to air quality as well. During production, some gaseous hydrocarbons change state and become a liquid, referred to as condensate.[46] Tanks collecting condensate on drilling sites vent benzene, toluene, xylene, and ethylbenzene into the air. Because the vapors of these hydrocarbons are heavier than air, they can accumulate in the surrounding areas.[47] Prolonged exposure to significant quantities of the vented hydrocarbons can lead to serious health effects, including irreversible nerve damage.[48]

B. General Regulatory Structure

The regulation of the recovery of natural gas by underground injection of fluids is solely within the purview of the state where the drilling operation is conducted. Before 2005, the process was subject to federal regulation under the Safe Drinking Water Act, with the EPA providing states with minimum requirements for underground injection control ("UIC") programs.[49] A state retained primary regulatory authority of the activity unless the EPA determined that its UIC program did not meet those minimum requirements, which included inspection, monitoring, and record-keeping standards as well as prohibitions against state agencies authorizing any rule that endangered drinking water sources.[50] But in 2005, the Safe Drinking Water Act was amended by Congress specifically to exempt from the definition of underground injection the "underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities."[51] Since this amendment, regulation of fracking for oil or gas production has been the exclusive domain of state authorities.

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[46] *See, e.g.*, *Sources of Oil and Gas Pollution*, EARTHWORKS, http://www.earthworksaction.org/airpollutionsources.cfm (last visited Apr. 15, 2012).

[47] *Id.*

[48] *See* U.S. Dep't of Health & Human Servs., *supra* note 35.

[49] Legal Envtl. Assistance Found. v. EPA, 276 F.3d 1253, 1255 (11th Cir. 2001).

[50] *Id.* at 1264; *see also* 42 U.S.C. § 300h-4(a)-(b) (2006).

[51] 42 U.S.C. § 300h(d)(1).

C. New York's Regulatory Scheme

1. Statutory Underpinnings

Regulation of the natural gas drilling industry in New York is governed by Article 23 of the Environmental Conservation Law. That statute commits to the state Department of Environmental Conservation ("DEC") the authority to promulgate rules overseeing the development and implementation of natural gas extraction, treatment, and transportation.[52] As discussed above, DEC regulations are meant to provide for development according to several stated policy objectives: first, to prevent waste; second, to provide for a greater recovery of gas; third, to protect fully the correlative rights of all owners; and finally, to protect fully the rights of all persons including landowners and the general public.[53]

The DEC's regulations, in turn, are subject to certain requirements contained in New York's State Environmental Quality Review Act ("SEQRA").[54] SEQRA requires that state agencies consider the environmental impact of any activity subject to discretionary approval before issuing a permit.[55] Thus, when an action is deemed to have a potentially significant impact, the DEC is required to draft an Environmental Impact Statement ("EIS"). Once a draft EIS is available, it must be posted for a comment period of at least thirty days, allowing the public to voice any potential concerns to agency decision makers and project sponsors.[56]

Rather than consider each activity's environmental impact on a case by case basis, the DEC has standardized its assessments through two mechanisms: the Environmental Assessment Form ("EAF") and the Generic Environmental Impact Statement ("GEIS"). The EAF allows permit applicants to provide the DEC with the details of a specific proposed activity's estimated environmental impact rather than requiring agency analysis of every proposal.[57] A GEIS allows the DEC to

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[52] N.Y. ENVTL. CONSERV. LAW § 23-0305(8) (McKinney 2011).

[53] *Id.* § 23-0301.

[54] *See id.* §§ 3-0301(1)(b), (2)(m), 8-0113.

[55] *See* N.Y. COMP. CODES RULES & REGS. § 617.7 (2011).

[56] *See id.*

[57] *See* ENVTL. CONSERV. § 8-0109(2); Defreestville Area Neighborhoods Ass'n v. Town Bd., 299 A.D.2d 631, 632–34, 750 N.Y.S.2d 164, 166–67 (3d Dep't 2002); *see also* N.Y. COMP. CODES RULES & REGS. § 617.9 (2011); *SEQR: Environmental Impact*

complete one EIS for an entire class of activities, rather than demanding a separate EIS for each individual proposal within the class.[58] Public comment period is solicited once, prior to the adoption of the GEIS, rather than prior to the issuance of each individual permit.[59] Once released, the GEIS covers virtually all projects within the class.

Until recently, proposed gas wells in New York were covered by a GEIS promulgated in 1992. The 1992 GEIS determined that the issuance of a standard individual oil or gas well drilling permit anywhere in the state, when no other permits are involved, was a "non-significant action" under SEQRA.[60] In 2008, anticipating increased instances of horizontal drilling and high-volume hydraulic fracturing in the State, the DEC determined that these practices warranted further review.[61] The DEC resolved to develop a Supplemental GEIS ("SGEIS") to address three key factors distinguishing these practices from more conventional drilling: "(1) required water volumes in excess of GEIS descriptions, (2) possible drilling in the New York City Watershed, in or near the Catskill Park, and near the federally designated Upper Delaware Scenic and Recreational River, and (3) longer duration of disturbance at multi-well drilling sites."[62] A draft SGEIS was published in September of 2009.[63] In response to additional research and extensive public comment on the draft, the DEC continued to revise the SGEIS through the summer of 2011. A Preliminary Revised Draft SGEIS ("prdSGEIS") was released in July of 2011,[64] with a further revision released in September.[65] As of this writing, the DEC has

Assessment in New York State, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/permits/357.html (last visited Apr. 15, 2012).

[58] N.Y. COMP. CODES RULES & REGS. § 617.10.

[59] *Id.*

[60] N.Y. STATE DEP'T OF ENVTL. CONSERVATION, FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM § II.A, tbl.1(a) (July 1992), *available at* ftp://ftp.dec.state.ny.us/dmn/download/geismaster.pdf.

[61] PRDSGEIS, *supra* note 26, ch. 1, at 4–5.

[62] N.Y. STATE DEP'T OF ENVTL. CONSERVATION, DRAFT: SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM ch. 1, at 4 (2009) [hereinafter 2009 DSGEIS], *available at* ftp://ftp.dec.state.ny.us/dmn/download/OGdSGEISFull.pdf.

[63] *See generally id.*

[64] *See* PRDSGEIS, *supra* note 26.

[65] The Revised Draft SGEIS was issued on September 7, 2011, and was open for public comment until January 11, 2012. *See Marcellus Shale*, N.Y. St. Department

not yet released a finalized version of the SGEIS. For purposes of its analysis, this Note assumes that the prdSGEIS will be adopted without substantial alteration and that its terms will govern the issuance of permits for new hydraulic fracturing wells in the post-moratorium period.[66] This Note does not pretend to possess the scientific expertise necessary to present an opinion on the sufficiency or efficacy of these measures.

2. The Regulatory Life-Cycle of a Natural Gas Well[67]

a. Birth: Permitting and Unitization

The process of complying with New York State regulations to begin drilling for natural gas is relatively straightforward. As a threshold matter, an operator must first demonstrate that it is a legitimate organization with adequate financial security,[68] but broadly speaking, the process consists of just two steps. First,

of Envtl. Conservation, http://www.dec.ny.gov/energy/46288.html (last visited Oct. 24, 2012).

[66] The draft SGEIS for high-volume hydraulic fracturing exempts a proposed fracking well from site-specific SEQRA determinations—and therefore from periods of comment by the local public—unless it falls within one of seven particular categories. Projects only require individual assessment where: (1) the target is shallower than 2,000 feet; (2) the target is less than 1,000 feet below the base of a known fresh water supply; (3) the proposal contains a centralized flowback water surface impoundment not previously approved; (4) the well pad is within 300 feet of a reservoir, stem, or controlled lake; (5) the well pad is within 150 feet of a private water well or other watercourse; (6) the project anticipates a significant reduction in the flow or habitat of nearby surface waters; or (7) *the location is within 1,000 feet of subsurface water supply infrastructure. See* 2009 DSGEIS*, supra* note 62, ch. 8, at 2–3. Whether this limitation on allowing the public to comment on individual wells further compromises Article 23's stated aim of fully protecting the rights of the public is too broad-reaching a question for this Note.

[67] The term "life-cycle" is used only as an analogy to present the reader with familiar stages of existence: birth, maturity, and death. In many ways, the term is inappropriate because gas wells do not share the characteristics of living things. They are not alive, nor are they part of any natural cycle.

[68] *Well Permitting Process: Well Permitting Requirements To Drill, Deepen, Plug Back and Convert for Oil, Gas, Solution Salt Mining and Other Regulated Wells*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/energy/1772.html (last visted Apr. 16, 2012). An operator may demonstrate financial security by submitting a Bond form, letter of credit, or similar financial document. *Financial Security*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/energy/1622.html (last visited Apr. 16, 2012). Assuming that they maintain sufficient financial security, companies already on file with the DEC need not repeat this step with each and every application.

the operator must establish a "spacing unit" for the project. Once the project is unitized, the operator may then apply to the DEC for a well permit.[69]

The DEC defines a spacing unit as "the geographic area assigned to the well for the purposes of sharing costs and production."[70] The prdSGEIS provides three options for standard unitization of hydraulic fracturing wells, but anticipates that "multi-well pads"—spacing units that allow for the drilling of multiple horizontal wells—will be the most commonly utilized.[71] The prdSGEIS also allows for the drilling of additional wells from separate locations within a spacing unit "with justification."[72] These are known as "infill" wells.[73] The initial wellbore must be approximately centered in the spacing unit, and no wellbore inside the unit may be within 330 feet of a unit boundary.[74] Because the standards for spacing units were the subject of public comment in the generic EIS, no public comment period is necessary for the DEC to establish a new unit that conforms with those standards.

As an alternative to the standard spacing requirements, the prdSGEIS allows for variances and non-conforming spacing units when such an allowance satisfies the policy objectives of Section 23-0301—that is, preventing waste and achieving a greater recovery of gas.[75] In the event that the DEC wishes to grant a permit to a non-conforming spacing unit, it must open the proposal for a period of public comment and, potentially, an adjudicatory hearing.[76]

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[69] *Drilling Permit Application*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/energy/1783.html (last visited Apr. 16, 2012).

[70] PRDSGEIS, *supra* note 26, ch. 5, at 17 n.16.

[71] *Id.* ch. 5, at 30.

[72] *Id.* ch. 5, at 24.

[73] *Id.* glossary, at 10. The drilling of infill wells is justified if "necessary to satisfy the policy objectives of section 23-0301." N.Y. ENVTL. CONSERV. LAW § 23-0503(4) (McKinney 2011). The term "infill drilling" is understood in the industry to refer to the "[a]dd[ition of] new wells in an existing field . . . to accelerate recovery or to test recovery methods." *See, e.g.*, *Infill Drilling Definition*, OILGASGLOSSARY.COM, http://oilgasglossary.com/infill-drilling.html (last visited Apr. 16, 2012). Presumably, then, a demonstration by the operator that an additional well would either accelerate recovery or achieve a greater recovery of gas is sufficient to justify additional drilling. *See* ENVTL. CONSERV. § 23-0301.

[74] ENVTL. CONSERV. § 23-0501(1)(b)(1)(vi).

[75] *Id.* § 23-0503(3)(a); PRDSGEIS, *supra* note 26, ch. 5, at 17.

[76] PRDSGEIS, *supra* note 26, ch. 5, at 24.

For a proposed spacing unit to be valid, the operator must control at least 60 percent of the acreage contained within it.[77] The remaining 40 percent—up to 256 acres—need not be controlled at the time of application. This uncontrolled portion of the proposed unit may be brought under the operator's control through the processes of voluntary or compulsory integration.[78]

Once a proposed spacing unit has been established, the operator may proceed with the application process. The application itself is just two pages long, requiring only the essential details concerning the proposed well, including its location, type, and target formation.[79] Along with the application, the operator must submit a fee,[80] as well as several supporting documents. First, the operator must submit a survey map showing the proposed well's location, the boundaries of the lease containing the well, and information on any wells nearby. The operator must also present a map showing the proposed spacing unit and an affirmation that it controls drilling rights in 60 percent of that unit. Finally, the operator must submit a document describing the proposed drilling program and a form assessing its likely environmental impact on the area.[81] All of these documents are prepared by the applicant and, though the DEC inspects the service location to determine whether it is an appropriate site for drilling, the DEC itself conducts no site-

[77] ENVTL. CONSERV. § 23-0501(2).

[78] *Id.* § 23-0501(2)(b). The process of integration is discussed at length *infra*, Part II.B(2).

[79] N.Y. STATE DEP'T OF ENVTL. CONSERVATION, APPLICATION FOR PERMIT TO DRILL, DEEPEN, PLUG BACK OR CONVERT A WELL SUBJECT TO THE OIL, GAS AND SOLUTION MINING LAW, *available at* http://www.dec.ny.gov/docs/materials_minerals_pdf/dril_req.pdf.

[80] *Drilling Permit Application*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/energy/1783.html (last visited Apr. 16, 2012). The amount of the fee due is dependent on the depth of the proposed well.

[81] *Id.*

specific testing prior to issuance of a permit.[82] In the case of multi-well pads, the DEC may elect not to re-inspect the site prior to issuing a permit to drill a new well.[83]

b. Adolescence and Maturity: Site Preparation and Operation

Actual operation of a well is subject to more complex regulation including record-keeping and monitoring requirements, inspection, and testing for environmental compliance. Under the prdSGEIS, any permit issued for hydraulic fracturing will be dependent on the operator meeting an elaborate set of conditions.[84] At the outset, an operator must create a series of environmental impact plans, an emergency response plan, develop a road use agreement with the municipality, and properly prepare the site for industrial activity.[85] A number of conditions require periodic compliance over the well's lifetime. For example, prior to any initial site disturbance or subsequent drilling, an operator must conduct tests of residential water wells within 1,000 feet of the well pad. These tests must be conducted by a certified commercial laboratory, not by the DEC, and must continue periodically until a year after the last fracking on the well pad occurs.[86]

The prdSGEIS contains extensive regulations covering site maintenance, drilling, and stimulation—the process of actually fracking the well.[87] Some of these regulations concern what materials are allowable to conduct a given activity. For example, handling and containment of produced water on the well pad requires steel tanks,[88] and only properly labeled biocides—additives used to kill bacteria—may be used for any operation.[89] Other regulations prescribe specific procedural mandates for

[82] *See* PRDSGEIS, *supra* note 26, ch. 8, at 47–48. Discretionary activities require an environmental impact assessment in accordance with the State Environmental Quality Review ("SEQR") and 6 NYCRR Pt. 617, but these assessments are now standardized through the required—and operator-prepared—Environmental Assessment Form. *See SEQR: Environmental Impact Assessment in New York State*, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, http://www.dec.ny.gov/permits/357.html (last visited Apr. 16, 2012).

[83] *See* PRDSGEIS, *supra* note 26, ch. 8, at 47–48.

[84] *See id.* app. 10 at 1–13.

[85] *Id.* app. 10 at 1–3.

[86] *Id.* app. 10 at 2; *id.* ch. 7, at 46.

[87] *See id.* app. 10 at 3–11.

[88] *Id.* app. 10 at 10.

[89] *Id.* app. 10 at 6; *see also id.* glossary, at 1–2.

drilling and fracturing operations. Required procedural conditions must be followed for the monitoring of the unused depth of fluid storage pits—known as "freeboard" monitoring[90]—as well as the removal of fluids from those pits.[91] Additional conditions mandate "[a]ppropriate pressure control procedures" during drilling[92] and detailed procedures for the actual fracturing of a well.[93] The operational regulations extend to record-keeping and reporting requirements. Records must be kept of the site's storm-water pollution protection plan ("SWPPP"),[94] the adequacy of the well's cement bond,[95] all pressure tests conducted,[96] all formations penetrated,[97] and any fresh water, brine, oil, or gas encountered during drilling.[98] Furthermore, the operator must maintain a detailed record of the hydraulic fracturing operation and that log must be available for inspection by the DEC upon request.[99] This record must include "all types and volumes of materials, including additives, pumped into the well, flowback rates, and the daily and total volumes of fluid recovered during the first 30 days of flow from well."[100] Operators are required to report to the DEC before commencing surface casing cementing operations,[101] before using any previously unreviewed chemical products,[102] and upon the occurrence of "[a]ny non-routine incident."[103]

c. Death: Plugging and Abandonment

Nor is terminating the operation of a well free from regulation. An operator may not abandon a well, even temporarily, without notification to the DEC and compliance with agency regulations.[104] When an operator wishes to plug and

[90] *Id.* app. 10 at 3; *see also id.* glossary, at 8.
[91] *Id.* app. 10 at 3.
[92] *Id.* app. 10 at 4.
[93] *Id.* app. 10 at 9–10.
[94] *Id.* app. 10 at 3.
[95] *Id.* app. 10 at 7–8.
[96] *Id.* app. 10 at 8.
[97] *Id.* app. 10 at 12.
[98] *Id.* app. 10 at 8.
[99] *Id.* app. 10 at 10.
[100] *Id.*
[101] *Id.* app. 10 at 7.
[102] *Id.* app. 10 at 8.
[103] *Id.* app. 10 at 12.
[104] *See* N.Y. COMP. CODES RULES & REGS. § 555.3(a) (2011) (prohibiting temporary abandonment for a period longer than 90 days).

abandon a well permanently, it must provide the DEC with formal notice of its intention to abandon at least ten days in advance of commencing the procedure. The DEC then issues a permit and arranges for a representative from the DEC to be present to witness the plugging.[105] Before the drilling site may be abandoned legally, the operator must satisfy the DEC that the well has been plugged in accordance with DEC regulations, including that the well bore itself has been filled with cement "from total depth to at least 15 feet above the top of the shallowest formation from which the production of oil or gas has ever been obtained in the vicinity."[106]

Apart from closure of the well itself, the surrounding area must also be reclaimed according to DEC regulations. The prdSGEIS specifies that the removal of fluids from the site must take place within forty-five days of the completion of operations.[107] The operator must consult with the DEC before disposing of any cuttings containing chemical additives.[108] Finally, the prdSGEIS requires that the operator scarify the affected land to alleviate compaction before restoring, seeding, and mulching the topsoil.[109]

The permit conditions and operational regulations listed above are non-exhaustive, but provide some idea of the scope and focus of the DEC's regulatory structure and its emphasis on post-permitting regulation, supervision, and reclamation.

II. INHERENT CONTRADICTIONS & POLICY CONFLICTS

Some of the contradictions inherent in New York's natural gas mining statute are plain from a hard look at the statute itself. Further contradictions become apparent when the regulatory framework is examined in the context of cases that have arisen in other states with practical experience in regulating high-volume hydraulic fracturing. This Section will examine each of the statute's stated policy aims, present several of the more illuminating cases, and enumerate the specific internal contradictions that they reveal in New York's approach.

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[105] *Id.* § 555.4(b).
[106] *Id.* § 555.5(a)(1).
[107] *See* PRDSGEIS, *supra* note 26, app. 10 at 11.
[108] *Id.*
[109] *Id.* app. 10 at 12.

A. Prevention of "Waste"

The first stated policy objective of Article 23 of the Environmental Conservation Law is to regulate the production of gas "in such a manner as will prevent waste."[110] Article 23 includes an explicit definition of "waste" that does not seem to extend to waste products or environmental waste. Specifically, the Article's definition is limited to "[p]hysical waste, as that term is generally understood in the oil and gas industry," and waste which, through inefficiency, results in the loss of oil and gas that would otherwise be recoverable.[111] Industry glossaries do not offer an indication of what might be meant by "physical waste,"[112] but the remaining context of the Article strongly suggests that the definition is meant to be limited to either the actual, physical loss of oil and gas or the diminishment of potential recovery. Article 23's enforcement provision lists as its chief offense, quite succinctly, that "[i]t shall be unlawful for any person to: 1. Waste oil or gas."[113] Title 21 of Article 23, New York's codification of the Interstate Compact to Conserve Oil and Gas, reinforces this understanding of the term. It states that "[t]he purpose of this compact is to conserve oil and gas by the prevention of physical waste thereof from any cause."[114]

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[110] N.Y. ENVTL. CONSERV. LAW § 23-0301 (McKinney 2011).

[111] *Id.* § 23-0101 ("Waste means a. Physical waste, as that term is generally understood in the oil and gas industry; b. The inefficient, excessive or improper use of, or the unnecessary dissipation of reservoir energy; c. The locating, spacing, drilling, equipping, operating, or producing of any oil or gas well or wells in a manner which causes or tends to cause reduction in the quantity of oil or gas ultimately recoverable from a pool under prudent and proper operations, or which causes or tends to cause unnecessary or excessive surface loss or destruction of oil or gas; d. The inefficient storing of oil or gas; and e. The flaring of gas produced from an oil or condensate well after the department has found that the use of the gas, on terms that are just and reasonable, is, or will be economically feasible within a reasonable time."); *see also* N.Y. COMP. CODES RULES & REGS. § 550.3(ax) (2011).

[112] *See Oil & Gas*, ALPHADICTIONARY.COM, http://www.alphadictionary.com/directory/Specialty_Dictionaries/Oil_,038_Gas (last visited Apr. 16, 2012); *see also Results for Waste Definition*, OILGASGLOSSARY.COM, http://oilgasglossary.com/?s=Waste (last visited Apr. 16, 2012).

[113] N.Y. ENVTL. CONSERV. LAW § 71-1305(1) (McKinney 2011).

[114] *Id.* § 23-2101(1).

By contrast, the prdSGEIS developed by the DEC evidences a broader, more conventional understanding of the term waste.[115] It mandates disposal and treatment procedures for the cuttings created during drilling, the liner of storage pits, the millions of gallons of "flowback" or produced water, production brine, and solid residual waste.[116] The 2009 draft SGEIS referenced studies by the Ground Water Protection Council ("GWPC"), an association of regulators in other states, whose findings on hydraulic fracturing waste disposal focus on produced water, not the physical waste of oil or gas.[117] As the study indicates, "[a]pproximately 98% of all material generated from oil and gas [exploration and production] operations in the U.S. is produced water."[118]

The generation of produced water creates a number of environmental waste concerns. Most obviously, the recovery, storage, and transport of produced water are highly susceptible to spillage.[119] Spillage not only necessitates soil remediation in the area where the spill occurred, but also increases the risk of contamination of nearby water resources.[120] But even when no spillage occurs, handling such large volumes of toxic material has a significant environmental impact. Most particularly, there is the question of the final disposal of the produced water. Some produced water is re-injected into deep underground disposal wells, where it can potentially affect sources of drinking water.[121] Much of the produced water, though, is sent to treatment

[115] Both definitions of "waste" should be distinguished from the term of art used in property law to describe acts which cause "an irreparable injury to the reversioner." Jackson v. Brownson, 7 Johns. 227 (N.Y. Sup. Ct. 1810). Under traditional waste doctrine, total extraction of a valuable resource from the land by anyone but the landowner would always constitute waste. Because the Environmental Conservation Law seeks to allow gas-drilling lessors to extract as much of the resource as possible, the statute cannot mean to adopt this understanding of the term. For a detailed look at the evolution of waste doctrine in property law, see Jedediah Purdy, *The American Transformation of Waste Doctrine: A Pluralist Interpretation*, 91 CORNELL L. REV. 653 (2006).

[116] PRDSGEIS, *supra* note 26, ch. 5, at 129–34.

[117] *See* 2009 DSGEIS, *supra* note 62, ch. 5, at 147 (citing GROUND WATER PROT. COUNCIL, ET AL., STATE OIL AND NATURAL GAS REGULATIONS DESIGNED TO PROTECT WATER RESOURCES (May 2009) [hereinafter GWPC REPORT], *available at* http://www.gwpc.org/e-library/documents/general/State%20Oil%20and%20Gas%20Regulations%20Designed%20to%20Protect%20Water%20Resources.pdf).

[118] GWPC REPORT, *supra* note 117, at 30 (footnote omitted).

[119] PRDSGEIS, *supra* note 26, ch. 6, at 18.

[120] *Id.*

[121] *Id.* ch. 5, at 131.

facilities. The sheer volume of water to be moved demands that hundreds of tanker trucks be employed to transport the waste generated in a single fracturing. Purely in terms of the subsequent carbon dioxide emissions, this amount of traffic will leave a substantial environmental footprint over time. Unfortunately, potential problems do not stop after shipment. The capacity of waste that any one treatment facility may process is limited by the prdSGEIS, and a facility can be punished for accepting waste that exceeds its capacity or that contains chemicals it is not equipped to treat.[122] Samples from Pennsylvania and West Virginia raise an additional concern that exposure to chemical additives and naturally-occurring elements of underground rock formations may render produced water untreatable by existing facilities.[123]

Confronted with such large quantities of waste, New York facilities may either reach capacity or simply be unable to treat produced water effectively. In such an eventuality, the disposal options that remain open to operators are unclear. They may be forced to ship their produced water out of state for treatment or injection elsewhere. Since much of the water will have been pumped out of fresh water sources within New York State, removing it from the local hydrologic cycle could significantly impact the State's ecology.[124] It is also possible that in the face of disposal difficulties operators will be tempted to discharge produced water directly into the environment in violation of DEC regulations. Whatever the ultimate outcome, given the tremendous volume of produced water likely to be generated by extensive fracking in the New York Marcellus, the legislature should address the issue. To ignore the ramifications of both solid and liquid waste products as a matter of policy by excluding them from the statutory definition of waste is a gross error.

B. Correlative Rights & Rights of Landowners

This Section will explore the related concepts of correlative rights and the rights of landowners. It will begin by identifying these rights as they are generally understood and the methods

[122] *Id.* ch. 6, at 55, 59, 61.

[123] *Id.* ch. 6, at 56.

[124] *See* Robert B. Jackson et al., *Water in a Changing World*, ISSUES IN ECOLOGY, Spring 2001, at 1, 3–9, *available at* http://www.epa.gov/owow/watershed/wacademy/acad2000/pdf/issue9.pdf.

employed by the statute to protect them. Contrasting New York's approach with that of two other states, it will conclude that an inherent tension exists between these two policy aims and that the legislature should clarify for the courts which policy interest it believes to be paramount.

1. Correlative Rights

Correlative rights, the protection of which is Article 23's second stated policy aim, are not explicitly defined in that Article. The correlative rights doctrine is generally defined as one limiting the rights of landowners in a common underground source to a reasonable share, typically based on the amount of surface area owned by each.[125] The term is perhaps most commonly used to refer to the rights of landowners in a common resource such as groundwater. Each owner must limit his use of the resource to a proportional share, preventing one owner from draining the resource and depriving his fellow owners of its use.[126]

In the context of gas extraction, this means that each landowner inside of a particular spacing unit is entitled to a share of the gas extracted from the entire unit in proportion to the amount of acreage owned, regardless of any single well's productivity. In theory, this practice protects the rights of an owner to the resource that lies under her land without requiring her to sink a new well and extract the gas herself.

2. Rights of Landowners

Article 23 claims as its next policy objective the full protection of "the rights of all persons including landowners."[127] The methods chosen to achieve this objective, detailed in Titles 7 and 9 of the Article, indicate that the rights referred to are, primarily, a landowner's correlative rights as discussed above. Titles 7 and 9 provide, respectively, for the voluntary[128] and compulsory[129] integration and unitization of oil and natural gas pools and fields. The first step in creating a spacing unit takes

[125] BLACK'S LAW DICTIONARY 396 (9th ed. 2009).
[126] *Id.*
[127] N.Y. ENVTL. CONSERV. LAW § 23-0301 (McKinney 2011).
[128] *Id.* § 23-0701(1).
[129] *Id.* § 23-0901(1).

place at the time an operator applies for a permit to drill.[130] For the spacing unit to be approved, the operator/applicant need control only 60 percent of the acreage contained within it.[131] Once a spacing unit has been established, owners of the separate interests within that unit may elect either to integrate interests voluntarily or, if "necessary to carry out the policy provisions . . . of this article," by compulsion of the DEC.[132] The specific policy provisions to which this section of the statute refers are not identified. One must assume, since compulsion by its very nature indicates a limitation on a person's right to refuse, that 23-0901 does not refer to the provision that claims to protect fully the rights of landowners. The practice of compulsory integration reveals an inherent contradiction in Article 23. The statute at once claims to protect landowners' rights, but denies landowners the right to refuse to integrate their land into a spacing unit.

Once compelled to join a spacing unit subject to drilling, a landowner's rights are limited to the ability to choose between three options. He may elect to become either an "[i]ntegrated participating owner," an "[i]ntegrated non-participating owner," or an "[i]ntegrated royalty owner."[133] If he elects to become a participating owner, he is responsible to pay his proportionate share of all costs associated with participation, including taxes and claims of third parties related to the well.[134] If he elects instead to become a non-participating owner, he is still responsible for his proportionate share of the costs, but that share is reimbursed to the operator out of production proceeds rather than owed to the operator prior to the commencement of production.[135] If he elects to become a royalty owner, he has no obligation to share the costs of the well, but he is still entitled to a royalty "equal to the lowest royalty . . . in the spacing unit, but no less than one-eighth."[136] Thus, the landowner's rights protected by the statute are not the commonly understood rights

[130] *See supra* Part I.C(2)(a).

[131] ENVTL. CONSERV. § 23-0501(2).

[132] *Id.* § 23-0901(2).

[133] *See id.* § 23-0901(3)(a)(1)–(3).

[134] *See id.* § 23-0901(3)(a)(2), (3)(c)(1)(ii)(A).

[135] *See id.* § 23-0901(3)(a)(1). A non-participating owner is also assessed a "risk penalty" of two-hundred percent of his share of actual costs. *Id.*

[136] *See id.* § 23-0901(3)(a)(3). An integrated owner who makes no election is deemed to be a royalty owner.

of fee-simple ownership, but are rather limited to the rights of a landowner to participate in a drilling operation and assert a claim for a proportional royalty under the correlative rights doctrine.

It is clear from the terms of the statute that a landowner may not refuse to have her land integrated into a spacing unit. Less clear is what rights the statute grants to an operator over the land once that land has been integrated. The practice of compulsory integration, in conjunction with the correlative rights doctrine, focuses primarily on sub-surface rights. Still, the statute does not prohibit—and may be read explicitly to allow—surface disturbances of integrated land. Title 9 of Article 23 provides that "[t]he well operator, on behalf of the owner, shall be entitled to conduct all acts associated with the well and necessary facilities related thereto."[137] Elsewhere, the statute describes the operations covered by an integration order as "including, but not limited to, the commencement, drilling, or operation of a well . . . upon any portion of a spacing unit."[138] As such, though it may not occur regularly in practice, an operator could theoretically drill on compulsorily integrated land against the landowner's will and still be in statutory compliance. Given the potential money to be made by extracting natural resources, theoretical loopholes in the regulatory structure can be expected to turn into practical transgressions, as demonstrated by the experiences of other states.

3. The Fracking Pioneers: Correlative Rights & Landowners' Rights in Texas and Oklahoma

Where correlative rights are granted to individual landowners but large extraction companies dominate the market, conflicts of interest are likely to arise. Demonstrative examples of these conflicts are readily seen in two cases that arose in Oklahoma and Texas, respectively.

[137] *Id.* § 23-0901(3)(c)(1)(ii)(I).
[138] *Id.* § 23-0901(3)(f).

a. Correlative rights

Oklahoma's high court has defined correlative rights as:

> [T]hose rights which one owner possesses in a common source of supply in relation to those rights possessed by other owners in the same common source of supply . . . . [I]t must be emphasized that [the] common source of supply in which the owners of mineral interests possess correlative rights is the underlying geological strata . . . rather than the well through which the oil and gas is reduced to possession.[139]

Thus as a rule, to protect the common source of supply, the State Commission set "allowables"—restrictions on the amount of gas an individual well could produce despite its potential productivity. Still, in the case of *Sinclair Oil & Gas Co. v. Corp. Commission*, the court recognized that exceptions to this rule were often necessary, finding

> the necessity of draining such reservoirs with a minimum of waste[ ] as more important than attempting to guarantee to any owner or operator that his permitted well or wells will produce the precise quantity of gas which some may predict to be in place under the entire surface area of his land.[140]

In *Sinclair*, owners whose wells exhibited lesser productivity brought suit against the Commission for allowing owners of wells with greater productivity to extract gas in excess of their allowable share.[141] The court recognized that the opposed interests—prevention of waste and protection of correlative interests—could not be reconciled without one giving ground to the other. The court deemed it in the public's best interest to minimize waste rather than protect owners' rights in the profits of an inferior well.[142]

New York's regulatory system handles this problem deftly, at least as far as the interests of persons whose land is within a spacing unit are concerned. Under New York law, owners share the proceeds from all gas recovered on a given spacing unit according to the percentage of land they own within that unit. The productivity of an individual well, or its location on one parcel rather than another, does not affect the amount to which the owners of those parcels are entitled. Take, for example, a

[139] Samson Res. Co. v. Corp. Comm'n, 702 P.2d 19, 22 (Okla. 1985).
[140] 378 P. 2d 847, 853 (Okla. 1963).
[141] *Id.* at 850–51.
[142] *Id.* at 852–53.

spacing unit consisting of two parcels of land of equal size. A well on parcel *A* turns out to be incredibly productive, but another well on parcel *B* yields only modest recovery. Under a system of allowables, operator *A* would be forced either to limit the amount he extracted from the productive well, or apply for an exemption. In New York, owners *A* and *B* share the profits of the two wells equally. When adjacent parcels are not within the same spacing unit, however, New York's system is vulnerable to other policy conflicts.

b. Landowners' Rights

It is unfortunate but likely that a policy of protecting individual landowner's rights regardless of environmental waste will lead to disreputable, though not necessarily prohibited, behavior on the part of extractors. In Texas, the recent case of *Coastal Oil & Gas Corp. v. Garza Energy Trust*[143] presented just such a situation. In that case, the defendant extractor owned a parcel of land directly adjoining another parcel on which it merely held a lease.[144] Drilling yielded an exceptionally productive well on the leased parcel, recovering gas on which the defendant was required to pay a royalty. It was in the defendant's best interest as the owner of the adjacent parcel to recover as much of the gas underneath the productive well from the adjacent parcel as possible. Consequently, the defendant drilled a number of infill wells on its own parcel as near to the border with the productive parcel as allowed by law.[145] The defendant then extensively fracked the wells on its own parcel, causing a significant amount of the gas from the productive parcel to drain across the boundary to the adjacent wells.[146]

One salient issue raised by *Coastal Oil* was whether the penetration by hydraulic fracturing of an adjoining parcel of land constitutes a trespass allowing for recovery of damages in the amount of the value of the gas drained.[147] To resolve such an issue, one must first determine which policy concern—the rights of landowners or the prevention of waste—one wishes to prevail.

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[143] 268 S.W.3d 1, 4 (Tex. 2008).

[144] *Id.* at 5.

[145] *Id.* at 6.

[146] *Id.* at 7 ("[T]he frac[k]ing of the Coastal Fee No. 1 and No. 2 wells was . . . 'massive' . . . .").

[147] *Id.* at 4.

The outcome then depends on whether one's definition of waste is limited to the physical waste of the gas itself or broadened to include environmental waste. The facts of *Coastal Oil* present another strong argument for the expansion of the definition of waste to include environmental factors other than the loss of gas. The amount of gas recovered would be the same whether it was drawn from the naturally productive parcel or the adjacent, heavily fracked parcel. If one could recover the same amount of gas without contaminating millions of gallons of water, the use of that water can only be described as wasteful.[148]

If the rights of landowners are to be protected fully, an action in trespass for such an incursion would be imperative. The landowner protected by such an action in a case like *Coastal Oil* would be the owner of the productive parcel, who is entitled to the profits from the resource trapped beneath his land. The operator should not be permitted to deny those profits to the landowner by using fracturing to free the gas and recover it on the other side of a boundary. But if instead the chief objective is the prevention of waste, allowing an action in trespass for fracking over a boundary would be counter-intuitive. Imagine a situation where a high producing well could easily recover a greater amount of gas by extending its reach beyond a boundary line through fracking. If this act were to be regarded as a trespass, gas that would otherwise be recoverable would be lost, creating waste.

In *Coastal Oil*, the Supreme Court of Texas held that the rule of capture precluded any damages for drainage caused by hydraulic fracturing.[149] The Court's reasoning depended largely on two findings: first, that in order to recover gas from certain geological formations "hydraulic fracturing is not optional"; and second, that the practice "cannot be performed both to maximize reasonable commercial effectiveness and to avoid all drainage. Some drainage is virtually unavoidable."[150] The Texas Court opted to hold in favor of the greater recovery of oil and gas, but by relying on the rule of capture it recognized that it did so at the expense of landowners whose assets were drained away.

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[148] The primary dictionary definition of "waste" is to "use or expend carelessly, extravagantly, or to no purpose." Waste, NEW OXFORD AMERICAN DICTIONARY 1951 (3d ed. 2010).

[149] *Coastal Oil*, 268 S.W.3d at 17.

[150] *Id.* at 16.

Even had the Court reached the opposite outcome, the issue raised in *Coastal Oil* would still make clear that simultaneous support for these two policy positions is not tenable. Given that New York's regulations allow for the drilling of infill wells within 330 feet of a spacing unit boundary[151] and that hydraulic fracturing wells can extend as far as 5,000 feet,[152] situations similar to those outlined in *Coastal Oil* are likely to arise. New York's legislature must provide guidance to the courts that will have to decide these controversies as to which policy the State favors. If the State wishes to protect the rights of landowners regardless of potential waste, it should allow for a cause of action in trespass for sub-surface fracturing. If, however, the State prefers the policy of achieving a greater recovery of gas while minimizing waste, sub-surface fracturing to achieve that recovery should not constitute a trespass.

C. Rights of the General Public

Finally, Article 23 provides for the full protection of the rights of "all persons including . . . the general public."[153] As the political entity in closest contact with any local community, the municipality is the body in the best position to discern the will of the public and defend local public interests. As such, the power of local governments to determine what procedures may be imposed on industry to safeguard local resources must be made clear.

1. Municipal Rights

The rights of the public as they might be embodied in local municipalities are expressly limited by New York's drilling statute. Title 3 of Article 23 states that "[t]he provisions of this article shall supersede all local laws or ordinances relating to the regulation of the oil, gas[,] and solution mining industries,"[154] but does not provide an explicit definition of what it means by the term "regulation," particularly with regard to the term's scope. Nor does the statute completely foreclose local government jurisdiction. It goes on to specify that its provisions do not supersede "local government jurisdiction over local roads or the

[151] PRDSGEIS, *supra* note 26, ch. 5, at 22.
[152] *Id.* ch. 5, at 25.
[153] N.Y. ENVTL. CONSERV. LAW § 23-0301 (McKinney 2011).
[154] *Id.* § 23-0303(2).

rights of local governments under the real property tax law."[155] By allowing some local government jurisdiction to remain intact and failing to define clearly which local actions are superseded, the legislature has left the door open for localities to challenge the limits on their remaining power. Recent experience in Pennsylvania suggests that without more explicit statutory guidance, this battle will be fought in the courts.

2. Brethren in the Marcellus: The Rights of the General Public in Pennsylvania

Due to the controversial nature of hydraulic fracturing, local populations will most likely attempt to find a means of exerting influence on local drilling activities above and beyond the regulations imposed by State statute. Across New York's southern border in Western Pennsylvania, the hydraulic fracturing "gas rush" quickly created a flurry of action in Pennsylvania courts as various municipalities sought to enact or enforce local laws when drilling operations moved in. As in New York, the governing statute in Pennsylvania purported to supersede local jurisdiction over natural gas extraction. It read: "No ordinances or enactments adopted pursuant to the aforementioned acts shall contain provisions which impose conditions, requirements[,] or limitations on the same features of oil and gas well operations regulated by this act or that accomplish the same purposes as set forth in this act."[156]

But Pennsylvania's attempt to supersede local jurisdiction on questions of drilling regulation was not perceived by the courts as absolute. In *Huntley & Huntley, Inc. v. Borough Council*, Pennsylvania's high court distinguished between provisions imposing conditions on a well's function and those addressing only its location and found that municipalities were capable of enacting the latter.[157] If such a distinction were to apply in New York, municipalities could potentially wield significant power over natural gas regulation, redefining the spacing provisions handed down by the State agency.

New York law, as it stands, does not provide a clear indication of the direction courts will be likely to take. On the one hand, there is *Envirogas, Inc. v. Town of Kiantone*, in which

[155] *Id.*

[156] 58 PA. CONS. STAT. ANN. § 601.602 (West 2011).

[157] 964 A.2d 855, 864 (Pa. 2009).

a court shot down a local bond ordinance cloaked as a zoning provision and levied against drillers.[158] Conversely, there is the more recent case of *Gernatt Asphalt Products, Inc. v. Town of Sardinia*,[159] in which the court arrived at an outcome similar to the function/location dichotomy of *Huntley & Huntley*. In *Gernatt*, which dealt with solid mineral extraction, not gas, the Court of Appeals considered the issue of whether a municipality may use its zoning authority to eliminate mining as a permitted use in all of its districts.[160] Title 27 of Article 23—the same Article that governs gas extraction—contained a supersession provision similar to that contained in Title 3.[161] The court found that general regulations of land use, like zoning ordinances, "are not the *type* of regulatory provision the Legislature foresaw as preempted . . . ; the distinction is between ordinances that regulate property uses and ordinances that regulate mining activities."[162] The court went on to say:

> A municipality is not obliged to permit the exploitation of any and all natural resources within the town as a permitted use if limiting that use is a reasonable exercise of its police powers to prevent damage to the rights of others and to promote the interests of the community as a whole.[163]

Using this reasoning, courts could easily extrapolate that Title 3's supersession provision, with its exception for enactments under the real property tax law, is similar to the one at issue in *Gernatt* and therefore "does not preempt the Town's authority to determine that mining should not be a permitted use of the land within the Town."[164] Theoretically, then, a community that was opposed to the practice of hydraulic fracturing could subvert the DEC's unitization and permitting process by closing off productive land to drilling operations.

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[158] 112 Misc. 2d 432, 435, 447 N.Y.S.2d 221, 223 (Sup. Ct. Erie Cnty. 1982), *aff'd*, 89 A.D.2d 1056, 454 N.Y.S.2d 694 (4th Dep't 1982).

[159] 87 N.Y.2d 668, 664 N.E.2d 1226, 642 N.Y.S.2d 164 (1996).

[160] *Id.* at 681, 664 N.E.2d at 1234, 642 N.Y.S.2d at 172.

[161] *Id.* at 682, 664 N.E.2d at 1234–35, 642 N.Y.S.2d at 172–73; *see also* N.Y. ENVTL. CONSERV. LAW § 23-2703(2)(b) (McKinney 2011) ("[T]his title shall supersede all other state and local laws relating to the extractive mining industry; provided, however, that nothing in this title shall be construed to prevent any local government from . . . enacting or enforcing local zoning ordinances or laws which determine permissible uses in zoning districts.").

[162] *Gernatt*, 87 N.Y.2d at 681–82, 664 N.E.2d at 1234, 642 N.Y.S.2d at 172.

[163] *Id.* at 684, 664 N.E.2d at 1235, 642 N.Y.S.2d at 173.

[164] *Id.* at 683, 664 N.E.2d at 1235, 642 N.Y.S.2d at 173.

A New York municipality might also attempt to circumvent Article 23's supersession clause by exploiting its exception for jurisdiction over local roads. On this subject, a recent Texas case is instructive. In *Texas Citizens for a Safe Future and Clean Water v. Railroad Commission*,[165] the Court of Appeals found that the state regulatory agency's focus "only on the increased recovery of oil and gas" was "too narrow a view of 'the public interest.' "[166] The court required the agency to consider the locality's position on heavy truck traffic on small, rural roads as being contrary to the public interest.[167] The Texas Supreme Court subsequently overruled.[168] The court found that the statute's use of the term "public interest" was ambiguous, entitling the agency's construction of that term to deference.[169] These discordant opinions highlight the ambiguity in New York's statute and the need for legislative clarification. If New York's regulatory agency or courts were to adopt a broad interpretation of the rights of the general public referred to in Article 23, a municipality could properly use its local road jurisdiction to prohibit heavy truck traffic on the roads within a spacing unit. This would effectively deprive the permit-holder of the supplies necessary to conduct operations and prevent either drilling or fracking to go forward.

Whether it is through a land-use prohibition or strict traffic controls, municipal power might readily bring the protection of the rights of the general public directly into opposition with the policy aim of achieving a greater recovery of natural gas. Unless the legislature addresses what, specifically, the scope of Article 23's supersession clause covers and what power remains in the hands of local governments, these questions will be wrestled with in courts on a case by case basis. The time that thwarted extractors will be forced to spend bogged down in litigation with whole counties or individual townships is time they might otherwise spend producing energy resources for the people of New York.

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[165] 254 S.W.3d 492 (Tex. 2007), *rev'd*, 336 S.W.3d 619 (Tex. 2011).

[166] *Id.* at 498.

[167] *Id.* at 502.

[168] R.R. Comm'n v. Tex. Citizens for a Safe Future & Clean Water, 336 S.W.3d 619 (Tex. 2011).

[169] *Id.* at 628–29.

III. RESOLUTION/PROPOSED ALTERNATIVES

This Section offers a series of discrete solutions to the issues raised in the analysis above.

A. A More Inclusive Definition of "Waste"

First and foremost, in light of the unique situation of New York's shale beds in the midst of vital environmental resources, the legislature should amend Article 23's definition of waste to include more than just the loss of potential gas production. If the definition as it currently stands is meant to include more than this limited understanding of waste, its language is not sufficiently specific to make that clear.

The statutory definition of the term waste should be amended to incorporate the broader understanding of the term evidenced in the prdSGEIS.[170] It should include environmental waste and the waste products subject to regulatory disposal standards. These include cuttings from drilling, pit liners, solid residuals, and, most importantly, flowback or produced water.[171] As written, Article 23 fails to address any type of environmental waste. A complete balancing of the various policy aims of the Article requires that environmental waste be considered in addition to the actual loss of gas or the diminishment of potential recovery. The statute should be amended to reflect this additional consideration.

B. Correlative Rights & The Rights of Landowners

1. Compulsory Integration

a. Amendment of Article 23's Policy Aims

The legislature should amend the policy provisions of Article 23 to more accurately reflect that in practice the rights of landowners are subservient to the State's interest in achieving a greater recovery of gas. The mechanism of compulsory integration, where a landowner may decide only how her land will be integrated, not whether it will be integrated, casts this contradiction into sharp relief.[172] A statute that allows for land

[170] *See* PRDSGEIS, *supra* note 26, ch. 5, at 130–34.
[171] *See id.*
[172] *See supra* Part II.B.2.a.

to be compulsorily integrated but simultaneously claims to protect the rights of landowners is at best disingenuous. The clause containing the claim should either be removed or language should be added to clarify that the landowners' rights are protected only to the extent that the landowner is entitled to recover a proportional royalty of revenue derived from use of her land under the correlative rights doctrine.

Alternatively, if the legislature wishes sincerely to preserve the policy aim of protecting the rights of landowners, the practice of compulsory integration must be done away with. Among the rights that landowners possess in their land is the right to keep that land free from industrial drilling.[173] If the State wishes to preserve that right, it cannot compel owners to allow drilling on or under their land, regardless of the interest of the State in greater recovery.

b. The Rights of Operators on Integrated Land

If the practice of compulsory integration is to continue, the legislature must specify what rights operators have over integrated land. Under the terms of the statute at present, operators could conceivably conduct more than subsurface intrusions on an integrated property. The statute does not explicitly prohibit an integrated property being subjected to surface disturbances. As such, an unwilling landowner's property might be used for storage of produced water, storage in open pits of cuttings contaminated with chemical additives, truck access, parking, or even actual drilling. A court finding that the statute allows such activities could deny the landowner any recourse.[174]

As of this writing, no incidents of surface disturbance of integrated land have been recorded. Once the moratorium on hydraulic fracturing in the state is lifted, however, and drilling activities increase, private sector operators will be looking to

[173] *See* Coll. Sav. Bank v. Fla. Prepaid Postsecondary Educ. Expense Bd., 527 U.S. 666, 673 (1999) (characterizing the right to exclude as the "hallmark of a protected property interest"); *see also* Richard A. Epstein, *Property and Necessity*, 13 HARV. J.L. & PUB. POL'Y 2, 3–4, 8 (1990); Lior Jacob Strahilevitz, *Information Asymmetries and the Rights to Exclude*, 104 MICH. L. REV. 1835, 1836 ("American courts and commentators have deemed the 'right to exclude' foremost among the property rights, with . . . leading property scholars describing the right as the core, or the essential element, of ownership.").

[174] *See supra* notes 124–25 and accompanying text.

maximize their profits. Rather than wait for a transgression—or a series of transgressions—to reveal the extent of the gap in the statutory language, the legislature should address the question of what rights permit-holders have over integrated land before the moratorium on fracking is lifted.

2. Subsurface Fracturing and the Issue of Trespass

To save the issue of whether subsurface fracturing constitutes a trespass from a long and arduous period of litigation, the legislature must specify which policy aim it values more highly: landowners' rights or the prevention of waste in achieving the greater recovery of gas. If the legislature addresses that question, resolving the trespass issue is simple. If landowners' rights are to be paramount, any subsurface incursion by fracking should be considered a trespass and the owner should be entitled to recover for the gas extracted from his land by fracking. If, however, the greater recovery of gas is to prevail, subsurface incursion by fracking should not constitute a trespass so long as it is done to minimize waste.[175] Given the high environmental impact of the practice, the New York legislature should adopt the latter approach.

C. Rights of the General Public: A Clear Standard of Local Authority

Finally, the legislature should amend Article 23 to provide local governments with a clear, definitive standard of the jurisdiction they retain under the Article's supersession clause. The legislature could avoid much confusion and a great deal of litigation simply by defining the term "regulation" in that clause, clearly delineating what powers remain available to local authorities. In light of the outcomes of *Huntley & Huntley* in Pennsylvania's high court and *Garnatt* in New York's, lawmakers should anticipate that many municipalities will likely attempt to regulate the location of drilling activities and the traffic to and from drilling sites. In some communities, these regulations may be so strict as to amount to a prohibition on fracking. If it is the legislature's intention to grant local governments that power, an amendment clarifying that intention will be helpful for both local governments and the courts who are certain to hear the

[175] *See supra* Part II.B.3.b.

industry's inevitable challenges to such restrictions. If lawmakers do not wish for municipalities to have that power, an amendment stating as much will deter improper attempts at local regulation and prevent the majority of those challenges.

CONCLUSION

New York's system of regulating the process of hydraulic fracturing under the Mineral Resources Law is both thorough and comprehensive. The system's flaw lies in attempting to achieve policy goals that bear inherent contradictions. Because of the highly controversial nature of the subject, regulation of hydraulic fracturing will continue to receive a great deal of attention as the moratorium on the practice is lifted. With modest effort, New York's legislature can correct a number of the law's internal contradictions and anticipate issues that are likely to arise. The discrete amendments to Article 23 suggested above will save an untold amount of time and resources otherwise certain to be expended by administrative agencies, courts, and the private sector. Given the State's interests in developing its gas fields and preserving its environmental resources, New York's legislature should not hesitate to act.